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TEXTBOOK
of
ABNORMAL PSYCHOLOGY

BY

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FOREWORD

Without reflecting any discredit on the pioneer treatises on this topic, it can fairly be said that the present volume marks the beginning of an epoch. In fact, I am strongly inclined to believe that the volume signals the beginning of the scientific era in abnormal psychology. The authors, it would appear, have produced a work which is in line with the foundations laid by Pierre Janet, and infused with the spirit of the great French pathologist. While the work of Janet has necessarily been restricted to the clinical aspects, the present authors have coördinated therewith the contributions of general and experimental psychology; thus producing a structure worthy of its foundation.

I am impressed, in the first place, with the vast amount of materials collected in this volume. No other book has attempted such a task. Obviously, this is a sharp departure from the conventional type of psychology text, in which "easy steps for little feet" has become more and more the rule. In conjunction with the literature-references, which are of extraordinary definiteness, the book furnishes a starting point from which the really industrious student may branch out into any subtopic in this complicated field.

In the second place, I am impressed with the critical balance of the book. Giving the various *isms* and theories their places, the authors avoid imposing on the reader either *isms* or emotional *anti-isms* (which is more than I can say for my own writings). Without being subjected to the stress of violent iconoclasm, the reader is prepared for immunity to both pseudo-psychological novelties and ancient superstitions.

There are various points of interpretation, of course, on which I should take issue with the authors; and on some of these points I should possibly be right. These features of the presentation, however, increase my appreciation of, and respect for, the whole. The authors, and the psychological profession are to be congratulated on this *magnum opus*, which demonstrates, among other things, that scientifically minded psychiatrists and psychologists can work together in harmony and fruitfulness: for, it should be said, this book has a history which is not superficially obvious; and in that history, Dr. Chapman has played a part of no small importance.

KNIGHT DUNLAP.

FOREWORD

This admirable book is written by two psychologists for students of psychology. It is a splendid work and to my mind the outstanding treatise on the subject today. It is obvious that to its preparation there must have been given long study and painstaking effort, yet one may easily forget this in the readability of the book. The authors have written simply and their presentation of theory and of fact is clear. There is in this volume a remarkable amount of information of great value to the student.

I am not in agreement with the authors in some of their conclusions, but I do agree that the psychologist is not qualified to treat "functional" mental illnesses without the coöperation of the physician, either within or without the hospital. No worthy psychologist or psychiatrist would undertake the treatment of what might seem to be the mildest neurosis without thorough physical examination, the effort to define the possible organic factor. Such an examination having been made and negative findings recorded, the fact remains that one of the most common and swift recourses of the neurotic is to physical symptomatology. The psychologist cannot ignore or adequately weigh such symptoms. He is at a disadvantage.

Granted that the psychiatrist has to act today too frequently on insufficient information both historical and clinical; granted that the psychologist may in many instances bring to patient and physician very great assistance, we pass into dangerous territory when we take mental disease out of the hands of the medical profession. The physician needs all the help he can get in this field. The professions which may contribute to his assistance are many. Nevertheless the directing force must be his. It must not be forgotten that mental illness presents the greatest of all problems in the fields of preventive medicine and the public health.

I look upon these years of association with Dr. Dorcus and Dr. Shaffer with the greatest pleasure. If in some measure the opportunities afforded by the hospital have contributed to the success which is their due in producing this book I am glad. They have also contributed much to our clinical work generally and to the treatment of our patients.

ROSS McC. CHAPMAN.

PREFACE TO FIRST EDITION

The text books in Abnormal Psychology which have appeared in the last ten years are, on the whole, either restricted to a discussion of the purely functional disorders in which the organic aspects are ignored or else they tend to explain all mental abnormalities as having an organic origin. Although previous authors have recognized the inadequacy of either of these methods alone, the attempts at combining the two have not been highly successful. When attempts have been made, the textual material has been too elementary to allow for anything other than a very cursory and brief statement concerning a given topic. This procedure has been necessitated in many instances by the lack of preparation of the students who enter the courses and by the wide range of purposes for which the texts have been intended.

The present writers have purposely ignored the problem of adapting the text to those students whose preparation in psychology and the related sciences is inadequate. On the contrary, this text has been written to fill the needs of advanced students in Psychology, Pre-medical students and Medical students who desire more psychological information. The latter group should find that the material dovetails with their information on Physiology, Neurology and Psychiatry. We have also purposely introduced, wherever possible, scientific terminology rather than popular terminology, since we feel that the scientific terms will be encountered by the individual from time to time in daily life and that a course in Abnormal Psychology should familiarize students with these terms.

The facts and principles of abnormal psychology have been presented by other texts almost entirely apart from the principles of normal psychology. In the present text, the authors have attempted to approach the discussion of abnormal phenomena through consideration of the normal. The symptoms and behavior of the abnormal individuals are not seen as completely new or mysterious ways of reacting but are recognized as exaggerated manifestations of normal functioning. Thus, dissociations of the personality are viewed in the light of the various conceptions of normal integration; and the abnormalities in the attempts at satisfaction of desires are considered through an understanding of the normal functioning of desires.

Our approach has followed along the lines of what has come to be known as reaction psychology. However, eclecticism has been utilized wherever it seemed helpful in the understanding of the phenomena under discussion. This procedure, however, has not involved the adoption of the variant systems of psychology from which particular viewpoints and terms have been drawn for expository purposes.

In most texts, the obvious question as to what is to be done about the abnormalities discussed, seems to be left unanswered. Consequently we have attempted to set forth the major principles of psychotherapy as they are practiced today. It is hoped that this material will not only be helpful to the Premedical and Medical students but will also indicate to the general student the principles which are applicable to the treatment of these conditions and enable them to adjust themselves better to their environment.

ROY M. DORCUS
G. WILSON SHAFFER

Baltimore, Maryland

PREFACE TO THE FOURTH EDITION

The basic organization of this textbook has been retained through four editions. It is the opinion of the authors that it follows closely the outline most frequently used for presenting the principles of normal psychology. The attention of the reader is directed first to abnormalities of the sensory and motor systems, then to disorders of central functions and finally to abnormalities as they are manifest in the total personality.

The present edition includes three new chapters: Brain Damage Disorders, Psychosomatic Disorders and The History of Mental Illness. In the first of those new chapters an effort has been made to tie together the sensory and motor disorders through the central nervous system. This chapter has, therefore, been given over primarily to topographical relationships. Although psychosomatic medicine and the history of the abnormalities were discussed in other editions, the present edition includes separate chapters for both of these topics. In addition to these new chapters, the section on psychotherapy has been rather completely rewritten and throughout the book the results of recent research have been added wherever they seemed most appropriate. Despite the fact that approximately 250 new references have been added, it is obvious that all of the source material available could not be included in a volume that is to remain useful as a textbook. Omission of a discussion of any particular research does not imply that the authors considered it unimportant, but merely that other material seemed to be more useful for this text.

As a result of our own teaching experience and from suggestions made by our colleagues who have used the earlier editions, we have added a glossary and rearranged some of the material to obtain greater clarity for the student. It is the opinion of the authors that these additions, changes and reorganizations will increase the value of the book to the student and research worker in the field of abnormal psychology.

ROY M. DORCUS
G. WILSON SHAFFER

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The writers wish to acknowledge their indebtedness to the late Dr. Knight Dunlap of the University of California at Los Angeles, the late Dr. Ross McC. Chapman of the Sheppard and Enoch Pratt Hospital, and Dr. Frank R. Smith, Jr., of the Johns Hopkins Hospital for their criticisms and suggestions concerning various parts of the manuscript; to Dr. Lawrence F. Woolley of the Sheppard and Enoch Pratt Hospital for his aid in the sections on therapy; to Dr. Robert H. Peckham for preparing the majority of the drawings; to Dr. Vernon P. Scheidt for aid in compiling the first index; and to Miss Virginia Shaffer for her assistance in editing the manuscript. Since the book was first published, a number of our professional friends have pointed out errors that appeared unavoidably in the first edition and have made suggestions concerning the inclusion and deletion of certain materials. We wish to express our appreciation to these friends and to acknowledge especially the suggestions of Dr. Frank R. Pattie, Jr., of Rice Institute and Dr. Edward Girden of Brooklyn College. We wish also to express our appreciation to Dr. John S. Lawrence for reading and criticizing some of the material dealing with pain; and to Dr. James M. Rankin for writing the section in which a recapitulation of some of the psychoanalytic theories are made; and to Dr. Margaret Jones for assistance in preparing the glossary and the table of contents; and to Mrs. Ethel Camarenba and Miss Mary Jane Beam for assistance in preparing the glossary and typing the manuscript material.

Through the coöperation of St. Elizabeth's Hospital, The Training School of Vineland, and The Rosewood Training School, the photographs of epileptic, athetotic and feebleminded patients have been made available.

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CHAPTER I

THE FIELD AND SCOPE OF ABNORMAL PSYCHOLOGY

SELF REFERENCE AS A CRITERION OF ABNORMALITY

In all of the treatises on abnormal psychology, there arises the problem of determining what activities are normal and what activities are abnormal. The solution of the problem becomes imperative if abnormal psychologists hope to offer aid in the treatment of mental difficulties. The fact that no solution has been reached is due in a large measure to our lack of knowledge of the normal individual.

One conception of the norm of life is that often adopted by the physician or psychologist, who takes his own life or some feature of his life as the norm or standard. If this norm is adopted, then that which agrees with it is normal; that which differs in any way is abnormal. That this procedure is fallacious and even dangerous is almost obvious to anyone possessing an elementary knowledge of individual psychology.

The physician or psychologist is likely to have occasional attacks of indigestion, to forget from time to time many important engagements, to dream after eating a heavy dinner, to feel at some time that people are talking about him, or that he is a failure in life. These are experiences common to the abnormal individual and are often regarded as symptoms of abnormality. The physician or psychologist may admit these symptoms in his own case but will interpret them as perfectly normal events, or he may not even think of them. It is only when one of these symptoms becomes exaggerated that the others begin to assume an important rôle in determining a norm. All that this method of approach accomplishes is the establishment of a multiplicity of norms.

Let us assume then that abnormal psychology is concerned with the development of concepts and principles of unusual mental activity, with special emphasis placed upon the relation of these principles and concepts to general, child, and adult psychology. If this definition is accepted and if a separate field is postulated, let us now examine it and see what the field comprises.

It has just been said that abnormal psychology is a study of unusual mental activity, and therefore, any psychological process or response

that differs from the usual must be abnormal. How do we determine what is an unusual activity?

STATISTICAL DETERMINATION AS A CRITERION OF ABNORMALITY

One method involves a statistical determination for each form of mental activity or for each type of response, resulting in the establishment of norms or averages. Then, whenever a particular response fails to come within a definite range on either side of the average or mode for its type, it is to be rated as abnormal. The range selected must by necessity be arbitrary; consequently any interpretation based upon this method of determination must be arbitrary. In common parlance we speak of abnormally tall and abnormally short individuals. In either case the meaning of the term "abnormal" is the same, and the basis for our statement depends upon our judgment of height. Height lends itself accurately to measurement; and if a sufficiently great number of measurements are made, a reliable average can be obtained. That is, the prediction may be made that if another group of individuals of the same race, sex and age are measured, approximately the same range of heights will be obtained and approximately the same average. The distribution of heights presented in figure 1 will be useful for our discussion. The average height is approximately 5 feet, 7 inches. At what point on the scale must an individual fall in order that he may be called "unusually" tall or "abnormally" tall? At what point may he be said to be "abnormally" short? If we arbitrarily select 5 feet, 3 inches as unusually short and 6 feet as unusually tall, then our determination of abnormality becomes quite simple. Stature serves as a convenient illustration of our point, but is in itself of importance in determining the mental activity of the individual in so far as it may or may not indicate a dysfunction of one of the endocrine glands, which produces acromegaly, cretinism, and other diseases. Stature may also influence mental activity if the individual is socially sensitive concerning it.

An examination of a distribution of intelligence tests scores (fig. 2) will be equally illuminating. An average score is obtained for the group; and individuals are classified as geniuses or feebleminded in accordance with the position that their scores indicate. The distribution of intelligence scores in figure 2 does not in itself in any way indicate where the demarcation between normality and abnormality should be drawn. This must be done arbitrarily.

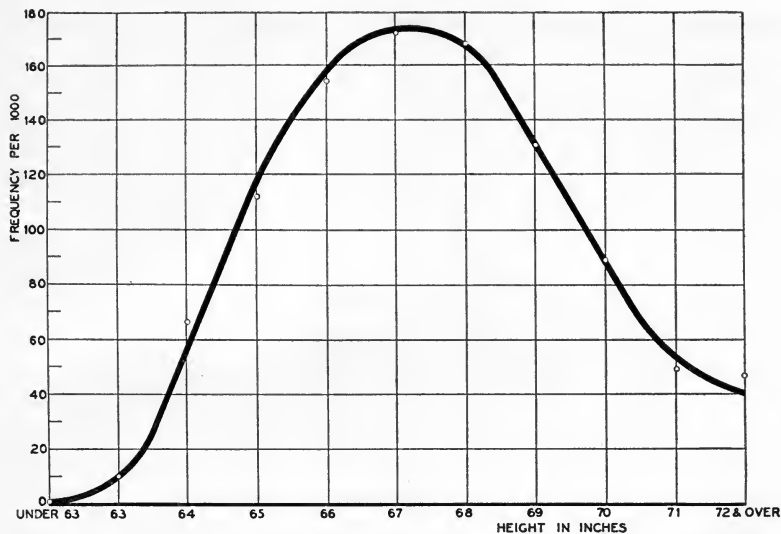


FIG. 1. Height of 304,113 accepted white recruits to the United States Army, 1906-1915. Army Anthropometry and Medical Statistics. F. L. Hoffman. Report to National Academy of Science, Philadelphia, November 21, 1917.

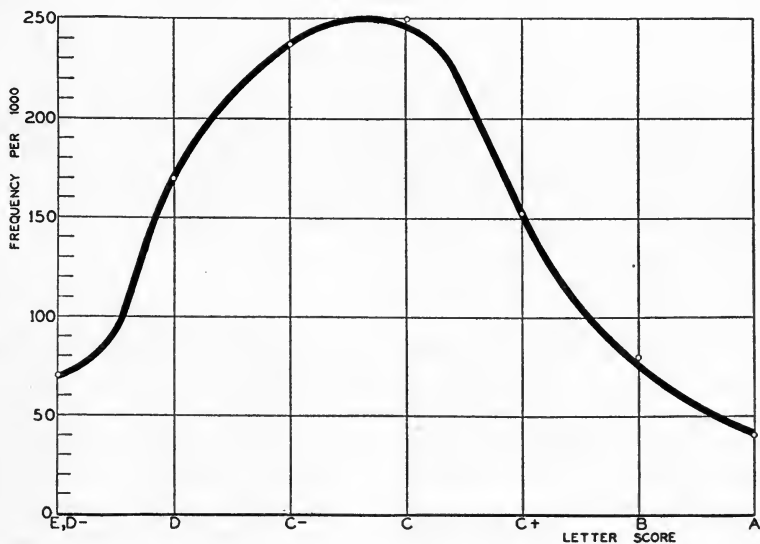


FIG. 2. Letter scores on Army Alpha Test, 94,004 drafted white men. *Memoirs National Academy of Sciences*, Vol. XV, p. 855, table 406.

Intelligence is a psychological concept, whereas stature is a physical concept, but in the case of each the notion of abnormality is a statistical one.

While we have stated that the norm is derived in part mathematically and in part arbitrarily, what we should say is that the average is mathematically derived and serves as a basis for determining the range that is acceptable as normal.

If we accept the average as the norm, then deviation from the average, beyond arbitrarily set limits, constitutes abnormality. A man above the average stature for his group is abnormal. A child above the average for his group in intelligence, is abnormal. The upper limit does not have to be the same as the lower limit. We might, for example, decide that the limits are, for stature in the illustrative group, 5 inches above the average and 7 inches below the average. We might revise this, and set the limits of the normal range at 7 inches above and 5 inches below. If there is no determinant of the norm, other than the average, we can decide upon any range we choose. If there is no good reason for adopting one range rather than any one of a great number possible, then the average would have no value. Obviously, we usually employ some other norm or standard, in addition to the average. This accessory standard may be described in terms of desirability and undesirability, beneficiality and harmfulness, appropriateness and inappropriateness. We may incorporate these apparently divergent criteria under the terms: advantageous and disadvantageous. We may proceed further and say: that which is advantageous is normal and that which is disadvantageous is abnormal. This conception is adequate within the limits imposed in our subsequent treatment. If all mental functions were adaptable to statistical measurement, then the task of determining abnormal conditions would be somewhat simplified. Unfortunately this is not true.

A few examples of psychological functions that do not lend themselves to statistical interpretation are stammering, sex perversions, functional blindness, and loss of memory (amnesia). Any one of these conditions may be exaggerated to a marked degree or may show only a slight deviation from the norm. How badly does a person have to stammer in order to be classified as a stammerer? The question may appear foolish, but actually there are very few individuals who have never hesitated in their speech at some time or other. Most of these people are not to be classified as abnormal, and no arbitrary scale thus far devised is satisfactory for any of the above conditions. In regard to

loss of memory or failure to recall (amnesia), the situation is almost as troublesome, although it should be possible on the basis of our present psychological knowledge to set up a useful scale for this type of deviation.

DEGREE AND KIND OF RESPONSES AS CRITERIA OF ABNORMALITY

There is another complicating factor in the establishment of suitable working norms; namely, that responses or activities may vary in kind and degree. These two aspects of activity may vary concomitantly or they may vary independently of each other. It is desirable to examine this idea further since it will clarify some of the problems arising in the field of abnormal psychology.

In considering that aspect of response which may be called degree, it may be found that a response is of the correct type for a given situation but that it is inadequate since it is not proportionate to the stimulus. For example, the individual who applauds very boisterously and for a long time each comical situation at the theatre, is giving essentially the right type of response, but his reaction is exaggerated.

The kind of response given in one situation may be inadequate in another. The inebriate in a swallow tail coat standing in the middle of the street directing traffic would not be making an inadequate or abnormal response under the circumstances. If, however, a clergyman or street cleaner, dressed in the garb of his occupation should do the same thing, his response would be abnormal or inadequate. Students celebrating a football game behave in a manner that would be inappropriate for certain other occasions. Some of their other responses seem to need careful scrutiny, especially those connected with fraternity initiations. Their activities appear appropriate for the occasion upon superficial examination, but closer scrutiny reveals the fact that their actions resemble the actions of groups who have been swept by hysteria.

The examples which have been discussed are also useful for illustrating certain other features of abnormal psychology. By definition, it was indicated that any unusual mental activity or response is abnormal. This has been interpreted to mean that only those responses which are undesirable belong in the sphere of our discussion. It is true that only undesirable activities give either the individual or society trouble, but trouble in itself is not an adequate criterion for deciding when a particular mental phenomenon is abnormal. An individual with an exceptionally keen memory, or one with tactual hypersensitivity, or an expert wine taster must be considered as belonging to an abnormal class of individuals. The abnormal psychologist must formulate theories

and rules for the origin and development of geniuses as well as explain the genesis of personality disorders. In other words, the extremes or deviations from the average, regardless of whether above or below, are of some interest to our discussion.

If suitable norms could be established for every psychological function and if a suitable conclusion could be reached concerning the deviations from these norms that are allowable for the so-called "sane" individual, there would be still other problems confronting us. Two individuals both of whom have had influenza accompanied by its customary toxic effects may be found to exhibit entirely different kinds of mental reactions. For example: a depression with mental symptoms may occur in one case but not in the other. Two individuals may have been in the same automobile accident; nevertheless, only one of them happens to develop a phobia of riding in moving vehicles. These differences in human reactions must be accounted for in some way. They may be explained on a basis of the individual's past experience or they may be explained by constitutional differences, that is, the mental and physical make-up, as inherited. This line of reasoning indicates the importance of a sound inheritance as one of the main features of mental stability. An example of the relation of inheritance to the responses to normal environmental factors is furnished by the behavior of a particular strain of goats. If a sudden noise is made, they become paralyzed and cannot move. Other strains of these animals do not react in this manner. On a similar basis, the psychotic tendencies of the black, brown, yellow, red and white races might be predictable. There are, in fact, certain mental "racial" differences, but just how far these differences are influenced by environment and training and how far they are "strictly hereditary" cannot be ascertained, although such differences might be expected on a basis of heredity alone.

The interrelation of heredity, biochemistry and environment can be demonstrated readily if we refer to work on some of the lower animals. It is possible to breed strains of rats that are very susceptible to noises that produce convulsive-like behavior. It is possible also to influence the frequency of the occurrence of these convulsive seizures by controlling the vitamin intake of the animals. Furthermore, the appearance of the convulsions will be determined in part by the type of surroundings in which the animals are placed. Thus it is evident that all of these factors act as a whole in determining the kind of response that the animal makes.

SOCIAL AND INDIVIDUAL HARMFULNESS AS CRITERIA OF ABNORMALITY

An aspect of abnormal psychology that may appear somewhat puzzling upon superficial examination is the relation between social harmfulness and individual harmfulness. What is harmful or disadvantageous to the individual may also prove harmful or disadvantageous to the group. However, what is beneficial or advantageous to the individual may prove harmful or disadvantageous to the group. Whether a beneficial or a harmful characteristic is abnormal for a given group is not always determined by the frequency of occurrence of the characteristic in the group. In reference to the preceding statements we may cite: (1) the child who masturbates and continues to play with the group; (2) the criminal who commits a holdup; (3) the prevalence of exophthalmic goitre in regions where there is a deficiency of iodine. In these regions there would be a high frequency of goitre which might be considered normal for that specific group, but abnormal for the population at large.

Closer scrutiny reveals well organized tendencies with respect to our judgments concerning this matter. In general, any trait or any action of the individual will not be considered abnormal by the social group unless it proves to be an annoyance to the group. A man may possess an extraordinary fear of germs that will lead him to excessive hand washing, but society as a whole will pay little or no attention to the peculiarity since it does not interfere with the comfort or the activity of the other members of the group. Another individual may have a loss of sensation in his arm and no social attention will be given to his case. If an individual through perversion of his reasoning processes becomes a political paranoiac, and attempts to alter our political structure, society will demand his incarceration. A speed maniac may be dealt with immediately in a rather drastic way.

Activities that are not harmful to the personal well-being of the individual or that are not injurious to society may go unnoticed for years. The individual who wears bizarre clothes or who wears his hair cut in an unusual fashion may have psychopathic tendencies; but as long as his actions do not become obnoxious he will not be interfered with, although he may be called eccentric. When actions become harmful to the individual, they are usually considered abnormal. If an individual should attempt to starve himself to death, in all probability society would interfere. Attempts at suicide are dealt with by law. Suicide is disapproved of by society, not because it is harmful to the individual

but because of social consequences. The religious taboo⁷ of suicide probably grew out of the notion that life was the property of the tribe or state.

LACK OF APPROPRIATENESS AS A CRITERION OF ABNORMALITY

Social approbation of actions determines to a considerable degree the classification of an individual as "normal" or "abnormal." We do not mean that social approbation itself is necessarily the determining factor, but that the person who cannot distinguish between what is socially approved and what is not, probably lacks in observation or in reasoning ability. Deficiency in one of these aspects is a primary basis for his "abnormal" behavior. We must not fail to recognize that actions which are disapproved of at one era and classified as abnormal, may at another era become the social fashion. Certainly women would have been accused of exhibitionism 20 or 30 years ago if they had appeared in public in the costumes which now meet social approval. Conversation concerning sexual matters between members of the opposite sex, which is now condoned, would have been classified not many years ago, as an indication of degeneracy.

Although we have presented a number of criteria that are used by various people for determining whether an individual is normal or abnormal, no one of the criteria is adequate alone in dealing with the borderline case. Those patients who manifest extreme behavior patterns could be classed as abnormal by any one of the criteria. Behavior is altered and passes by almost minute gradations from the normal or usual pattern to the abnormal or unusual pattern. It is in cases of the less extreme type, that we find it necessary to apply all the criteria available. Our diagnosis may still be in error, unless we possess accurate information concerning the previous experience of the individual, due to the fact that behavior is founded on past experience.

Page and Page (1) have examined the criteria for admission to a mental hospital. They find the following rules have come into general use:

"(1) Does the individual engage in psychomotor, ideational, or emotional behavior that is inappropriate to the situation and out of keeping with his cultural background? Some examples are: delusions, hallucinations, compulsions, mannerisms, psychomotor disturbances, speech abnormalities, talking to self, unprovoked elation or sadness, etc. These reactions, while not necessarily a source of danger to self or others, are regarded by the individual's associates as bizarre, peculiar,

inexplicable, and annoying; and hence are socially disapproved and often feared.

(2) Does the individual exhibit traits detrimental or dangerous to himself, as, for example, does he wander about in a confused disoriented state, does he squander his money, mutilate himself or attempt suicide?

(3) Does the individual engage in activities that are a source of potential or actual danger to the welfare of others? For instance, is he assaultive or threatening toward innocent bystanders, destructive of property, or guilty of sexual and other criminal offenses?"

A breakdown of the various components of behavior is given by the authors in the following quotation: "It was found that 18 per cent of the group engaged in behavior directly affecting the safety and welfare of others, 74 per cent in behavior detrimental to the self, and 99 per cent in actions which, though relatively innocuous, were disturbing to others because of their bizarre nature. Emotional-social and thought disturbances were noted in 88 per cent of the cases. Fifty-six per cent exhibited speech abnormalities, 45 per cent memory defects, and 40 per cent psychomotor disorders. Delusions were the most prevalent of the individual symptoms, with an incidence rate of 46 per cent. Hallucinations were noted in 28 per cent and suicidal tendencies in 16 per cent. Fifteen per cent of the patients were described as destructive or assaultive."

HABIT FORMATION AND ITS RELATION TO ABNORMAL PSYCHOLOGY

A large part of abnormal psychology is concerned with the topic of learning and habit formation. If it may be assumed that the infant develops psychologically by means of activity, it is also fair to assume that in that growth (both mental and physical) some malformation and malfunctioning may occur. It has been clearly demonstrated for animals and birds that many of the so-called instinctive or inherited activities are not inherited at all, in the popular sense of the word "inherited." For example: the cat's "instinctive" tendency to catch mice and rats has been shown to be learned. The tendency for chicks to pick at small objects, and their ability to stand alone seem to be dependent upon movements which have occurred earlier in the shell. In children, most of the "instinctive" tendencies are purely mythical. Sucking, fear of animals, and many other forms of activity are learned. In the process of learning, many good habits as well as many bad habits are acquired. The individual is constantly faced with the problem of destroying or breaking down the bad habits, and replacing these with

desirable habits. Much of the difficulty with humans, then, involves the inability to destroy these undesirable habits. The important problem is not one of recognizing the unwanted habits, but it is one of finding a suitable means of combating them. Bad habits are of every psychological type. Faulty habits of perceiving (illusions); faulty habits of thinking (delusions); faulty habits of feeling (apathy, etc.); and faulty habits of acting (stammering, functional paralysis); are acquired as development occurs. This classification is not complete; more will be said of these disorders in later chapters. The acquisition of faulty habits is not limited to the developmental period; they may be substituted for correct habits which have already been established. The importance of habit formation in abnormal psychology is so great that it is not apt to be overemphasized.

ABNORMAL PSYCHOLOGY AND PSYCHIATRY

In the past some writers in the field under discussion have attempted to distinguish between this field and psychiatry. In many instances, the distinction has not been clear-cut. Perhaps those who have not separated the two fields have been deliberate in their action, since the distinction becomes progressively more difficult as more information is secured by research in both fields. Investigators in the field of psychology are constantly demonstrating the interrelation of mental activity and physiological and organic conditions. Likewise, research in the field of medicine is supplying us, almost daily, with additional facts demonstrating the influence of nutrition, bacterial infection, circulatory failures, and pathological changes in neural tissue and in the various vital organs, on mental activity. With this close relationship, it is perhaps undesirable to approach any of the biological sciences from too widely divergent points of view. The importance of the statement will be more significant as the reader masters some of the later chapters in the text. Although the distinction between psychiatry and abnormal psychology is difficult to make, since both psychologists and psychiatrists must deal, by necessity, with the same material, the behavior of human beings, there are certain practical distinctions that are useful. Abnormal psychology was defined, or rather described, as the science which formulates the rules and principles applicable to unusual forms of behavior. In contrast with this, psychiatry deals with the diagnosis, classification and treatment of mental diseases. It might be expected on a basis of these definitions that psychiatrists would be concerned only with treatment and that abnormal psychologists

would be concerned only with formulating hypotheses and submitting these to tests. In practice, both groups must engage in both types of work. In any case, the psychologist must insist on a thorough physical examination by a competent physician in order that organic conditions may be ascertained. This is necessary not merely to check the organic basis of the mental condition but also to reveal the detailed condition of the organism. Medical treatment in conjunction with the psychological adjustment will often be required. Many people think of psychiatric work in terms of hospitalization with "crazy" or insane individuals, without realizing that all varieties of nervous patients are treated under it. Stigma may become attached to any one who seeks advice or treatment from a psychiatrist or a psychiatric hospital. This notion, of course, is not justified but nevertheless prevails. Psychiatry from the lay point of view deals primarily with cases needing hospitalization. The same attitude does not prevail toward psychologists. This is due to the fact that psychologists have not been associated by the public with hospitals in which violent or very disturbed cases are kept.

ABNORMAL PSYCHOLOGY AND SOCIAL PSYCHOLOGY

In discussing the relation of the other sciences to abnormal psychology, we are confronted with a somewhat similar situation. No one science is sufficient unto itself. The main differentiation is a matter of emphasis. Sociology, clinical psychology, social psychology, neurology, and mental hygiene are interrelated with each other, and they are also closely related to abnormal psychology and psychiatry.

In social psychology, there are many concepts that play a very important rôle in the formulation of theories and explanations of group life and group activity, which are also of the utmost importance for the field of abnormal psychology. If some of these concepts are examined, and their usefulness in both fields pointed out, clearness will be more readily attained.

A phenomenon important in both fields is that of suggestion. Suggestion has been used to remove hysterical symptoms; it has also been used to explain the causation of these symptoms. Here, we are dealing with both individual and social behavior. Strangely enough, Tarde has developed a whole system of social psychology in which he explains groupings and group action on a basis of suggestion. The founding of one of our large religious denominations (social group) had its origin in the demonstrations of hypnosis by Braid and Quimby.

Another concept common to social psychology and abnormal psy-

chology is that of the instincts. The dynamic function of instincts (urges, impulses) in the psychology of Freud and the analysts is well known. McDougall, Trotter, and Veblen have attributed to the same concept the formation of our complex social structure and social laws. Trotter's book on the *Instincts of the Herd in Peace and War*, and McDougall's *Social Psychology*, are excellent examples of the use of instinctive tendencies for explaining social interaction. Even family adjustment and family problems become involved in this situation. Freud's Oedipus and Electra complexes are typical examples of abnormal behavior arising from instinctive tendencies, while some social psychologists postulate mating on a basis of paternal or maternal instincts. It is not the purpose of the text to go into the validity of these statements at this point. It may be said, however, that instincts as factors in both social and abnormal psychology are fast becoming obsolete.

Crime, since Lombroso, has been one of the favorite topics for workers in both the social and the abnormal fields, some viewing it from the criminal or abnormal side, others as a social situation aggravated to a considerable degree by sociological factors.

Social psychology is a study of groups and is concerned with the individual only to the extent that social groups are composed of individuals and in so far as grouping influences individual reactions. Two illustrations by Lindemann¹ (2) show clearly the source of the factors at work in formulating group laws and group action. These also indicate some of the material which the social psychologist must explain (if possible), or at least must arrange in an orderly way.

In an extremely backward rural community of the Middle West, there exists a particularly stubborn resistance to change in agricultural practices and methods, a resistance that is not common to the surrounding communities. A recurrent phrase used by the residents of this community whenever confronted with a proposal emanating from the "outside" gave the clue to this community mind set. The natives met each approach, whether of the commercial agent or the representative of the agricultural college, with a suspicious response accompanied by the term "Bohemian oats." Investigation revealed that this phrase originated more than a half a century before, when an unscrupulous salesman had sold what he pictured as a superior brand of oat seed to the fathers and grandfathers of the present generation. The agent named his seed "Bohemian oats" and upon the basis of the claims that he put forth, agreed to buy five bushels of seed from each farmer at harvest time for each bushel sold to the farmer. The whole transaction was a fraud and the salesman was later apprehended and sent to prison. But "Bohemian oats" became a tradition in this community that endured for three generations and so far

¹ Lindemann has presented both the situation and comment.

conditioned the behavior of its residents as to cause a distinct differentiation between it and its neighboring communities.

Comment: The abnormal feature of this situation lies in the fact that an attitude of suspicion toward the outsider—which is, of course, normal enough for pioneer communities—was perpetuated as a tradition and ultimately became a folk myth. Consequently, it not only conditioned the conduct of residents, but actually shut them out from evolving experiences. Community mind sets of this sort furnish the basis for gradients of community development. They begin as rational reactions to disappointing experiences and culminate as irrational fixations toward whole areas of possible experience.

In a one-factory town the president of the corporation and his wife, being public-spirited persons, have supplied both the initiative and the resources for practically all community projects. They were instrumental in services of the Y. M. C. A., the Y. W. C. A., the Red Cross, a dental clinic, and so forth. Whenever anything new happens in this community, its origins may be traced directly to this industry and to the president or his wife. In recent years, however, this industry has suffered reverses; the president and his wife spend diminishing portions of each year in the community and increasing portions in travel. Some of the social and recreational services that they initiated have already disappeared and others are sustained with difficulty. It now becomes necessary to appeal to the citizens for support, but such support is invariably lacking. Indeed, the residents now reveal attitudes of hostility toward their former benefactors, and the community as a whole sinks to lower and lower levels of responsibility and activity.

Comment: As in most instances of paternalism, this community illustrates how a normal community process may become abnormal, when those with superior resources assume too much responsibility. Such persons invariably prevent the community from developing its own resources and thus, in the end, undermine its capacities. The fact that persons thus demoralized should come to feel contempt for their former benefactors is thus easily understood as a part of abnormal human relations. Over-solicitude extended to communities may have the same consequences as those visited upon the child by his over-protective mother.

ABNORMAL PSYCHOLOGY AND SOCIOLOGY

Sociology is intimately related to abnormal psychology. Sociological factors (living quarters, finances, size of families) play an important rôle in the lives of everyone. It is also obvious that these factors are of the utmost importance in determining the behavior and attitude of individuals. No psychologist or psychiatrist would be willing to undertake the treatment of a maladjusted individual without having information on these points. Crime, which was mentioned earlier, has been held to be due almost entirely to environmental factors. Patients in mental hospitals as a result of monetary losses due to a depression illustrate admirably the influence of sociological and economic conditions on mental life. Evidence reported by Landis (3) and others indicates that although economic conditions may be one of the con-

tributing factors toward mental illness, no appreciable increase of patients in mental hospitals resulted from the last depression. More recent evidence presented by Landis and Page (4) shows that the incidence of mental disorder is related to the bed capacity and facilities of hospitals rather than to war and depression. The information presented in figures 3 and 4 shows that since 1910 there has been no serious

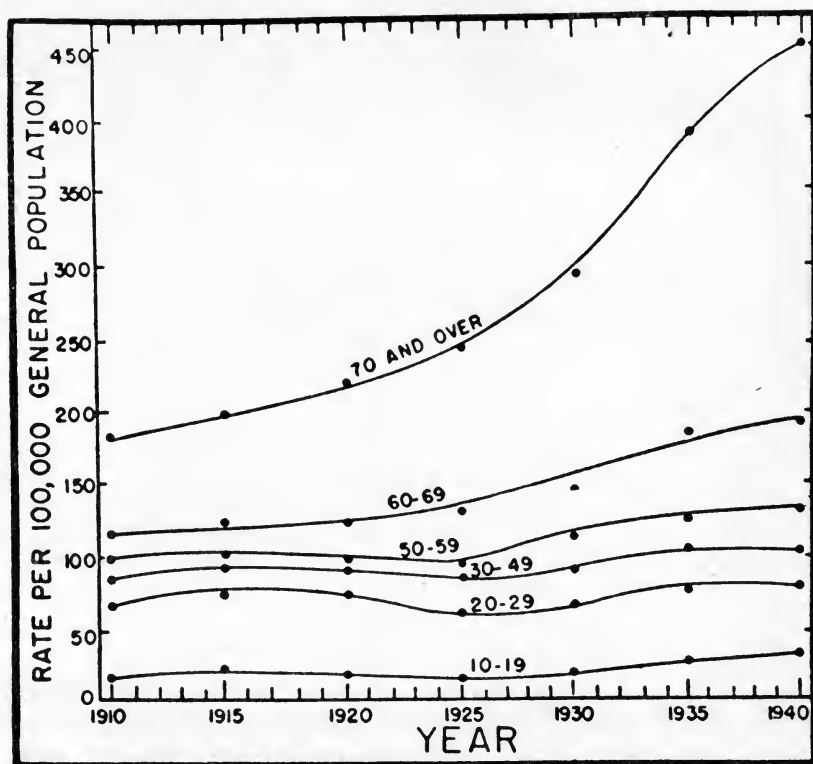


FIG. 3.

peak of admissions for any age group and for any particular type of mental disorder with the exceptions of those over 70 years of age and cases diagnosed as cerebral arteriosclerotic. The increase in the older age group represents better physical care at earlier age levels and more liberal admission practices, while the increase in the number of cerebral arteriosclerotics probably can be explained on a basis of shifts in psychiatric diagnosis. Whether prohibition has an influence on the

incidence of alcoholic psychoses is not clear. Nineteen twenty (pre-prohibition) was one of the low incidence years. This low rate was not maintained with the advent of prohibition. The incidence rate started climbing and approached a high level prior to the 1920 period.

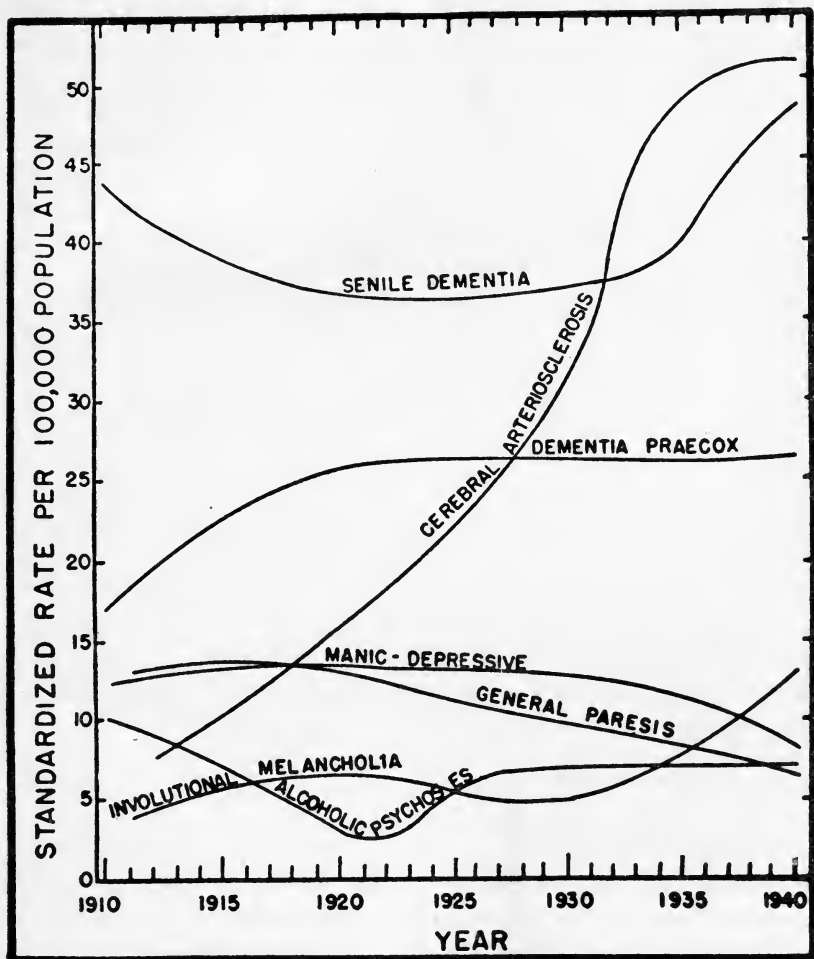


FIG. 4.

There is a tremendous volume of literature dealing with the impact of the war on the incidence of mental disorder. The major portion of the literature tends to show that there is little evidence to support the notion that war in itself results in a greater incidence of mental disorder.

There is some evidence to the contrary. Some classes of disorder tend to decrease in number. The magnitude of the problem and its social implications can be readily seen when we point out the fact that of every 1000 registrants examined for the draft in this country 43.7 cases were rejected because of mental or neurological disability (5). These figures do not include the cases rejected because of mental deficiency. The incidence is still higher if those cases are included who are subsequently discharged from the army before reaching combat zones. Woodward (6) reports that of 80,607 selective service men discharged prior to combat action, 26,000 or about 32 per cent were dismissed because of mental or nervous disorder. Are these cases caused by the war and army service or are these the result of inadequate psychiatric selection at the time of induction? The opinion is expressed in this report that about 75 per cent of the draftees who suffer mental breakdown during the training period had mental illness of varying degrees

TABLE I

Rejections for psychiatric disorders in communities of different sizes

Semi-rural communities.....	11.6%
Towns.....	8. %
Small cities.....	9.4%
Medium sized cities.....	9.8%
Large cities.....	12.4%

of severity before being inducted into the army. These results are in line with the conclusion drawn earlier in this chapter and are supported by the careful study of Hemphill (7) on 354 civilian cases in England. He found that of 354 cases admitted to a mental hospital in 1940, only 29 could be attributed to the war. He states, in addition, that pre-existing family life or constitutional taints may have rendered these individuals more susceptible to mental disorder.

Other areas in which sociologists have made contributions to our understanding of mental disorder are exemplified by studies of population densities, income levels, occupational prestige, national origins of peoples, cultures, and related topics. A brief summary of the influence of these factors on the incidence of mental disorder will aid in bringing them into perspective. It has been found by Hyde and Kingsley (8) that rejection for mental disorder among selectees for the draft in Massachusetts varied with the size of the community and population density. The rejection rate was highest in semi-rural communities and in large cities. This relationship is presented in table I.

There is in addition, a tendency, according to Blockman and Klebanoff (9) for migration of certain types of the mentally disordered from one kind of area to another. Schizophrenics migrate towards rural environments, while manic-depressives migrate towards urban environments. It has been suggested that the rural areas allow the withdrawn schizoid to continue his withdrawn isolated existence, while the cities tend to provide the excitement demanded by the manic-depressive groups.

Investigations by Hyde and Kingsley (10) show that whereas only 7.3 per cent of inductees were rejected from the best socio-economic level, 16.6 per cent were rejected from the poorest type of socio-economic level. These varying levels contribute also in differing degrees to the various classes of mental disability. Income and occupational prestige are tied in with socio-economic level and with population density, since a study by Clark (11) of some 3000 first admission mental hospital cases (schizophrenics) indicates a correlation of $-.80$ between occupational prestige and the admission rate for that occupation. Job prestige is closely associated with income. Some of the reasons suggested for this relationship are:

- a. Personality make-up of these patients handicaps them in job competition and promotion
- b. There is greater job security and satisfaction in higher grade jobs
- c. Choice of jobs, and the individual's own estimate of worth is influenced by income

The social psychologist and the sociologist, in their consideration of personality development, stress the social forces that impinge upon the individual. It might be expected therefore that attention would be directed toward the problems of the foreign born. Since their customs, language, and self-isolation build up frustrating barriers, the hypothesis is logically developed that we might expect a higher incidence of mental disorder. Studies have been published on this general thesis by Hyde and Chisholm (12), Klopfer (13), Malzberg (14), and Lemert (15). First admissions to mental hospitals show that foreign born exceed the native born by a high percentage, but when the percentages are corrected for age and environment (rural vs. urban) the difference is about 8 per cent. If a new culture constitutes a real barrier to adjustment, then the children of parents who are foreign born should show an incidence rate of mental disorder approximating that of the native population. This thesis has been verified on total first admission rate as well as first admission rates for specific types of disorder.

In comparing the influence of culture systems on the incidence of

mental disorder, studies have been made of primitive peoples, almost all nationalities and religious groups. Carother's study (16) will illustrate the general approach. A comparison has been made of the incidence of mental disorders in Kenya Africans with the incidence of mental disorder in American Negroes. The comparison is presented in table 2.

TABLE 2
Admission proportions in percentages

TYPE OF DISORDER	KENYA AFRICANS	AMERICAN NEGROES
	%	%
Organic psychoses.....	32.4	47.
Epilepsy.....	3.6	3.1
Mental deficiency.....	11.6	3.8
Psychopaths.....	3.0	9.0
Schizophrenia.....	28.7	27.3
Paranoia.....	2.0	3.2
Manic-depressive psychoses.....	3.8	8.3
Involitional melancholia.....	1.4	.4
Psychoneuroses.....	2.1	1.8
Unclassified psychoses.....	11.3	4.7

TABLE 3
Percentages of rejectees

NATIONALITY	PSYCHOPATHS	PSYCHO-NEUROTICS	CHRONIC ALCOHOLICS	MENTAL DEFECTIVES
	%	%	%	%
Negro.....	16.3	6.7	2.2	11.7
Chinese.....	1.2	5.9	0.0	24.5
Italian.....	4.5	3.8	1.2	3.9
Irish.....	5.9	2.5	3.0	1.2
Portuguese.....	2.4	4.1	.6	3.1
Jewish.....	2.5	5.2	.2	.9
Old American.....	1.5	2.7	.4	.7

Table 3, from Hyde and Chisholm, gives data on individuals from various national groups who were rejected by screening examinations for army service.

The data in tables 2 and 3 are not directly comparable, since the data in table 2 are derived from those cases admitted to hospitals, and the

data in table 3 are derived from non-hospitalized cases. The comparison points, however, to cultural differences which influence both incidence and variety of mental disorder.

ABNORMAL PSYCHOLOGY AND MENTAL HYGIENE

Mental hygiene is a relatively recent development. Its purpose is to inform the public of the correct rules for sane mental living. It should serve a purpose similar to that of preventive medicine which develops and applies diphtheria toxin antitoxin. In other words, it has a preventive function. The educational program of mental hygiene must fill the place of a course in abnormal psychology for the majority of the population. Mental hygienists are advocates of parent training so that incipient neurotic conditions will be detected in childhood, believing that by proper training methods these incipient cases will be avoided.

An approach to this is illustrated by a study of the problems arising in an average high school population (17). Students were asked to answer the following questions:

1. Have you ever had asthma, hay fever, hives, or allergies?
2. a. Have you ever stuttered?
b. Do you stutter occasionally?
3. a. Do you attend mixed social gatherings (of boys and girls)?
b. Have you ever had a date with a member of the opposite sex?
4. Have you ever had kidney trouble? If so, has it been within the past two years?
5. Are you bothered by nightmares, intense fears, by walking or talking in your sleep?
6. Does the excitement of examinations affect your eating or sleeping?
7. Are you bothered by "choking" spells, i.e., shortness of breath and pounding of the heart when excited?
8. Do you have to watch your diet because of pain before or after eating?
9. Have you ever had a falling spell (fit)?
10. Have you ever had fainting or dizzy spells?

About 50 per cent of the high school juniors and seniors reported one or more of these symptoms. Since such a large part of the population has experienced these symptoms, it would seem imperative to find out how such symptoms are reflected in behavior and personality development. There is little evidence, however, to show that such manifesta-

tions prevent the affected individual from meeting the demands of high school life. There was found also very little correlation between behavior deviation of other kinds, physical findings on medical check-up, and the occurrence of the types of symptoms in the questionnaire. The study is important even in the absence of positive findings, since it represents an attempt to screen out possible problem cases in the young population. Mental hygienists advocate training to cover many other fields of adjustment, so that adults may be better able to meet the emergencies which arise in their mental life. This work has been attempted in many of the clinics for child guidance. Since many habits are not already formed and since children are more pliable than adults, a vast amount of work may be accomplished in teaching desirable habits of living in the early years. It must be emphasized that the effort is one of instilling correct mental habits in normal individuals in contrast with the work done by the psychiatrist, who attempts to alter or change habits that are faulty and well fixed.

ABNORMAL PSYCHOLOGY AND NEUROLOGY

There is one other field that is directly related to the topic of abnormal psychology and which is the source of some confusion to many. This is the field of neurology. Neurology is a study of the structure and growth of the nervous system, including the brain, spinal cord and the receptors of the special senses. It treats of the various types of cellular structure and their physiology. In its narrower meaning the function of the brain and neural pathways is outside of its sphere. By function is meant what is ordinarily treated in general psychology under the topics of perceiving, thinking and associating or learning. It is to be expected that the psychologist and the neurologist should have a competent understanding of both fields. It also happens that both must from time to time use the methods and techniques belonging to the other. In determining whether certain conditions such as paralysis, blindness or anesthesia are the result of a lesion in the neural pathway or whether they are the result of a functional disturbance of the associating mechanism, recourse must be had to both the neurologist and psychologist. In the case of "glove anesthesia," for example, a condition in which there is psychological loss of sensation of the hand, following approximately the area covered by a glove, the neurologist can definitely say that it is not organic, since the loss of sensation does not conform to the known ramification of the nerves of the hand. The neurologist cannot say, however, what factors are involved in producing

the condition, nor prescribe the treatment to be administered, since no medicament has been discovered for treating such cases.

The foregoing treatment of the various sciences should enable the student to form ideas of the relations between them. It should also enable him to recognize some of the limitations of each science.

ABNORMAL PSYCHOLOGY AND PSYCHOSOMATIC MEDICINE

Psychosomatic medicine is a term that has come into popular use in relatively recent years, although the basic concepts underlying the term are almost as old as the scientific approach to medicine. Nearly all of the older scholars in the field of psychiatry recognized the fact that emotional disturbances might produce either temporary or permanent changes in organic structures or in physiological functions. The majority of the somatic changes that arise are in those areas or functions under the control of the autonomic nervous system. Disorders such as hypertension, stomach ulcers, cardiac and circulatory impairment, skin lesions, and dysfunction of the endocrine glands are usually discussed in the literature dealing with psychosomatic medicine. The problem is one which will be discussed more fully when organic versus functional disorders are reviewed.

CHAPTER II

SENSORY DISORDERS

SENSORY DEFECTS: GENERAL CONSIDERATIONS

We distinguish sensory abnormalities from perceptual ones on the grounds with which you are already familiar in the common distinction of sensation and perception. Those perceptual disorders which are due specifically to abnormalities of a sensory mechanism are usually classified as sensory disorders. That is to say, a sensory abnormality is one in which the primary cause is to be found in a defect or faulty function of the sense mechanism.

The defect may be any one of several types:

a. Congenital defects exist from birth. An example of this sort is deafness due to the incomplete development of the cochlea of the ear. The receptor mechanism necessary to receive auditory stimulation does not form when the other parts of the body develop in the fetus. Myopia may be congenital. The eyeball is not properly formed in its development. Congenital defects of other senses are found.

b. Defects may be due to injuries inflicted by mechanical or chemical agencies. Blindness due to the thrusting of something into the eyeball, or the splashing of acid in the eyes falls in this category. Such injuries are said to be *traumatic*; that is, from a wound.

c. Disease is a frequent cause of sensory defect. Deafness may be caused by scarlet fever; blindness by syphilis. Tubercular disease of the spinal cord produces disordered touch sensation.

d. Degeneration of organs and tissues not strictly due to disease, is a cause of sensory defect. Senile degeneration comes under this class, as well as deterioration of vision and of hearing common in old age. Degeneration of sense organs, or of other parts of sense mechanisms may occur, however, in middle life, or even in youth.

e. Defects are caused by toxins. Toxic injury shades into traumatic injury on one side, and into disease effects on the other, but it is useful to place some conditions in the toxic class. Wood alcohol, for example, taken into the system by drinking or inhalation, may produce blindness, or if less severe, color blindness. Tobacco has been suspected of injuring the sense of taste and the sense of vision.

It is obvious that if any sense is abnormal, perception through that sense must be abnormal. On the other hand, persons with normal sense mechanisms may have abnormal perception. In hysteria, the patient may be blind, but the sense of vision be perfectly normal. The hysterical person may be tactually anesthetic, or analgesic, on certain areas of the body, although the sense mechanisms for touch and for pain are not defective or injured. Such abnormalities, although they involve abnormal sense perception (or lack of sense perception) are not classed as sensory abnormalities, but as perceptual. By sensory abnormality or sensory disorder we mean strictly abnormality due to defect, injury, degeneration, or poisoning, of the sense mechanism.

The sensory disorder may be localized in one of several places:

a. In the sense organ or the accessory structures. For an example, blindness may be due to injury to the eyeball, which is the sense organ of vision. Deafness may be due to injury to the cochlea, which is the sense organ of hearing.

b. In the afferent or sensory nerve. An instance of this is if the optic nerve is injured, or degenerates, visual disorder is caused. Injury to afferent nerves running from the skin to the spinal cord may cause disorder of touch and the temperature senses on the areas of the body supplied by the nerve affected.

c. In the brain stem, or the spinal cord. All sensory nerves enter either the spinal cord or the brain stem, and through these structures are connected with the brain. Injury or degeneration of the spinal cord or the brain stem may cause sensory disorder.

d. In the sensory centers in the cerebrum. Each sense has its receiving "center" in the cortex of the cerebrum. Injury to the center for a sense may cause disorder in that sense.

In many cases, it is not possible to discover the locus of the sensory disorder. It has been assumed, for example, that color blindness is due to an abnormal condition of the retina; that is, it is localized in the sense organ. This, however, may be questionable. The trouble may be in the cerebral center of vision or even in the brain stem.

Sensory disorder has mental effects on the person similar to those of bodily malformations. The person is excluded from full advantage of certain phases of life. If one of his senses is defective, he does not perceive as normal persons do, his sensory contents being limited or distorted. He is therefore limited with respect to the materials for his more complex mental life. Thinking depends upon sense perception, and sense data which you cannot perceive you cannot think about.

The seriously color blind man cannot know the world of colors as other persons do. His esthetic appreciations are limited by his defect. The deaf person may suffer even more. Not only does he fail to perceive the rich content of sounds which normal persons perceive, but he may be precluded from receiving information conveyed by the speech of other persons. The total effects of these limitations vary for different individuals. In some cases, they are serious matters, causing further mental disorder. In other cases, the effects of the limitation are less important. A sensory disorder may be a primary cause of further disorder in a given person. Secondary causes may also be at work determining the character and severity of the disorder.

The results of the individual's knowledge of his sensory abnormality may be a serious factor in enhancing disorder. Knowledge of a definite sensory disorder, such as partial blindness or partial deafness, may breed further causes of disorder. This is also true of bodily defects.

The person may think that others regard him with scorn, contempt, or even merely as inferior. If he is treated with especial consideration and kindness, on account of the defect, his condition may be as pointedly emphasized as if he were laughed at or struck.

We might expect an individual with a particular sensory defect to develop an abnormal condition with the sensory defect as the primary cause, especially if the condition is coupled with secondary causes derived from improper evaluation of the defect. Some people become seriously depressed and morbidly timid; others develop a truculent attitude or become apathetic.

A few examples from the many that may be cited will illustrate the importance of sensory defects in shaping the mental life of the individual.

An individual who had been studying art for some time began to make rather grotesque combinations of colors; it was found upon subsequent testing that he was color blind. The emotional response to this situation readily developed into a morbid condition. In fact, it meant that the individual's life had to be altered and his cherished ambition had to be cast aside.

Another individual was refused an automobile driver's license because of a deficiency in hearing. Not only was that individual deprived of the personal satisfaction of driving but his social contacts were narrowed and competition with members of his own sex for one of the opposite sex was made more difficult.

Loss of sensation in the genital organs was even more disastrous for the sex experience and marital adjustment of the person so afflicted.

It is not hard to conceive of the withdrawal of this person from social contacts and the consequent development of a depression.

Deprivations of the other senses are not so important for the social life of the individual and are not likely to bring about as marked conflicts with the desires and feelings of the person.

RATIO OF SENSORY DISORDERS IN NORMAL AND ABNORMAL PEOPLE

In obtaining a complete picture of the abnormal individual it is desirable to compare the percentage of sensory defect occurring in psychopathic individuals with the percentage of the total population which manifest such defects. The approximate percentage of people who manifest defects of the two most important senses is given by Sydenstricker and Britten (18). They found from examining 100,000 records of the Life Extension Institute that 57 per cent of native born males had some kind of defective vision. Tests were made with the Snellen and Jaeger charts. Defective hearing was present in 15.9 per cent. A defect was noted if the test with the whispered voice gave less than 10 for either ear. The publication of the White House Conference on Child Health and Protection gives an estimate of 20 per cent of visual defects and 14 per cent of auditory defects among school children.

Recent data (5) obtained from examination of men in the selective service procedure throws additional light on visual and auditory defects in the adult population. About 12 per cent were rejected because of visual defects and 5 per cent for auditory defects. These figures are lower than those given above since the standards were less rigid and since the age groups involved were more restricted.

For the psychopathic group, our knowledge of the defects of the special senses is slight. Using as a basis for estimation the frequency of visual and auditory defects among 100 unselected male cases admitted at the Sheppard-Pratt Hospital, the following percentages have been obtained. Thirty-eight per cent of the patients showed visual defects and 10 per cent of the cases showed auditory defects. More significance could be attached to the findings for the normal population as well as to the findings for the psychopathic group, provided an analysis of the types of defect was made. In both groups the defects range from a slight deficiency to a total loss of both senses.

A comparison of the percentage of auditory and visual defects for the psychopathic and normal population does not throw much light on the significance of these disorders in producing psychotic conditions. Adler has maintained, nevertheless, that sensory and organic deficiencies

are paramount in influencing mental activities. In speaking of neurosis, Adler suggests that the individual goal of superiority is the determining factor. The goal, however, always originates in—and is strictly conditioned by—the actual experiences of inferiority. In his earlier works, he held that these experiences of inferiority originated in organic inferiority. Farnsworth (19) has attempted to ascertain the merits of the Adlerian thesis by comparing certain sensory capacities of groups of children and adults who have or do not have musical and artistic ability. He examined the auditory acuity and the color weaknesses of different groups and found that those who were superior in musical and artistic ability were not inferior in auditory acuity and color sensitivity. These facts do not substantiate Adler's thesis.

It should be pointed out, however, that sensory deficiency of any kind may leave some influence on the further mental life of the individual.

For the other special senses, including the cutaneous, the olfactory, the gustatory, the vestibular, the kinesthetic, the somatic and the visceral, no figures are to be had which would enable one to make a determination of the frequency of defects. This lack of information concerning the normal and psychopathic groups prevents the presentation of a complete picture.

Malzberg (20) states that the rate of mortality at corresponding ages is from 3 to 6 times as great among patients with mental disease as among the general population. This may be expected, since many cases with mental disease have other pathological conditions, such as arteriosclerosis, general paralysis and disease of the central nervous system. Even those cases which fall into groups that are described as functional also show a higher mortality rate than the rate for the general population. Although functional types of mental disease cannot be shown to have a specific organic origin, we may, on a basis of the information available, suspect some constitutional inferiority as a contributing factor. Kaplan (21) has reviewed the literature relative to the rôle of the nervous system in aging. His study on life expectancy of low grade mental defectives indicates that incapacities directly associated with mental deficiency seem to be a minor cause of death and that "intelligence" *per se* is not essential to longevity.

TERMINOLOGY FOR SENSORY FUNCTIONS

In the subsequent treatment of the sensory material, some of the technical names of the modal senses in table 4 will be employed.

TABLE 4

Technical names of modal senses

I	II	III	IV
Taste	Gustation (Geusis)	Ageusia	Gustatory Geusic
Smell	Olfaction (Osmesis) Ospphresis	Anosmia (Anosphresia)	Olfactory (Osmetic) Ospphretic
Sight	Vision (Opsis)	Anopsia	Visual Optic Optical
Hearing	Audition (Acusis)	Anacusia	Auditory Acoustic Acoustical
Touch	Tact (ion)	Anaphia	Tactual Haptic
Pressure sense	Baresthesis	(Baranesthesia)	Baresthetic
Warmth sense	(Thalposis)	(Athalposia)	(Thalpotic)
Cold sense	(Rhigosis)	(Arrhigosis)	(Rhigotic)
Tickle sense	(Gargalesthesis)	(Gargalanesthesia)	(Gargalesthetic)
Vibration sense	Palmesthesis	Palmanesthesia	Palmesthetic
Pain sense	Algesis	Analgesia	Algetic Algesic
Vertigo sense			Vertiginous
Movement sense	Kinesthesis	Akinesthesia	Kinesthetic
Sexual sense			Voluptual
Fatigue sense			

In the first column of this table the common English names are given; in the second column, the more technical names derived from the Greek or Latin; in the third column, the terms for the absence of sensitivity, that is, for the absence of responses to the data of a given sense. The fourth column includes adjectives applying to the sensitivity and to the sense data. The introduction of certain other terms at this time will also facilitate the comprehension of the text. These terms are used as prefixes in abnormal psychology and psychiatry, and some of them occur in non-technical language. The list of these prefixes includes:

a-, absence of	macro-, large
ab-, away from	micro-, small
dys-, faulty	syn-, together
hemi-, half	para-, disordered; accessory to;
homo-, similar	closely resembling
hyper-, increase	-itis, inflammation (suffix)
hypo-, decrease	

Although a complete list of the modal senses has been presented, not all of them will be treated in detail in this chapter. Since some of the proprioceptive and interoceptive sensations can be discussed more advantageously along with desires and feelings, they will receive consideration later.

VISUAL DISORDERS

The defects of the special senses include anatomical and functional conditions. The anatomical or organic deficiencies of the visual sense consist of those of the lens system, the receptors for chromatic and achromatic light, and lesions of the optic nerve or sensory cortex. Functional deficiencies may manifest themselves in any one of numerous ways. It is sometimes difficult to decide without comprehensive laboratory tests which variety is involved. The main distinguishing feature of the functional type lies in the fact that no organic or anatomical defect can be detected. Hurst (22) explains functional disorders of the special sense on a basis of a sticking or retraction of the dendrites at the synaptic connection. His point of view has been criticized by other theorists. His theory as well as the objections to it will be amplified in our later discussions. It must be remembered that for all of the special senses both organic and functional disorders have been found.

The variety and percentage of visual disorders found among the registrants for the draft are presented in table 5. It is obvious that

TABLE 5

DEFECT	PER CENT
Eyes.....	12.35
Blindness, bilateral.....	.07
Blindness, unilateral.....	.58
Amblyopia.....	.31
Blindness, partial.....	.16
Vision defective or insufficient.....	1.6
Astigmatism.....	.58
Hyperopia.....	.18
Myopia.....	1.75
Errors of refraction, other, unspecified.....	3.08
Ptosis, eyelid.....	.09
Cornea, diseases of.....	.29
Choroiditis.....	.03
Phthisis bulbi.....	.01
Iris, diseases of.....	.04
Synechia.....	.04
Night blindness.....	*
Retina detached.....	.02
Retinitis.....	.09
Color blind.....	.10
Optic nerve, diseases of.....	.06
Exophthalmos.....	.13
Glaucoma.....	.01
Cataract.....	.21
Aphakia.....	.02
Pupillary abnormalities.....	.22
Strabismus.....	.77
Nystagmus.....	.15
Congenital anomalies of eyes, lids.....	.03
Eye, injury.....	.22
Eyelids, injury.....	.01

* Percentage is negligible.

lens defects or defects of acuity afford the greatest number of cases in vision. In many instances the relation of the refractive power to the distance separating the retina from the crystalline lens is at fault. The abnormalities arising from this source are called hyperopia and myopia. They are designated by the lay person as farsightedness and nearsightedness respectively. Figure 5 shows where the image falls with relation to the retina under normal conditions and also under the abnormal conditions specified.

It will be noted in the hyperopic eye that the image normally falls behind the retina; this is caused by the unusual shortness of the eyeball or the refractive power of the lens. In myopia, the opposite condition occurs. The eyeball, being unusually long, causes the image to fall in front of the retina. There are two other types of ocular disorders ordinarily associated with lens defects. These are astigmatism and presbyopia. The former is due to irregular curvature of the lens which produces greater refraction in one meridian than in the other; the latter is due to hardening of the crystalline lens which prevents accommodation for near and far objects.

The conditions are clinically detectable and may be partially corrected by the insertion of the proper type of lens before the eye. Hyperopia may be corrected by convex lenses; myopia by concave lenses and astigmatism by lenses with cylindrical curvature. Presbyopia may be partially corrected by the proper kind of lenses. The type required will depend upon the nature of the visual difficulty.

Among elderly people, near vision may be lost; far vision may be intact. Cases of this type may be corrected by lenses for a particular distance or small range of distances. For another distance, other lenses must be used so that the image will be brought to a clear focus on the retina. Kratz (23) attributes myopia to excessive demands on accommodation, on convergence, and to weakness of the sclera. Only when myopia is associated with astigmatism, neurasthenia, or muscle imbalance can improvement through training be expected. Two studies indicate improvement may be expected in about 30 per cent of such cases.

The best controlled study on the effects of training on visual disability resulting from myopia is that reported by Woods (24) of the Wilmer Clinic. One hundred and three patients with uncomplicated myopia were subjected to careful visual tests before eye exercises were introduced. The training was supervised by an expert in the technique and

the patients were retested at the clinic upon completion of the training. The results were as follows:

- Group 1 (30 patients) showed a low grade improvement on all visual acuity charts
- Group 2 (31 patients) showed a low grade over all improvement
- Group 3 (32 patients) showed no improvement
- Group 4 (10 patients) showed a decrease in acuity

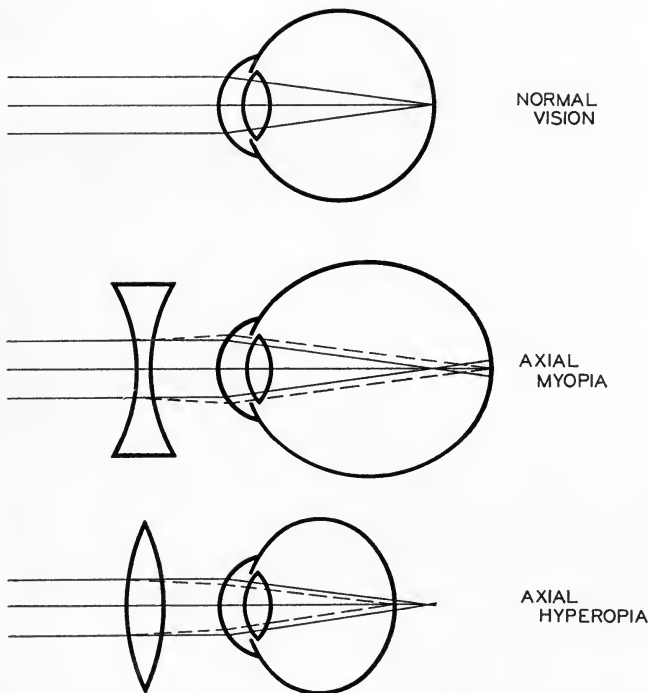


FIG. 5. Spherical error due to anatomical defect in the shape of the eye-ball. The solid rays are the uncorrected incident rays. The dotted rays are the corrected refracted rays. The lenses used are those of such power that the refracted rays come to a focus on the retina.

A less frequent defect which is closely associated with the partial loss of accommodation is known as asthenopia. This is the inability to maintain muscular contraction because of muscle weakness. When the ciliary muscle becomes weakened so that accommodation cannot be maintained, blurred vision or a reduction in acuity occurs. This type is called accommodative asthenopia. The same phenomena result

when the external muscles of the eyes become involved (muscular asthenopia). Objects appear hazy on the retina since the eye comes to rest for only a very brief time. Morgan (25) offers another explanation for disorders of accommodation of certain kinds. He postulates changes in the mass of the ciliary body due to improper functioning of the vascular tonus mechanism.

In some cases, muscular weakness may be restricted to a specific muscle causing squint or strabismus. Various forms of squint or strabismus may occur, since any single muscle or certain combinations of muscles may be involved. When certain muscles become involved divergent squint arises; when other muscles are involved convergent squint takes place. In cross-eyedness or strabismus, when both eyes appear to be turned to the right, the internal rectus muscle of the right eye and the external rectus muscle of the left eye are affected. Correction for asthenopia depends upon the nature of the causal factors. Convex lenses will relieve the strain on the ciliary muscle where the difficulty involves only one focal distance. In the case of strabismus, lenses which will force the eyes to be moved more to the median plane for clear vision sometimes strengthen the muscles, when the individual is not too old. An operation in which a few fibers of one muscle are cut may also relieve the condition. Shure (26) reports that in 65 adults on whom surgery was performed, 60 gave very favorable results. In certain cases the difficulty is not with the muscle. The lack of innervation cannot be corrected except by building up the whole organism through proper physical hygiene.

Diplopia or double vision is the result of paralysis or weakening of the external muscles or the internal muscles of the eyes (see fig. 6). In animals with monocular vision this phenomenon could not occur, since it is dependent upon the images of the two eyes falling on non-corresponding points of the retina. It can be demonstrated in the normal individual by holding a finger about 18 inches before the eyes, with the tip of the finger just below a small dot on the wall, at several feet distance. By converging on the mark on the wall the finger tip may be seen double, and by converging on the finger tip the dot will appear double. It is theoretically possible that individuals with a very low order of intelligence may suffer from this difficulty, since in normal depth perception this becomes ignored through a form of development or learning. Bielschowsky (27) has discussed the etiology of squint and double vision and tends to place emphasis on an additional factor; namely that of central fusion. He has shown from a study of 289

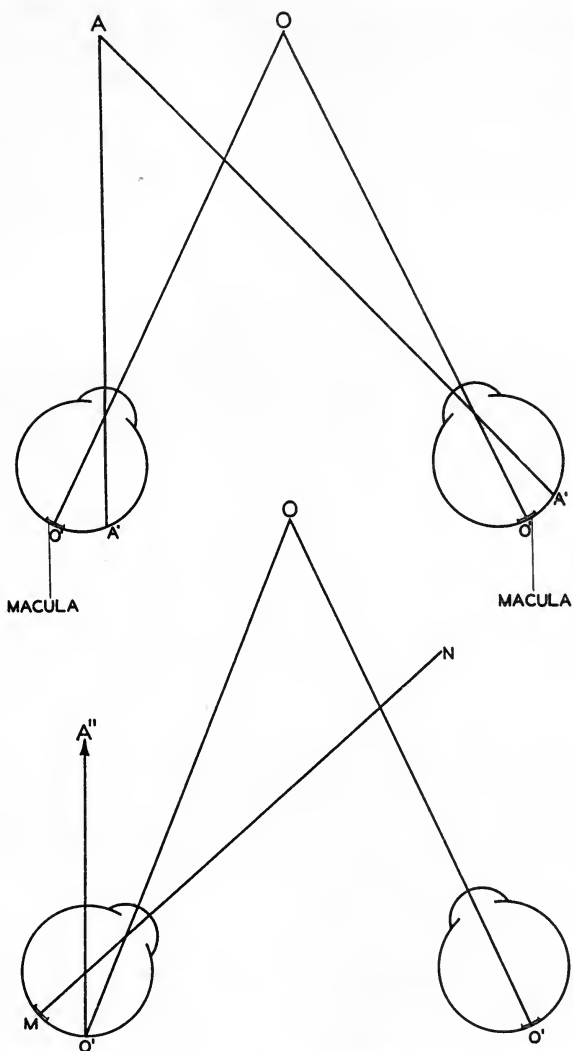


FIG. 6. Illustrating normal binocular vision and the cause of diplopia in convergent strabismus. The upper figure shows two eyes converging normally upon the object O , in such a manner that its images, O' , O'' , are focused on the maculae. Another object A to the side of O will have its retinal images at A' , A'' . Hence, images at A' , A'' will be interpreted as coming from an object at A , while the images on the macula come from O . The lower figure illustrates a convergent strabismus. Note that while one eye is focused normally upon the object, the other eye is turned in. The line $M-N$ represents the optical axis of the turned-in eye. Light from O now falls on one side of the macula. Images falling upon this portion of the retina are projected as coming from one side, and hence one eye perceives O in its normal position, the other eye perceives O projected toward the position A'' .

cases that strabismus may result from injury or blindness of one eye. He also maintains that muscular weakness or abnormal innervation will not be sufficient by themselves to produce anything other than a temporary strabismus.

Thus far, we have been concerned with defects of vision that depend in part upon muscular deficiency. There are many other types of defect that arise from organic factors in the retina, the optic nerve, and the central visual area. In Bridges' (28) classification, the disorders that fall in the above categories include amaurosis, amblyopia, hemianopsia, concentric narrowing of the field of vision (tunnel vision), scotoma, and color blindness. The form of disordered vision that is most familiar is blindness (anopsia). The term anopsia is a general one used to cover a wide variety of light sensitivity deficiencies due to almost any cause. Since the term anopsia embraces many variant conditions, more precise terminology will be employed in our discussion.

Light sensitivity may be completely lost in one or both eyes; for the whole visual field or for only part of the visual field. If vision is lost in one or both eyes for the whole visual field, it is called monocular amaurosis and bilateral amaurosis respectively. While no demonstrable lesion of the nervous mechanism is found in such conditions, it is generally held that systemic disease or perhaps nerve degeneration affecting the retina, the optic nerve or the visual center of the cortex is responsible.

Amblyopia refers to dimness of vision without organic lesion of the eye and is employed sometimes synonymously for amaurosis. Mahoney and Linhart (29) report 13 cases of hysterical origin. They think that the etiological factors are to be found in the inability of individuals to cope with their environment. The common features encountered in the cases mentioned were a life long history of poor eyesight, uncorrected vision, concentric narrowing of the field of vision, and a characteristic personality. They were immature emotionally, resigned, and poorly endowed mentally. These latter characteristics are at variance with those reported later in this chapter by Bender. Corneal anesthesia is often concomitant or occurs alone. Miller (30) has examined a large group of hysterical patients and reports that out of 69 such cases all but 5 had bilateral corneal anesthesia.

In some cases, blindness for the central portion of the visual field is found, while vision in the peripheral field is intact. This condition is known as central scotoma. The person thus afflicted cannot see an

object lying along the optic axis but can see objects lying outside of this central area. The reverse of this situation is encountered in concentric narrowing of the field of vision (tunnel vision). The central field is visible, but the peripheral limits of the field of vision are reduced. Thus objects lying in the periphery are not seen, and numerous traffic accidents have been attributed to this cause. Although Charcot and Janet considered tunnel vision a stigma of hysteria, Hurst (31) states that Babinski and Morax do not corroborate the findings of these earlier investigators. They hold that in hysteria the symptoms arise from suggestions received during examinations. Baird (32), in experiments carried out years ago, attempted to demonstrate that Charcot and Janet were correct in contending that concentric narrowing of the field of vision was associated with hysteria. He measured the color zones of 1 hysterical and 5 neurasthenic patients with a campimeter. The results of the tests on the patients when compared with those of 3 normal cases supported the contention of Charcot and Janet. It should be pointed out that the number of cases was too few to be significant and that the objections of Babinski and Morax were not eliminated. The symptoms may be produced by neuritis of the optic nerve or by pressure exerted on the visual area by a brain tumor.

Bender and Furlow (33) have described the psychological phenomena encountered in a soldier six months after injury to the calcarine cortex of both occipital lobes. After being completely amaurotic, vision returned in the peripheral fields with residual large bilateral central scotomas. During the recovery period there was good perception of motion, defective color vision, little appreciation of form, and ability to see best in low illumination. All of these visual functions are characteristic of peripheral portions of the retina. He possessed normal psychological filling in the field of vision, thus perceiving objects as a whole. He retained a subjective central point in the blind area which made it difficult for him to realize that central vision was lost. There was a gradual reorganization of this field of vision when a few functional fovea was formed. Subjective visualization of emanating "waves" and fluctuation of attention was present.

The symptoms in this case contrast clearly with those found by Halstead (34) with other conditions. He has encountered poor peripheral vision in patients after removal of a lobe of the brain and in individuals subjected to intermittent anoxia caused by high altitudes. Transitory peripheral loss is also found in lobotomy.

Removal of the symptoms depends upon their origin. Operations for the removal of brain tumors are successful in some cases; removal of the toxic sources will relieve inflammatory conditions.

In figure 7, the loci of the possible lesions in hemianopsia are shown.¹ A lesion of the optic tract posterior to the optic chiasma results in the loss of vision in the temporal half of one eye and the nasal half of the other. Loss of vision of this type is almost always organic in nature, although a functional loss may occur among the rare group of individuals who have a knowledge of neurology. If there is an actual lesion nothing can be done to restore vision. If the disorder is of a functional nature associated with hysteria, psychological analysis may relieve the condition. Various methods of analysis for functional cases will be set forth in a later chapter. Experimental work by Hilgard, Cohen, and Wendt (35, 36), has demonstrated that conditioned eyelid reactions and conditioned verbal reactions can be obtained from hysterical patients by the method of reinforcing and inhibiting the eyelid reflexes. When stimuli are presented to the blind area, responses are gradually elicited. These responses are in contrast with the results obtained from patients with organic hemianopsia.

The point at which the optic nerve enters the fundus of the eye is ordinarily referred to as the blind spot. In pathological conditions of the retina or of the neural structure of the optic nerve and brain, there may be other areas insensitive to light or color. These areas are technically called scotomata. They may be detected by the use of a perimeter or campimeter. They are less likely to be of psychological origin than many of the other visual disorders.

It is often found upon clinical examination that there is no actual blindness, but reduced or dim vision, for the whole or for part of the visual field. In this reduced or dim vision, a distinction is made between that due to cataract and that due to amblyopia.

A cataract is a clouding of the crystalline lens of the eye, occasioned by the deposit in the lens of a substance such as a calcium salt or sugar. Recent experimental work indicates that such deposits are partially dependent upon vitamin deficiency. In many cases, the cataract forms late in life. It begins with a slight cloudiness, and progresses, sometimes over a period of years, to a density which makes the pupil of the eye appear milky or white to another person. This not only reduces to a low degree the light transmitted to the retina, but also,

¹ For a detailed study of the neural structure and neural tracts involved, the student is referred to *Nerve Tracts of the Brain and Cord*, by William Keiller.

by diffusing the light as does milk glass or ground glass, makes vision of the forms of objects impossible. The person with a well developed cataract can see light, but cannot see objects. His vision is somewhat like that of one with a piece of white paper over each eye.

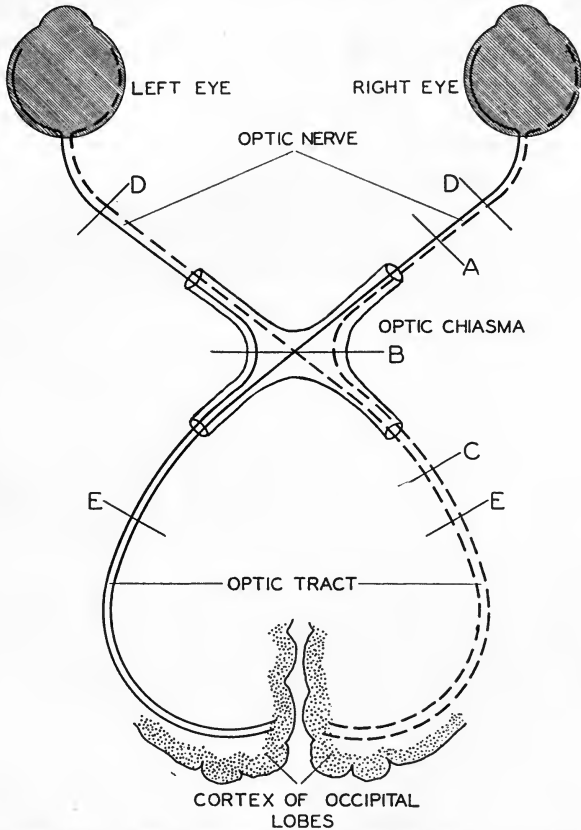


FIG. 7. Scheme showing semi-decussations of optic nerves. Pulvinar and geniculate commissures omitted. Lesions at *A* would produce monocular blindness, at *C* hemianopsia, at *B*, or at *D-D*, or *E-E*, total blindness. The left visual field is shown as dotted, the right as solid.

In a few cases the cataract is congenital. The deposits in the lens have formed during the intra-uterine life, and the babe is born unable to see clearly. These cases are sometimes described as being blind from birth; but the condition is not blindness. The visual mechanism is usually normal, except for the mechanical screen which cuts down and diffuses the light.

Cataracts usually form in both eyes nearly simultaneously; but in some instances, the cataract develops in one eye in advance of the other, although before the one has reached its final density the other is on its way. Conditions favorable to the development of cataracts are diminished metabolism, a decrease in membrane permeability and a loss in ascorbic acid.

The cure for cataract consists in a surgical operation by which the clouded lens is removed. The person is then provided with spectacles with lenses to compensate for the natural lens. He has vision which is normal for objects at a certain distance from the eye; but since the power of focussing or accommodating the eye is lost with the removal of the crystalline lens, he requires other lenses for other distances.

Dimness of vision due to conditions in the retina, in the brain, or in parts of the visual apparatus between the eye and the brain, is called amblyopia. In amblyopic vision, efficiency is lowered because the sensitivity to light is reduced but not because of refractive errors. The different forms of amblyopia correspond to those of blindness; that is general, central, concentric and irregular amblyopia. Certain toxic substances such as wood alcohol, arsenic, lead, quinine, and the poisons from uremia may give rise to optic neuritis which is responsible for the condition. In many cases, the actual cause of the disorder is unknown. It is found in some cases of hysteria and hence functional origin is postulated as a possible cause.

A few persons have apparently normal vision in daylight and in relatively bright illumination, but are amblyopic in twilight or dim light. This peculiarity of vision is termed hemeralopsia. It is sometimes assumed that the causative factor is the absence of rod cells or a deficiency of the visual purple since the rod cells function predominantly in dim illumination. Barondes (37) stresses the varied causes of this disorder and points out that spastic disorders of the retinal arterioles may be responsible. Use of vasodilating drugs may then correct some types of hemeralopsia by changing the vascular condition. Vitamin A and riboflavin in massive doses has been found to be effective in overcoming this disorder in a large number of cases. Stewart (38) approaches photophobia (undue sensitivity to light) and hemeralopsia from a functional viewpoint. These conditions are attributed to a feeling of inadequacy in persons of low intelligence; and in persons of superior intelligence, to an obsessional meticulousness in work which the individual knows could be performed perfectly by others who are less able. The visual conditions are therefore defenses. While this explana-

tion may hold for some cases, it seems untenable for those cases that certainly seem to have their origin in organic bases such as fever conditions and avitaminosis.

A disorder of vision that is relatively innocuous but a source of annoyance and controversy is color blindness. The term color blindness has been used rather indiscriminately by some people. There are certain statements usually made about the varieties of color blindness that need modification. Instead of having distinct types such as the totally color blind, the red-green blind and the blue-yellow blind, there is a graded scale ranging from the normal, through the color weak to the totally color blind. The totally color blind are achromopsic, that is, all of the colors of the spectrum appear to these people as different shades or intensities of gray. On a basis of the Young-Helmholtz theory of color vision it is supposed that light of any wave length excites all three color processes of the color blind in a balanced ratio. Some theorists hold that the cone cells are entirely lacking while others maintain that the cone cells and rod cells are in a permanent state of equilibrium.

The partially color blind are referred to as parachromopsic. In this category are included the red-green blind and the blue-yellow blind. The red-green blind may be further subdivided into deuteranopes and protanopes. The scientific terminology is relatively unimportant, but the essential differences between the two types should be understood. Both the protanope and deuteranope tend to see low saturations of red and green as gray or yellowish. Furthermore, the spectrum appears to have only two colors, namely blue and yellow. These colors lie on either side of the red-green band which appears similar to daylight. The main difference between these two classes occurs in the extremely long wave length of the spectrum. To the individual with normal eyes, light having a wave length of $760 \mu\mu$ (red) is visible; to deuteranopes the total length of the visible spectrum at the red end is visible but is seen as yellow; to protanopes, the extreme end is not visible even as yellow. The exact amount of shortening of the spectrum varies for individual cases. In the case of blue-yellow blindness, if there are any true cases of this variety, the supposition is that confusion between blues and yellows occur. The only portions of the spectrum visible to this group would be the reds and greens. Figures 8 and 9 show discrimination sensibility for hues and distribution of luminosity for different kinds of color blindness. The explanation of vision in the various types of color blindness will depend somewhat upon the theory

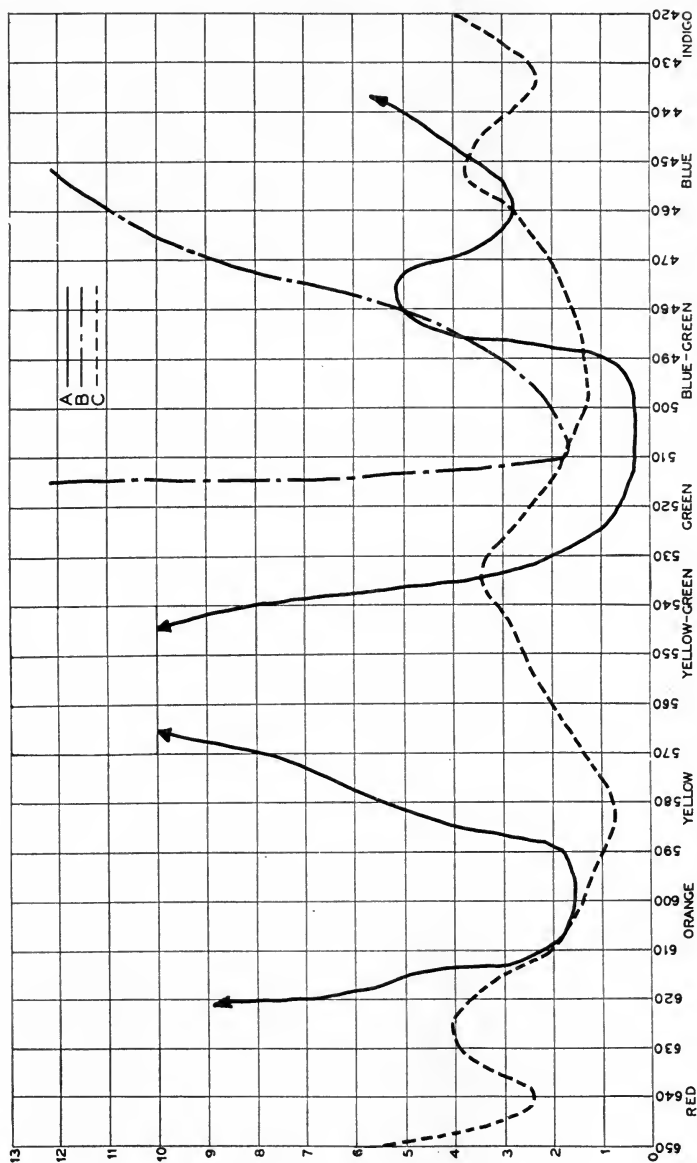


FIG. 8. Discrimination sensibility for hues. Abscissae, wave-lengths of colored light; ordinates, differences in wave-lengths capable of being discriminated (JND) in units of 10. Curve A: Protanope. Curve B: Deuteranope. Curve C: Normal trichromat. (Data from Steindler's curves.) For example, the sensibility of the normal trichromat in the region of yellow, at about $580=7$; this means that the normal trichromat should report a JND between 580 and 587, or between 573 and 580. Note the high sensibility of the protanope for pure green and blue-green, from about 520 to 495. The color range for the deuteranope is limited to the region between about 515 and 457, with color perception only for deep green and blue-green.

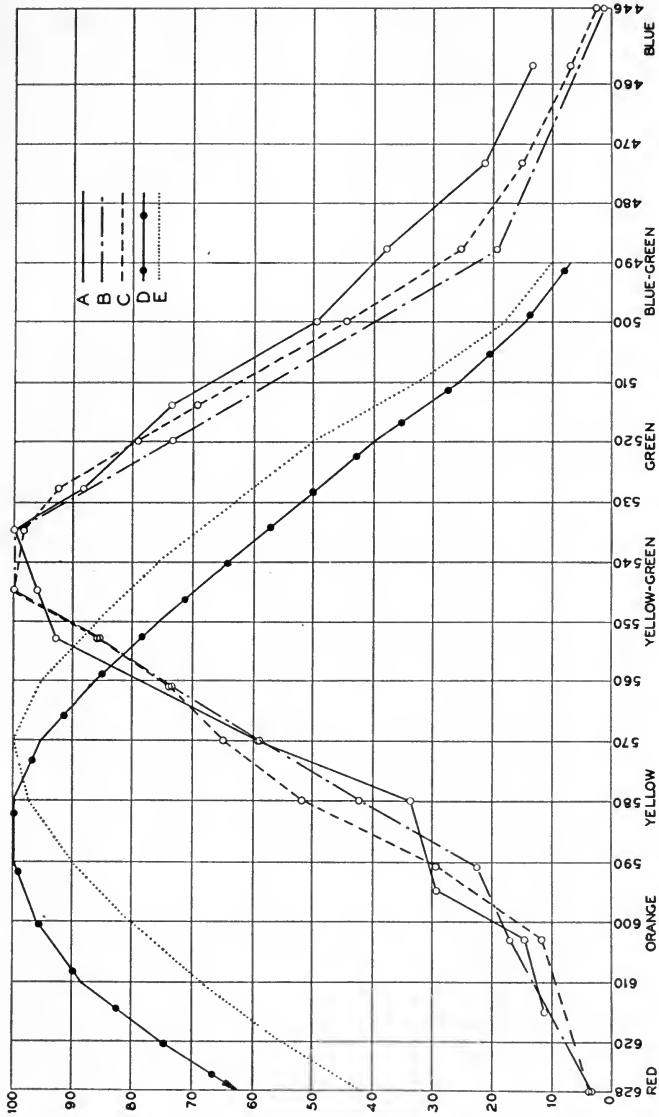


FIG. 9. Distribution of retinal luminosity. Abscissae, wave-length of colored light; ordinates, relative percentage of luminosity. Curve A: Total color-blindness (Nagel). Curve B: Total color-blindness (von Kreis). Curve C: Twilight vision of deuteranope (Nagel). Curve D: Photopic luminosity for normal trichromat (Watson). Curve E: Photopic luminosity for red-weak anomalous trichromat (Watson).

of color vision adopted. In terms of the Young-Helmholtz theory, the red and yellow green processes are both stimulated equally when ether vibrations of the correct wave length for either red or yellow green impinge on the retina, thus producing gray. Blue-yellow blindness has been explained in a similar manner.

The cause of color blindness is a controversial question. Inheritance has long been considered as the primary cause. This thesis is based on genetic studies in which the ratio of the incidence in the two sexes has played a prominent part. It has been reported from various studies that there are about 4 times as many color blind males as there are color blind females. These figures would seem to favor a sex-linked recessive gene, since these are the proportions that would normally be expected. However, we must consider that color blindness is arbitrarily defined in terms of a particular test. Some individuals fail on plate tests (Ishihara, Stilling, A.O.I. Tests) and pass yarn tests. Others have normal ability to discriminate hue using a spectrometer as Hamilton, Briggs and Butler (39) have shown. They found that 50 per cent of those who are deficient on the Ishihara had normal wave length discrimination on a spectrometer. Scheidt (40) has found that many cases with optic neuritis and retinitis fail on both yarn and plate tests. Johnson's work (41) on rats indicates that color vision deficiencies may be expected in avitaminosis A. Histological studies revealed that in the retinas of rats suffering from a deficiency of vitamin A, there was a degeneration of visual cells, the internuclear layer, the pigmented epithelium, and the internuclear layer. If the degeneration had not progressed too far, 3 or 4 weeks of therapy repaired the damage. Some diabetics show a color deficiency which tends to improve with insulin therapy. Burt (42) has called attention to the relation between eye-color and defective color vision. His study indicates some relationship and he proposes 3 possible explanations: (a) a genetic linkage, (b) pigment metabolism, and (c) light absorption of certain spectral bands by the eye pigment. In addition, retinal pathology and systemic poisoning have been postulated as causes. If all of these factors enter into the production of different kinds of color blindness and if an individual is color blind on one test and not on another, it is difficult to accept the genetic theory, except possible in limited types of cases which have as yet not been specified.

In recent years the controversy has been raging as to whether color blindness can be alleviated. The controversy was initiated by the work of Dunlap and Loken (43) in which they reported that some cases

of deficiency responded to vitamin A therapy alone or to a combination of vitamin A therapy and cobra venom. There have been numerous investigations, some tending to confirm, others to negate the results of Dunlap. LeGalley and Harrison (44) are among the proponents, while Elder (45), Richardson and Kinard (46), Hamilton, Briggs and Butler (39), and others, are antagonistic. The preponderance of the data tends to demonstrate that color discrimination either on color blind tests or on a spectrometer is not improved. Melville (47), and Dvorine (48) assign any improvement to training with colors or to better brightness discrimination.

The analytic approach to functional color blindness is exemplified by the case presented by Fodor. Fodor (49) reports a case of total hysterical color blindness in a 29 year old patient in which recovery was partially made under analysis: The analyst was able to determine that he had once possessed normal color vision but had lost it under difficult environmental circumstances. He had been severely punished by his teacher at school for attempting to contact the sexual organs of a female school companion. The patient was locked in a dark closet and for all he could figure out he was blinded in punishment for this misdeed. Some time after the kindergarten incident, red vision was blotted out, since this was the color of the female genitals. Subsequently vision for green was lost, probably due to homosexual relations with an older man by that name. How vision for the other colors came to be lost is not clear. We see in this case how the dynamics underlying the condition were determined by the analyst.

It is probably not safe to assume that color blindness has no higher frequency among psychotic patients than among the population at large in view of Hrdlicka's (50) investigation and that of Kaplan and Lynch (51). The latter tested 403 cooperative mental patients with the Ishihara and Stilling charts. The results are presented below:

	SCHIZOPHRENICS		MANIC DEPRESSIVES	
	Males	Females	Males	Females
Total color blindness.....	2.7%	.7%	7.7%	.0%
Red-green blindness.....	17.9%	1.4%	7.7%	.0%
Red-green color weak.....	12.1%	2.4%	.0%	10.5%
Without color defect.....	67.2%	95.2%	84.6%	89.5%

While the ratios of the two sexes vary from those usually reported for the normal population, no satisfactory explanation is available. The differences in the two classifications are likewise not readily explained. Neurotic disorders have been suspected of contributing an undue number

of color blind cases. Dunlap (52) has found that many of his color blind cases have neurotic symptoms. Malholm (53) tested with the Ishihara Test 165 asthmatic males and 192 males afflicted with hay fever. The incidence of color blindness in the total group was 8.4 per cent. The evidence tends toward the fact that mental disorder is accompanied by a somewhat higher incidence of color deficiency than is encountered in the normal population.

The importance of the various vitamins for normal visual activity is such that a brief summary at this point would help the student to obtain a better over-all picture. Hahn (54) has worked out these relationships.

Vitamin A: is found in the cornea. It aids in maintenance of intact epithelium; it is necessary for normal respiration of the cornea.

Vitamin A: is found in the retina. It is essential for regeneration of visual purple.

Vitamin B₁ (thiamin): is found in the nerve tissue. It is important in metabolism of nerve cells, hence in reception and conduction of visual stimuli.

Vitamin B₂ (riboflavin): is found in the cornea. It is necessary for respiratory mechanism of cornea.

Vitamin B₂ (riboflavin): is found in retina. It serves a useful purpose in light perception.

Vitamin C: is found in intraocular fluids. It is required for their normal secretion.

Vitamin C: is found in crystalline lens. It aids in metabolism and respiration of the lens.

Vitamin E: is concerned with reparation processes.

Vitamins K and P: are involved primarily with the blood and blood vessels.

An inadequacy of any one of the vitamins may result in visual dysfunction. We have pointed out these disorders but a recapitulation is useful.

Insufficient vitamin A slows down the rate of regeneration of rhodopsin, hence poor light adaptation and night blindness. It may be related to poor visual acuity and color vision, especially when tests for the latter depend in part on brightness discrimination. Deprivation of fat soluble A produces a keratinizing epithelium in place of normal epithelium in cornea. This results in vascularization of the substance of the cornea.

Vitamin B (thiamin, nicotinic acid, riboflavin) aids in utilization of carbohydrates. Thiamin deficiency may be accompanied by ophthalmoplegia of Wernicke's syndrome and a circulatory syndrome. Insuffi-

cient riboflavin produces poor visual acuity, dimness of vision, photophobia and vascularization of the cornea. Vascularization is brought about by reduced oxygen level and the attempt of the organism to prevent anoxemia.

Lowered vitamin C is found in cataract and aphakia.

Deficiencies of the other vitamins are not as clearly worked out in relation to specific visual dysfunctions.

Sardana (55) found 3 well-defined syndromes in his study of 500 cases of avitaminosis. The syndromes are given in table 6.

Even if the condition cannot be corrected, a better adjustment may be had by the individual toward his environment if colors are adopted for various purposes which will enable the color blind individual to make color discriminations on a basis of brightness. This procedure will not interfere with those individuals who possess normal vision.

TABLE 6
Vitamin insufficiency syndrome

A	THIAMINE	RIBOFLAVIN
Night blindness	Dim vision	Hazy vision in sun
Itching eyes	Burning sensations	Poor acuity for distance
Sensitivity of cornea	Dull pain back of eyeballs	Nyctalopia preceded by hemeralopia
Tunnel vision	Photophobia	
Reduced acuity for distance	Poor accommodation	

The public is partly cognizant of this fact, and the change in actual colors and designs of traffic signals has been a decided aid to the color blind.

Two visual defects which are in opposite relation to each other are macropsia and micropsia. These are subjective estimates of objects as too large or too small. These conditions may be the result of organic or psychological factors. Micropsia is observed more frequently than macropsia, especially when the defect is physiological. Various theories have been offered in explanation of these disorders. One is that in inflammation of the retina (retinitis) the receptors become displaced or rather become separated, so that the receptors which are normally stimulated by an object one centimeter square now require an object one and one-fifth centimeters square to cover them. Under these circumstances the original object appears reduced by approximately one-fifth. In macropsia, the opposite might be assumed to occur.

There is a crowding of the receptors, and an object which would normally be interpreted as one centimeter square is now interpreted to be one and one-fifth centimeters, since many more retinal units are stimulated by an object one centimeter square. Some investigators have attributed the phenomena of macropsia and micropsia to the psychological effort involved in muscular changes of the crystalline lens. In presbyopia and following the injection of atropine, additional effort must be made for accommodation. This greater muscular effort in the general scheme of space perception affords the idea of nearness. Interpretation of nearness usually means smaller sized objects, hence micropsia.

Another point that needs comment is the relation between the relative size of the objects on the retina of each eye. Ames, Glidden and Ogle (56) have shown that individuals frequently have retinal images of the two eyes which differ in size and shape. These have to be fused centrally. If we assume that an individual may be dominantly right eyed or left eyed; that is if dependence for size and shape is based primarily on the image of either the right or left eye, then any sudden shift of this dominance may give rise to macropsia, or micropsia. Which form would occur would depend upon the dominance in the original perceptual pattern.

Southard (57) cites a case following gunshot wounds of the occiput in which the individual had Lilliputian hallucinations. Although these Lilliputian hallucinations dated from the trauma (wound), other mystical delusions concerning Allah and Mohammed dated from early childhood. Southard is inclined to explain the Lilliputian hallucinations by suggestion. The patient, either in examination or from some other source, heard of Lilliputians and incorporated them into his delusions.

Inman (58) describes two cases that came under his care. One was a boy eight years old; the other, a boy ten years old. The details of the anomalies are inadequate for explaining the cases in terms of the theories outlined. One of the boys complained of apples growing smaller and smaller, while the other said that the dishes, the page of a book and even his mother became smaller as he looked at them. Macropsia and micropsia are spoken of as signs of hysteria. Moreover, Inman explains them on a psychoanalytical basis, tying up the disorders with oral fixations of nursing. It is fairly clear that Southard's case, as well as Inman's two cases, are not due primarily to sensory disturbances and that these types of disorder should possibly be placed in another classification.

Bender et al. (59) refer to the condition in which the images formed by the two eyes are unequal in size, shape, or both, as aniseikonia. The test employed for this disorder is described by them as follows: "Aniseikonia is measured by presenting to the two eyes paired images having a common, central object with horizontal and vertical lines which stimulate fusion. Near the ends of these lines (4° from the center) are a pair of numbered indicator lines, so polarized that one of each pair is seen by each eye. If aniseikonia is not present, the pairs of lines appear equidistant from the center and also appear in alignment. If aniseikonia is present, the lines seen by one eye appear closer to the center than those seen by the other; this condition may occur horizontally, vertically or in both meridians. Measurement of degree is effected by determining the extent to which magnification of one ocular image is required to bring the two images into alignment. The per cent of difference in size is measured by a calibrated scale on the system of lenses, which produces the magnification. The aniseikonia is measured at distances of fifteen feet for distant vision and at sixteen inches for near vision."

Burian, Walsh and Bannon (60) estimate from their experience in New Hampshire that about 35 per cent of the total population would benefit from aniseikonic corrections. The experience of Cushman (61) in treating patients gives a somewhat less optimistic picture. Of 24 patients treated, 14 had complete comfort with aniseikonic lenses; 3 showed improvement; and 7 showed no improvement or had reading difficulties.

While the importance of a visual defect in contributing to a mental disorder has been demonstrated in specific instances, very little systematic information has been collected, except by Bender (59) and his co-workers, that shows how visual defects contribute to the total personality pattern in individuals who are not designated as abnormal. In a very careful study of 124 college students, they have measured visual factors such as hypermetropia (hyperopia), myopia, astigmatism, heterophorias and aniseikonia. In addition, they have collected data on such psychological factors as intelligence, reading rate, behavior description reports, personality, vocational interest and school grades. Their conclusions indicate that it is important to correct visual defects that interfere with visual efficiency but that it is extremely difficult to show the actual influence of such defects on the motivational pattern of the individual. There seems to be a two-way adjustment. The motivational pattern of the individual influences his adjustment to

his visual defects and vice versa. The visual condition is so imbedded within the personality structure, that its psychological significance is not clear.

AUDITORY DISORDERS

The disorders of audition are not only less frequent in number but also fewer in variety than disorders of vision. The range of defects is more limited because of lack of detailed information concerning the actual functioning of the auditory mechanism.

The percentage of each type of defect for which rejection was made under selective service regulations is given in table 7. The location

TABLE 7

DEFECT	PER CENT
Ears.....	5.01
Deafness, bilateral.....	.07
Deafness, unilateral.....	.18
Hearing, defective.....	.57
Mastoiditis.....	.04
Mastoidectomy, result of.....	.17
Otitis externa.....	.03
Otitis media.....	.83
Otitis interna.....	.03
Tympanic membrane, perforated.....	.4
Tympanic membrane, absence of.....	.02
Tympanic membrane, other.....	.63
Ear, deformity of.....	.06
Impacted cerumen or foreign body in ear.....	1.91
Ear, other conditions of.....	.07

of these defects anatomically can be ascertained by referring to figure 10 which shows the general relation of the various parts of the ear.

Studies on the function of the middle ear have embraced a wide number of approaches. The eardrum itself is subject to a variety of changes that result in either unilateral or bilateral anacusia. Bordley and Hardy (62) have shown that even small incisions of the drum result in impairment which is somewhat greater for low tones than for high tones. Blocking of the drum, such as occurs when the external meatus is filled with wax or when the eardrum is covered artificially with vaseline, results predominantly in a decrease in the ability to hear low tones. A large rupture of the tympanum, disengagement or fixation

of the ossicles, or a total lesion of the cochlear branch of the eighth cranial nerve produces unilateral deafness. A lesion of this type usually involves the vestibular response. Whether both ears will be involved by a lesion of the neural pathway depends upon the locus of the lesion. There is a crossing of certain fibers from each ear to the opposite superior temporal convolution which is presented in figure 11.

Bunch (63) cites a case of a patient whose entire right cerebral hemisphere had been removed; nevertheless, tests with the 1 A audiometer showed that the auditory acuity of the two ears was approxi-

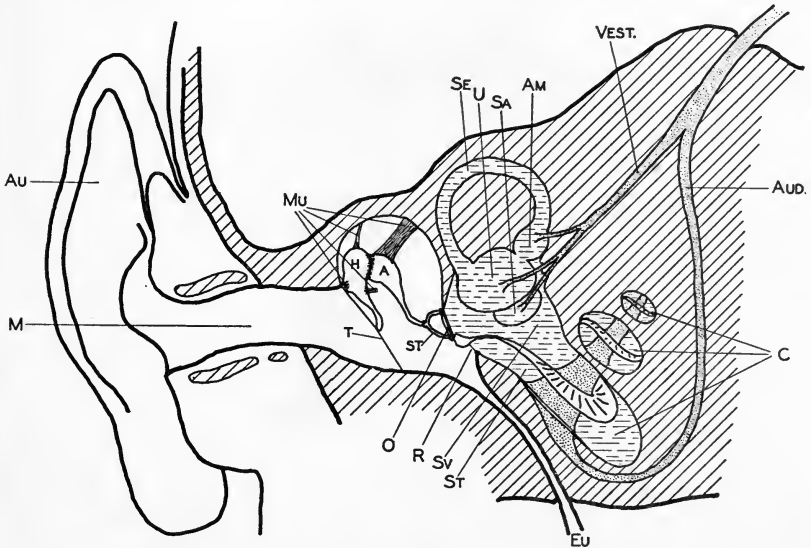


FIG. 10. Schematic section through right ear. *Au.*, auricle; *M.*, external auditory meatus; *T.*, tympanic membrane; *H.*, malleus; *A.*, incus; *ST.*, stapes; *O.*, fenestra ovalis; *R.*, fenestra rotunda; *Sv.*, scala vestibuli; *St.*, scala tympani; *Eu.*, Eustachian tube; *C.*, cochlea; *Aud.*, auditory branch VIIIth nerve; *Vest.*, vestibular branch VIIIth nerve; *Am.*, ampulla; *Sa.*, sacculus; *U.*, utricle; *Se.*, semi-circular canal; *Mu.*, muscles of ossicles.

mately normal and equal. He further states that none of the tones produced was inaudible in either ear. Investigations on dogs and cats by Brogden, Girden, Mettler and Culler (64) who removed one cortex gave results similar to those of Bunch on humans. Very little or no loss of auditory acuity followed such extirpations. These findings indicate that both ears were functionally normal and that the removal of the fibers on one side did not prevent those which go to the opposite side of the cerebral hemisphere from taking over or performing the tasks which may under usual circumstances fall elsewhere.

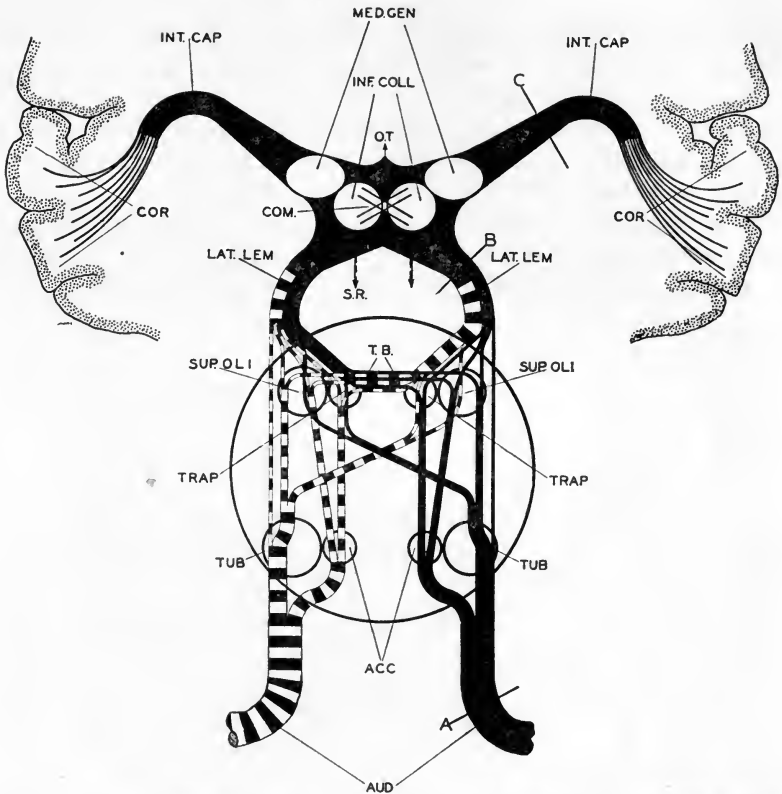


FIG. 11. Auditory sensory path. Schematic diagram showing principle sensory connections and commissures. Fibers from the left cochlea, shown as banded lines, enter the pontine region (indicated by circle) via the auditory branch of the VIIIth nerve. (For external connections see fig. 8.) Here they branch into the tuberculum acousticum (*Tub.*) and the accessory nucleus (*Acc.*). From the tuberculum certain fibers go directly to the lateral lemniscus (*Lat. lem.*) of the same side, and others to the superior olivary nuclei (*Sup. oli.*) of either side, from where they enter the corresponding lateral lemnisci. Fibers from the accessory nucleus go to both the olivary nucleus and the trapezoid nucleus (*Trap.*) of the same side; from the olivary nucleus to the lateral lemniscus of the same and the opposite side, and from the trapezoid nucleus to the lateral lemniscus of the same side, or to the lateral lemniscus of the opposite side via the trapezoid nucleus of the opposite side. The fibers connecting the olivary and trapezoid nuclei of the two sides form the trapezoid body (*T.B.*). The ending of the left lateral lemniscus is partly in the opposite medial geniculate body (*Med. gen.*) and partly in the inferior colliculi (*Inf. coll.*). The inferior colliculi are connected by commissural fibers (*Com.*). New fibers arise here and enter the cerebral lobes through the internal capsule (*Int. cap.*). These mixed fibers finally terminate in the left superior temporal gyrus and the left transverse temporal gyri. Two interesting tracts leave the region of the olivary bodies and colliculi; one pair downward to spinal motor reflexes (*S. R.*) and one which branches into the two optic tracts (*O. T.*). Lesions or injuries at *A* would result in the deafness of one ear. At *B* they would have little effect, since fibers from both ears would enter both lobes. At *C* one of the cerebral lobes would not function. (In order to better illustrate these connections, the anatomical proportions have been greatly distorted. The student is referred to Gray's *Anatomy*, figs. 736, 737, 774, and 778, for the correct anatomical proportions.)

The influence of fatigue, muscle tonus, and stapes fixation in otosclerosis, have been pointed out as causes of hypesthesia; in the latter instance there is actual lessening of function of the chain of ossicles. Movement is reduced because of hardening of the bony tissue at the point of attachment of the ossicle mentioned. The interruption of the chain of ossicles produces a loss of from about 40-60 decibels according to Wever and Bray (65). Experiments dealing with tension or its absence on the tensor tympani muscle and the stapedius muscle, are reviewed by Wever (66). The results seem to indicate that increased tension causes a decrease in the magnitude of the action potentials picked up from the cochlea. These changes in auditory acuity are also in line with the known facts about the influence of pressure changes on auditory acuity. Most people experience a loss of acuity when the eustachian tubes are congested and the middle ear pressure is out of balance with the external pressure exerted on the eardrum. Thompson, Howe, and Hughson (67) have verified this experimentally by artificially producing such pressure changes. The work of Seitz and Smith (68) shows an increase of 24 per cent in errors of comprehension in going from sea level to high altitude conditions. Middle ear hearing deficiency in some patients can be separated from inner ear deficiency by use of the bone conduction technique, although this method is not infallible. If the sound waves can be made to pass through the skull bones, they presumably stimulate either the auditory nerve or the central area directly. The mechanical difficulties of the middle ear are circumvented.

Losses of hearing ascribed to the inner ear range from losses in acuity to losses for specific pitches. Crowe and Hughson (69) have shown that auditory sensitivity may be improved by blocking up the fenestra rotunda by grafting periosteum over it. Work by Culler, Finch, and Girden (70) indicates that Crowe and Hughson were in error since they found an actual loss. Recent work by Davis et al. (71) tends to confirm the contentions of the latter investigators.

In connection with problems associated with the inner ear, intralabyrinthine pressure has been scrutinized. Culler and co-workers (72) have noted that an impairment in hearing results when a saline solution is injected and the pressure is increased. Fowler and Forbes (73) and Wever and Bray (74) have noted a general decrease in auditory responses following the application of various chemical substances to the round window. High tones were affected more than low tones.

As we pass on to an examination of the functions of the cochlea, we find that some disorders of audition result from pathology existing in

this portion of the ear. Most of the work has dealt with destruction of portions of the cochlea. Very little can be said at present other than the fact that lesions in a given area do affect responses to some frequencies more than to others, but there is produced a general lessening of response to all frequencies.

Many of the cases of occupational deafness are attributed to pathological changes in the cochlea due to prolonged stimulation. This is borne out by surveys in industries in which a disproportionate number of people with deficient hearing are found. Reports have been made on the high incidence of nervous disorders developing among women war workers who have been subjected to loud noises. Most of the effects of noise tend to disappear after a few hours, but in those cases that are susceptible, Rosenblith (75) found that noise levels of 75 to 80 decibels, if sufficiently prolonged, bring about premature aging of the ear. Jankoff (76) indicates that extreme temperature changes may result in a loss in hearing. Railway engineers showed a marked loss in hearing in the right ear which was exposed more than the left ear, whereas brakemen tended to show a similar loss for both ears.

We have as a result of the war, many cases of hearing deficiency in aircraft pilots, in aerial gunners, bombardiers, and in ground personnel exposed to artillery fire and even to small arms fire. While some cases have actual demonstrable pathology of the hearing mechanism, many others do not. Malone (77), Ullman (78), and Cope and Johnson (79) give representative data on these disorders. Among 100 officer combat fliers 66 per cent had a fatigue notch at 2896 cycles per second; 16 per cent at 4096 cycles per second; and 18 per cent had mixed forms of frequency loss. Ninety-seven of the group showed a loss of some kind. Three per cent showed a loss of 100 decibels at one or more frequencies; 27 per cent showed a loss of 100 decibels at one or more frequencies; 12 per cent showed a loss of 30 decibels; and 55 per cent showed a loss of from 10 to 25 decibels at one or more frequencies. The amount of loss is related to flying time up to 2000 hours. Men who exceeded this time without loss may not show impairment with increased time.

It should be pointed out that there is a difference in the apparent permanence of the hearing loss engendered by noise from aircraft motors and hearing loss arising from altitude changes. Kos (80) finds that the latter type of disorder will yield fairly readily to rest and other forms of therapy for correction of disorder in the pressure regulating mechanism of the ear.

Loss from exposure to gunfire presents a similar picture. The frequency range most affected is from 2048 to 4096 cycles per second.

Tinnitus aurium (acoasma or akoasma) is a subjective ringing or roaring sound in the ears. This may be produced temporarily by drugs such as quinine, by closing of the eustachian tubes, or by inflammation of the middle ear. In some cases, the sounds are continuous and exist when no special auditory defect can be detected although tinnitus is more frequently found in conjunction with other auditory defects. Fowler (81) has found that 85 per cent of patients with aural disease have tinnitus as a concomitant. Circulatory disturbances of the inner ear, pressure on the ear drum due to improper equalization of atmospheric pressure, and continued stimulation of particular neural fibers have been suggested as possible causal factors. Goodfriend (82) states that among the causes of progressive deafness, tinnitus and vertigo, will be found abnormal dental bite. This condition produces chronic irritation of tympanic membrane, circulation interference and degeneration of tissue.

TABLE 8

NUMBER OF CASES	RELIEF	IMPROVEMENT	NO CHANGE
Group I. Vasospastic tinnitus. Treated with nicotinic acid			
175	15%	48%	37%
Group II. Vasodilated tinnitus. Treated by histamine desensitization			
31	26%	40%	34%

Atkinson's report (83) on the treatment of tinnitus furnished information on the probable outcome of therapy on selected patients. He divided his patients into 2 groups: those whose tinnitus arises from a vasospastic condition; and those whose tinnitus probably arises from a vasodilated condition. The results of treatment are found in table 8.

Birth injury, meningitis, and infantile paralysis will produce a variety of hearing difficulties. The magnitude of these disorders in contributing to hearing loss can be ascertained from Rutherford's survey (84) of cerebral palsy children. Forty-one per cent had a hearing loss. It was found that the loss was somewhat greater in the pyramidal or spastic cases than in the extrapyramidal or athetotic cases.

The therapeutic technique for hearing deficiency depends upon the hearing loss. Unilateral and bilateral anacusia cannot be cured when the difficulty arises from a gross lesion of the cochlea. Hypesthesia may be aided with suitable amplifiers. A few remarks concerning the difficulty of finding a suitable amplifier will point up some of the other

problems of audition. Watson and Knudsen (85) have presented a report on their study on "Selective Amplification in Hearing Aids" which students of this field will find very worthwhile. It must be remembered that each individual shows a characteristic hearing loss. Some people have a loss throughout the entire tonal series, that is a decrease in sensitivity to all pitches. Others may experience difficulty toward the upper limit of pitch or the lower limit of pitch. Still others may have tonal islands and tonal gaps. Most amplifiers are built to amplify the speech range; consequently those pitches for which hearing is normal will be amplified as well as those for which a deficiency exists. The result of this is a distortion to which the individual must adapt. Loud sounds are amplified as well as weak sounds. Since the intensity of sound varies inversely with the square of the distance, a loud sound close by will almost cause pain, whereas a sound of weak intensity coming from a distance will just be audible. There are certain other sounds arising from the instrument itself which offer confusion in distinguishing the sounds of the environment. An audiogram obtained by the use of an audiometer will materially aid in determining the type of amplifier that is most suitable for the individual. Instruments are now built that will fill a specific need, but these are fairly expensive.

Shambaugh (86) has developed an operation for otosclerosis that he reports as being successful in about 88 per cent of the cases on which it has been tried. The operation consists in removing the ankylosed bones of the middle ear. In a follow-up study on 201 patients (87) one year after operation, he found that the hearing was worse in 1.5 per cent of patients; unchanged in 2.5 per cent; improved, then lost in 5.5 per cent; 20 per cent of the patients gained 10 to 20 decibels; 37 per cent gained 20 to 30 decibels; and 33.5 per cent gained over 30 decibels. While these figures are somewhat higher than those from other sources, the differences may be accounted for in the selection of patients and in the skill of the surgeons.

Osborn (88) and Fisher (89) have demonstrated that preventive therapy with children will decrease progressive deafness. While we are not presenting the nature of the disorders underlying the hearing loss, the figures of the authors mentioned show that radiation of lymphoid tissue which interferes with the functioning of the eustachian tubes, will prevent deafness in many cases. Similarly, tests one year apart on children with various types of hearing difficulties have confirmed the efficacy of therapy. The hearing of 85 per cent of the treated group improved, whereas only 23 per cent of the non-treated group showed improvement.

Lawrence (90) has experimented with vitamin A, and others have tried prostigmine as therapeutic agents. On the whole the results of these agents have not been too encouraging. The latter has been found to be effective clinically in selected cases.

Functional loss of hearing for one or both ears may occur. Likewise the loss of hearing for particular words or sounds may be of psychological origin. The removal of these deficiencies depends upon the discovery of the psychogenic factors involved. A functional type of tinnitus is "telephone tinnitus." The nature of the actual sensation is very similar to the ringing or buzzing sound made in the telephone receiver. This is somewhat of an occupational neurosis, occurring from the continual use of the telephone. The etiological factors of this neurosis can not be attributed to degeneration of the neural fibers through continuous use.

A case history of a patient with psychogenic deafness is summarized from Truex (91). A sergeant, 25 years of age, was admitted to the hospital. His military record was excellent. His history was not unusual. He had several earaches in childhood but nothing else of significance until he was in the Philippines. He was exposed there to mortar and artillery fire which caused tinnitus and mild bilateral impaired hearing. Later a mortar shell blast nearby caused a back wound, bleeding from both ears, and deafness. Acuity improved some on the following day, but then there was no change. The ears revealed no abnormality. He was tense, restless and moody. Loss for pure tones in speech range averaged 59 and 52 decibels for the two ears. Loss of speech however was recorded at 30 decibels. This discrepancy among other things suggested functional loss. For example, a day later the losses recorded were 87 and 85 decibels for pure tones, and 35 decibels for speech. Treatment was instituted under sodium pentathol. Emotional release of his feelings over killing of the enemy was obtained and the following day his hearing was normal.

Hyperacuteness of hearing (auditory hyperesthesia) presents some very interesting paradoxes. Slight sounds or noises are usually sensed as very loud. They may even cause discomfort and pain. We usually speak of these patients as having unusual ability to hear weak intensities of sound. Hurst (92) tested the power of hearing accurately in one patient. He found that sounds could be heard at a distance four times as great as in the case of the average individual. This would mean that the hearing of the patient was sixteen times greater than the average. The patient could hear sentences whispered in the opposite corner of a large room which were inaudible to people in the center of

the room. Administration of 100 grains of bromide per day, which is a very large dose, and plugging of the ears had very little effect. The hyperacusis was carried over into sleep. Hurst's explanations are theoretical and not well founded neurologically, since he assumes that hyperesthesia is due to some fixation of the synaptic connections of the auditory pathway. In all cases of hyperacuity it would be desirable to make some tests to determine whether the threshold changes. Some individuals may have a neural system so predisposed through inheritable factors that hyperacuity has no relation to any neurological change or disorder. In other individuals, there may be an emotional factor loading the circulatory system with one of the endocrine products which causes increased neural irritability of the auditory system. If the latter condition is true, then the hyperacuity should be reduced by clearing up the emotional factors. In these patients there seems to be some discrepancy between the subjective sensation of sound and the actual intensity of the physical stimulus. Meningitis or strychnine poisoning will produce phenomena akin to those experienced by the functional cases.

The diagnosis and treatment of these auditory defects from a psychological viewpoint is most difficult, since any physiological disturbance such as that accompanying a head cold, may furnish an actual basis for the sensations. With the disappearance of the organic factor the akoasma may still persist.

Priest (93) has summarized the tests that have been developed for unilateral deafness and malingering. These are especially useful in separating organic from functional cases. A description of such tests would be too lengthy for inclusion here.

In our preceding discussion, we have pointed out various factors that influence auditory acuity, mentioning, among other factors, fatigue and muscle tonus. Travis (94) and Bartlett (95) have investigated the influence of reverie on auditory acuity as a means of diagnosing some of the various types of mental disorder. They proceeded on the theory that in certain types of mental illness, increased muscle tonus occurred, whereas in other types decreased tonus was encountered, and that the condition of muscle tonus was best brought out in reverie. Psychoneurotics are supposed to respond more readily to suggestions of daydreaming and reverie, while schizophrenic cases are supposed to react negatively. In reverie, we might encounter relaxation and lowered muscle tonus which in turn influences auditory acuity. Travis claimed almost 100 per cent efficiency in diagnosis by this method.

Bartlett, on the contrary, did not corroborate the findings of Travis and points out numerous sources of possible error in Travis interpretations.

In summarizing the psychological effects of deafness, a quotation from an article by Solomon (96) is very appropriate.

"In the actual symptoms [of adjustment], themselves, deaf children do not differ from other children who show emotional disturbances. The manifestations may be of the nature either of withdrawal or of aggression. The withdrawn, submissive child may show anxieties, shyness, apathy, enuresis, nail biting, masturbation, tics, or other symptoms of a similar nature. The aggressive child, on the other hand, may exhibit such symptoms as temper outbursts, stubbornness, fighting, fire setting, lying, and stealing, or may present behavior of an attention-getting nature, such as clowning, grimacing, and so on.

As the deaf child grows older, he develops less and less ability to fight off his feelings of inadequacy. The problem is always with him. There is no shaking off the handicap. As an adult, he arrives at the conclusion that only hearing people are happy. It is then that his spirits become low. A feeling of depression is quite common in deaf people. Indeed, this feeling of depression may lead to thought of suicide and often times to actual attempts in this direction.

These feelings of inadequacy usually lead to a decided overestimation of the consequences of deafness. The deaf individual considers himself an inferior person. As we have said, he suffers from the feeling that his body is not intact. These attitudes reflect themselves in self-imposed isolation from social contacts, especially those with hearing individuals. Job-hunting becomes an almost insurmountable difficulty.

The most noteworthy character trait of deaf persons is suspiciousness. If a hearing person were to be in a room where everybody was busily engaged in talking a foreign language he did not understand, he would naturally wonder whether he was being talked about. This suspicion is chronic in the deaf. It is a well-known concept in psychiatry that anxiety is produced when one is confronted with unknown dangers. The deaf person is habitually confronted with the phenomenon of facing the great unknown. Of course, the hearing person knows that most of what is said around him is not worth hearing anyhow, but the deaf person always thinks that he is missing something.

Suspiciousness fostered by the productive phantasy world of the deaf produces the paranoid personality. These paranoid ideas may so completely overwhelm the individual as actually to produce a psychotic picture. It is not surprising to learn that it is estimated that 6 times

as many deaf persons as hearing persons, in proportion to their relative numbers in the population, develop psychoses that require hospitalization."

CUTANEOUS DISORDERS

The cutaneous disorders include the sensations arising from the receptors located in the skin, subcutaneous tissue, and the mucous membrane of the bodily orifices. The cell bodies of these receptors are situated in the spinal ganglia or other ganglia close to the brain stem.

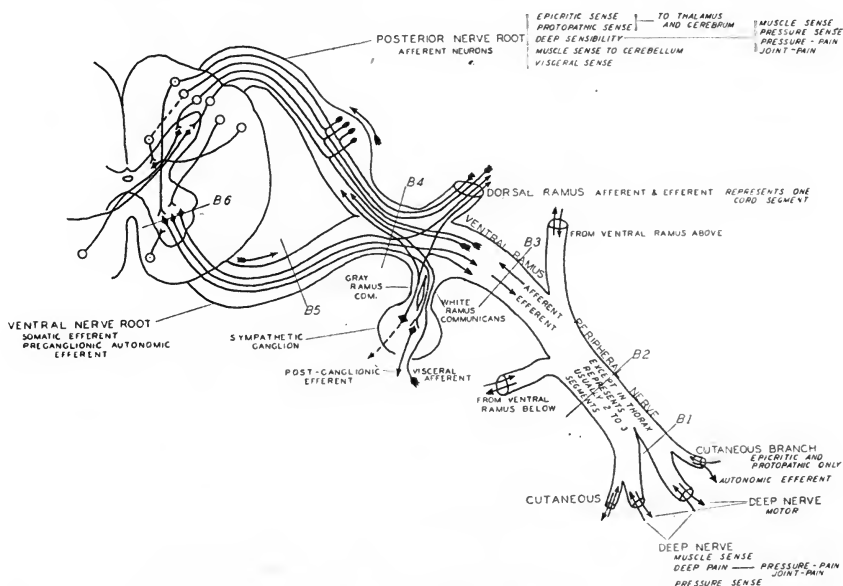


FIG. 12. Typical spinal nerve. (Reprinted by permission from William Keiller, *Nerve Tracts of the Brain and Spinal Cord*, 1927, fig. 99, p. 381. The Macmillan Co.)

A chain of neurons similar to those in vision and audition is not found. In figure 12, the cell body is represented in the dorsal root of the spinal ganglion. In this classification (see Dunlap's table) belong the haptic, baresthetic, thalpotic, rhigotic, gargalesthetic, the algetic or algescic and possibly the palmesthetic senses. The recognition of separate receptors for each of these senses has come about largely through the study of abnormal conditions. Cases have been found in which there is a loss of all varieties of cutaneous sensations; others have been found in which only the thalpotic or pain (algescic) sense is lacking. In fact,

any combination of sensations may be destroyed. In addition to the studies of abnormal cases, Head (97), Boring (98), and more recently Lanier (99) have shown experimentally by sectioning a nerve fiber or by the infiltration of alcohol into the fiber that separate receptors function for various kinds of physical stimuli. These receptors are distributed over a much greater body surface than are the receptors for vision and audition; consequently disorders arising through injury to the nerve fibers are more likely to occur. Since the nature of their distribution and action is not so well known by the general public, bizarre functional disturbances result. All of the sensations of the



FIG. 13. Loss of cutaneous sensibility: black portion, actual area of a case with complete cutaneous analgesia; shaded area represents a typical case of hysterical insensibility. Head, H.: *Studies in Neurology*, Oxford University Press, 1920, p. 427.

dermal group are subject to functional disorders which may cause a decrease or increase in sensitivity. The ones less frequently reported as affected are the sensations arising from the palmesthetic and bares-thetic senses. This may be expected since the majority of people do not realize that they possess receptors for stimuli of vibration and pressure. It is not implied that most people do not have these sensations, but simply that they are not recognized as separate forms of sensation. The explanation of these functional disorders is similar to the explanation of functional disorders of the other special senses. The vibration and pressure senses are less susceptible to accidental lesion since they are situated in the deeper layers of the skin and in the muscles and tendons. Collins, Zilinsky, and Boas (100) have discovered that

diabetics are prone to impaired sense of vibration. In cases associated with or without peripheral neuritis, 90 per cent had impairment in the upper extremities while 98 per cent had impairment in the lower extremities. The organic possibilities are not so varied since the sensory organs are less complicated. Any lesion of the peripheral nervous system, of the spinal cord, or of the brain is sufficient to cause a total or partial loss of sensation. The regional distribution of the loss will be



FIG. 14. Loss of cutaneous sensibility: black portion, insensitive area caused by injury to the circumflex, the ulnar and the internal cutaneous nerves; shaded area represent as typical case of hysterical insensibility. Head, H.: *Studies in Neurology*, Oxford University Press, 1920, p. 120.

determined by the locus of the lesion. Figures 13 and 14 show the actual loss of sensation following neural destruction. In these figures losses that might be expected from functional disorders are presented schematically. The technical names for total loss of sensation are given in the table of the modal senses. Functional anesthesia or loss of sense of touch can be detected more readily than the other forms of functional cutaneous loss. The insensitive area changes and varies from day to day, although at any given time the area may be plotted by means of esthesiometers.

The method of Bruesch and Richter (101) for detecting lesions and mapping cutaneous distribution of peripheral nerves may be important in working with certain kinds of patients. They found that disturbances in sweat secretion in rhesus monkeys following transection of peripheral nerves caused an increase in skin resistance to passage of electrical current. The borders of such an area of altered conductivity show a general correspondence to the region of cutaneous supply of the severed nerve.

Another criterion by which it may be identified is that it does not conform to the anatomical distribution of the neural fibers, resulting in "stocking anesthesia," "glove anesthesia," anesthesia of an arm, one or both legs, or anesthesia of the head. The last three may be caused by an organic lesion. The loss of sensation of the genitals rarely occurs in functional disorders. In contrast with the functional losses, organic losses are caused by poliomyelitis, myelitis, arterio- or multiple sclerosis, syphilitic infection or tubercular infection which may attack any portion of the spinal ganglion or the cord. The amount of loss will depend upon the extent of the area as well as the position of the lesion involved. The loss of cutaneous sensation may be of diagnostic value in detecting *tabes dorsalis*, a syphilitic lesion involving the dorsal nerve root, before the onset of locomotor ataxia.

The deeper reflexes are usually intact where organic destruction has not taken place and these serve in distinguishing between functional and organic disorders.

Hyperesthesia is due to increased sensory or neural irritability. All of the sensations may be affected by this hyper-irritability. The names for these increases may be derived by adding the prefix hyper to the names of the modal senses, for example, hyper-algesia, hyper-rhigosia and hyper-gargalesthesia.

Hyperesthesia may be caused by various organic conditions, such as meningitis, various stimulants and certain toxins. In some instances, the hyperesthesia is a referred condition. For example, an inflamed nerve fiber entering a ganglion will cause impulses arising from other nerve fibers entering the same ganglion to be perceived as painful, although the areas in which the fibers originate are perfectly normal. An inflammatory condition produced by exposure of a dental nerve to the air may, through the constant activity of its afferent impulses, cause afferent impulses from the nerves of sound teeth to be interpreted as painful. A clinical example of hyperesthesia is found in the condition known as *dermographia* (see figure 15). Any slight pressure on the skin

with the finger nail or blunt instrument causes a welt to arise which may persist for a considerable period of time. It is common in cases of vasomotor ataxia and is sometimes found in hysteria.

A few studies dealing with the thresholds of the cutaneous senses of disordered persons have been made. Hunt (102) in his survey of psychological experiments with disordered persons discusses these studies.

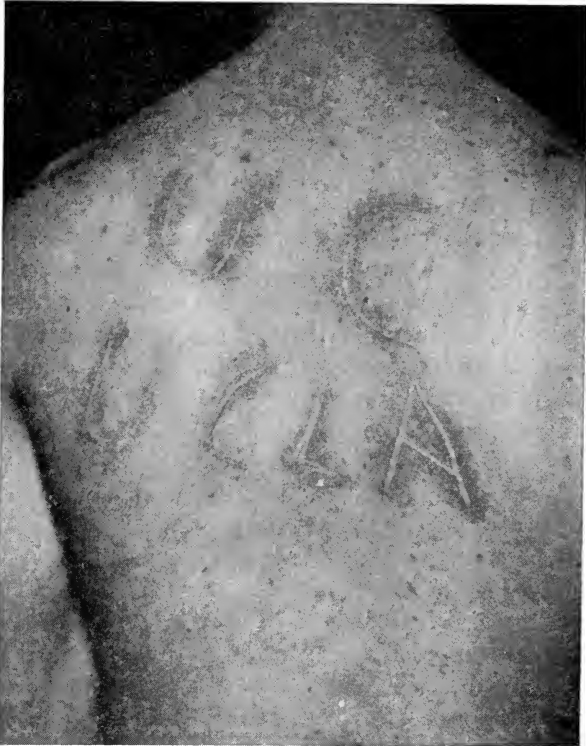


FIG. 15. The letters were traced lightly on the back of a 24 year old male subject with a blunt wooden stylus. The picture was taken 30 seconds after the impression.

In general, the differences in threshold for electrical stimulation among the various groups of psychopathic individuals are unreliable as a diagnostic technique for either separating the groups or for differentiating them from normal people. Two point discrimination, determined on relatively few cases, shows that there is no clear demarcation between the normal and abnormal subjects, although the investigators have brought out certain specific trends.

The perversions of the cutaneous senses consist primarily in the arousal of sensations without any adequate physical stimulus, the false localization of the application of the stimulus and the false interpretation of the type of stimulus applied. These sensations consist of itching, boring, burning, crawling, and so forth. Among the first group of sensations which have been listed are those encountered in the hallucinations of drug addicts. In some forms of the addiction, the hallucinations are chiefly of a visual and auditory nature, while in other forms of drug addiction, cutaneous hallucinations play a decided rôle. The disorders of localization usually referred to as dyschiasia involve nonpunctiform localization, sensations localized simultaneously on the opposite sides of the body, and sensations localized contralaterally or on the opposite side. The other forms of perversion of sensation include extremely unpleasant sensations which are unnatural or unusual. These are called phrictopathic sensations. Pathologically, these are produced by a partial lesion of the sensory conducting paths. If no lesion can be determined, they must be assumed to be functional in origin.

While functional disorders give rise to sensations which may seem to originate in disordered sense organs, the locus of the difficulty is usually in the central processes themselves. It might be useful, however, to point out some skin disorders of a psychosomatic nature.

Dunbar (103), and Weiss and English (104) have elaborate discussions of these disorders. Since the disorders are not strictly of sensory origin our discussion will be limited at this point. Among the skin manifestations that may be due to psychosomatic difficulties are vesication, herpes, gangrene, edema, spontaneous hemorrhage, pruritis, urticaria, eczema, psoriasis, lichen planus, verrucae, and anomalies of pigmentation. The psychosomatically engendered disorders are usually encountered in psychoneurotics, and MacKenna (105) has attempted to show the relationships which exist between personality types and kinds of skin disorders encountered. He suggests that the relationship is probably as follows:

<i>Low intelligence</i>	<i>Hysterical make-up</i>	<i>Narcissistic make-up</i>	<i>Gross anxiety states</i>	<i>Obsessional make-up</i>
Lesions due to parasitic infestation	Self infliction and irritation lesions	Exudative dermatoses	Excoriated Hyperidrosis Pompholyx	Lichenification Prurigo simplex Pruritis ani
Septic lesions			Rosacea	Pruritis vulvae

MacKenna believes that individuals of low intelligence run more risk of contracting ectodermal parasites since their hygiene is usually poor. When infestation occurs, there is not as much mental discomfort, hence

a delay in seeking treatment. This delay gives rise to secondary complications such as septic lesions. Hysterics use their illness for obtaining sympathy or privileges and are susceptible to areas of local anesthesia. These factors give rise to self-mutilation and self-irritation lesions. The obsessional patient is assumed to be of a high intellectual make-up, tense, restless, overconscientious, preoccupied with cleanliness, order and routine, and he tends to develop to a large extent the disorders listed above. In contrast, in a group of patients with rosacea, it was found that 22 per cent had abnormal degrees of social anxiety; 42 per cent had long histories of sexual stress; 26 per cent had acute psychological trauma. The narcissistic individual is self-centered and self-absorbed. He has a deep conviction of inadequacy and possesses infantile psychical features. MacKenna believes that individuals with this type of personality develop exudative dermatoses. The following case history sets forth the dynamic approach held by MacKenna:²

"The patient tends to be of the conceited type, with an apparent ease of social manner and a facility for making personal contacts. He wears a uniform like a popinjay as an outward symbol of his awe-inspiring personality. Then under service discipline, he slowly or quickly learns that a uniform is designed for much more than personal adornment: a battle dress is a dress for battle, and to train for battle a high standard of personal efficiency and knowledge is required. He finds that he is being outstripped in learning by his companions; he begins to feel inadequate; deep down within him he may realize that for all his bravado, battle, woundings, and sudden death are more than he can face. His feeling of inadequacy changes to a feeling of guilt, for sooner or later he will mentally let down his comrades: he, who posed as a tough soldier, the envied of the unit and the idol of women folk, will fail and will be debunked and shamed before his fellow men and women.

"Now throughout the years of his pride, his personal appearance was the focus of his self-esteem, and because he has concentrated on the importance of his physical beauty, it is his skin that nature selects as the tissue in which the visible signs of deep mental conflict became manifest."

The etiology of many skin disorders according to those psychosomatically inclined is to be found in strong emotional experiences. These emotional experiences may result in "conditioned reactions" of the vasomotor system as well as in "conditioned changes" in biochemical activities of the body which in turn involve the appearance of the disorder.

² MacKenna, R. M. B. Reprinted by permission of *Lancet*, 1944, 247, 679-681.

The various skin disorders respond to a variety of pharmacological treatments; some, however, do not. It is the claim of psychotherapists that many of these disorders will yield to psychotherapy, particularly analytic or suggestive therapy. There are very few statistical data which can be used to evaluate the results of these therapeutic techniques although there are numerous reports of treatment of a few cases by various therapists. Bloch (106) has attempted to systematically evaluate the treatment of warts (verrucae) by suggestion. The claims of success vary from about 25 per cent to 88 per cent, depending upon the therapist and type of verrucae treated.

Rothman (107) has discussed the interrelation between pharmacological therapy and psychotherapy, or at least has theorized why one or the other or both approaches may relieve these disorders. He points out that the reactions which take place in the skin are controlled essentially by the autonomic nervous system which controls (a) the pilomotor muscles involved in erection of hair follicles, (b) the activity of the sweat glands, (c) vasomotor reactivity, and (d) the secretions of the sebaceous glands. The reactions are influenced by strong emotions which may cause the activities directly or secondarily through the liberation of endocrine products which produce the reactions. The biochemical substances may pave the way or furnish a fertile soil for the development of fungus infections or herpes simplex when the individual is a carrier of the latter virus. Chemical therapy such as the barbiturates would reduce the sensitivity of autonomic response or removal of the emotional elements would accomplish a similar purpose, hence either the endocrine output would be lessened or the reaction to it would be lessened.

The foregoing general survey presents a partial picture of the dysfunctions related to the dermal senses. Additional consideration needs to be given to certain of the dermal senses since the receptor systems are located in areas not strictly dermal. Perhaps the most important of these senses is that of pain.

Whether pain is a normal or abnormal phenomenon is open to argument. Pain sensations may be considered normal when the organism is subjected to certain kinds of stimuli; nevertheless when the sensations become too intense or when they cannot be held in abeyance by normal amounts of analgesics they may be said to be abnormal. Since pain is one of the ways in which the organism protects itself and since the control of pain is a very difficult problem, we shall devote considerable discussion to this topic.

Pain may arise from conditions existing in almost any part of the

body; viscera, skin, bones, glands, blood vessels, and possibly nerve tissue itself. There are a variety of stimuli that will arouse painful sensations when they are of sufficient intensity or when repeated at appropriate frequencies. Pain may be aroused by pressure, heat, cold, electricity, and stretching of tissues. It may be local or referred in nature; it may be organic or functional in origin; and it is distributed anatomically over all parts of the body. The intensity of pain can be in part estimated in a number of ways. The psychogalvanic reflex, blood pressure elevation, condition of motor reflexes, vasomotor changes, dilatation of the pupil, respiratory change, and in extreme conditions, by equilibrium loss, by trophic changes, and by elevation of temperature. The pharmacologists utilize as a scale the amounts of various drugs necessary to overcome painful sensations. It is difficult to set up a single classificatory system that is applicable to pain. A system based in part on the organic structure, such as bones, circulatory system, or skin tissue, might be employed but this system is inadequate since pain is usually localized in some particular part of the body. Regional tabulation therefore seems more appropriate, although not entirely adequate since pain may originate in areas other than those in which it is localized. The system adopted in table 9 is therefore a combination of both approaches and there is a certain amount of overlapping.

It is fairly obvious that pain sensations arise because of numerous body conditions and from different causes. There are certain kinds of pain that are quite persistent and do not respond readily to ordinary analgesics; hence the continuous search for better pain controlling drugs and new surgical means of alleviating such conditions. A few of the specific types of pain that do not yield readily to control are, trigeminal neuralgia, migraine, phantom limb pains, certain kinds of dysmenorrhea, pains associated with carcinoma, and pains associated with some lesions of the spinal cord. While all of these pains can be assuaged with numerous drugs, it is not always feasible in therapy to use drugs in sufficient quantity to permanently inhibit the pain because of the depressing and deleterious effects of the drugs on other organs and functions of the body.

As a result of these difficulties, cutting of the afferent or sensory nerves has been developed as a procedure. This method proves effective in the relief of pain for many patients but is not effective in some patients and cannot be applied for the relief of some kinds of pain. In the volume entitled, *Pain*, edited by Wolff, Gasser, and Hinsey (1938), a comprehensive survey of the work on pain with reference to the neuro-

TABLE 9

LOCALIZATION OF PAIN	SOME CAUSES
1. Head and neural structures	
A. Brain and brain stem	Infectious diseases, tumors, abscesses, hydrocephalus, syphilis, changes in blood volume, aneurysm, anemia, alcohol, neurasthenia, hysteria
B. Spinal cord	Hemorrhage, trauma, tumors, meningitis, poliomyelitis, syringomyelia, tabes dorsalis, neurasthenia, hysteria
C. Nerve terminals and trunks	Influenza, malaria, gout, nephritis, diabetes, syphilis, gonorrhoea, small pox, copper, lead, arsenic, alcohol, mercury, trauma, tumors, hernia, misplaced vertebrae, etc.
2. Muscular tissue (general)	Tumor, trauma, edema, hemorrhage, myositis ossificans, trichinosis
3. Back	Sprain, fatigue, tuberculosis, caries, leukemia, dislocation of spine, involvement of pleura of lungs, heart and aorta, various disorders of viscera and genitourinary tract, pregnancy
4. Neck (including pharynx and larynx)	Diphtheria, influenza, tuberculosis, ulcers, leucetic ulcers, carcinoma, thyroiditis, toothache
5. Chest	Disease of bones of chest, mediastinal inflammation, aortic aneurysm, angina pectoris, other coronary diseases, bronchitis, pneumonia, pleurisy, carcinoma. May be associated with menstruation, pregnancy, and ovarian disease.
6. Abdomen	Skin lesions of erysipelas, herpes; muscular wall inflammation, cysts and tumors; peritoneal inflammation, tuberculous tumors, adhesions, hernia; stomach, intestines and appendix pains may be caused by gastritis, hemorrhage, ulcer perforation, carcinoma, obstruction, pyloric stenosis
7. Rectum	Obstruction, tumors, hemorrhoids, ulcers, constipation, fissure
8. Limbs	Circulation disturbances, flat feet, tubercular infection of joints, bursitis, traumatism of bones, osteomyelitis, leukemias, sarcoma and carcinoma of bones, osteitis deformans, rheumatism, thrombosis, phlebitis, varicose veins
9. Eye	Herpes zoster, edema, tumor, empyema of sinus, ophthalmoplegic migraine, corneal erosion, photophobia, iritis, syphilis, gonorrhoea, scleritis, glaucoma, neurasthenia
10. Ear	Furuncle, otitis media, abscess, tumors, mastoiditis, pressure changes
11. Nose	Nasal polypi, hypertrophies, tumors, inflammation, sinus inflammation
12. Liver, gall bladder	Hepatitis, carcinoma, cysts, tropical abscesses, cirrhosis, syphilis, gall stones
13. Pancreas	Inflammations, hemorrhage, calculi, cysts, carcinoma

TABLE 9—Continued

LOCALIZATION OF PAIN	SOME CAUSES
14. Spleen	Inflammation, displacement, gumma, hemorrhage, cysts, tumors
15. Kidneys	Renal tuberculosis, inflammation, rupture, growths, pyelitis, calculi, obstruction
16. Ureter	Caruncles, calculi, rupture, inflammation
17. Bladder	Cystitis, tuberculosis, calculi, rupture, dystension, tumors
18. Male genitalia	Congestive gonorrhea, syphilis, nonspecific infections, hypertrophy or tumors of prostate, tuberculosis
19. Female genitalia	Dysmenorrhea organic or functional, displaced uterus, normal menstruation, septic infections, gonorrhea, syphilis, endometritis, tumors and growths, pregnancy, childbirth, abscesses of vagina

logical involvements is presented. Some examples of controlling pain by nerve block or nerve section will illustrate the general results obtained.

Injection of alcohol or novocaine produces very satisfactory results in controlling pain of angina pectoris, coronary infarction, or aneurysm of the aorta. Similarly, if the upper thoracic sympathetic ganglia or their rami are destroyed, relief will be afforded (White, 109). Weiss and Davis (110) overcame referred pain in the skin which arose from various diseases such as angina pectoris, gastric ulcer, appendicitis, and nephritis by local anesthesia of the abdominal wall. Figure 16 illustrates the neurological mechanism by which referred pain may come into consciousness.

Not all referred pain follows similar chains of neurons. In the case of phantom limb pain, the neurological scheme is probably that shown in figure 17. Ewalt, Randall and Morris (111) review the theories for phantom limb pain. These include the theory that the painful sensations are due to neuroma at the nerve stump; impaired circulation at the nerve stump and muscle spasms that pinch the nerve stump. They believe that the phenomena are associated with psychopathology since phantom limb types of pain are not encountered in breast and genital amputations. They contend also that Pisetsky's (112) results from electric shock treatment of phantom limb pains confirm their belief. The electric shock influences the psychopathology and in turn abolishes the phantom limb pain. Eldhart's (113) detailed description of the

circumstances under which phantom limb pain is encountered is quite interesting. Twenty-six years after an amputation of fingers and part of a shoulder, a patient still experienced pain in the amputated members. He kept a record of the circumstances under which pain was aroused and found that emotional experiences were intimately related. Emotion of anger evoked pain 50 per cent of times; fear or happiness, no per cent

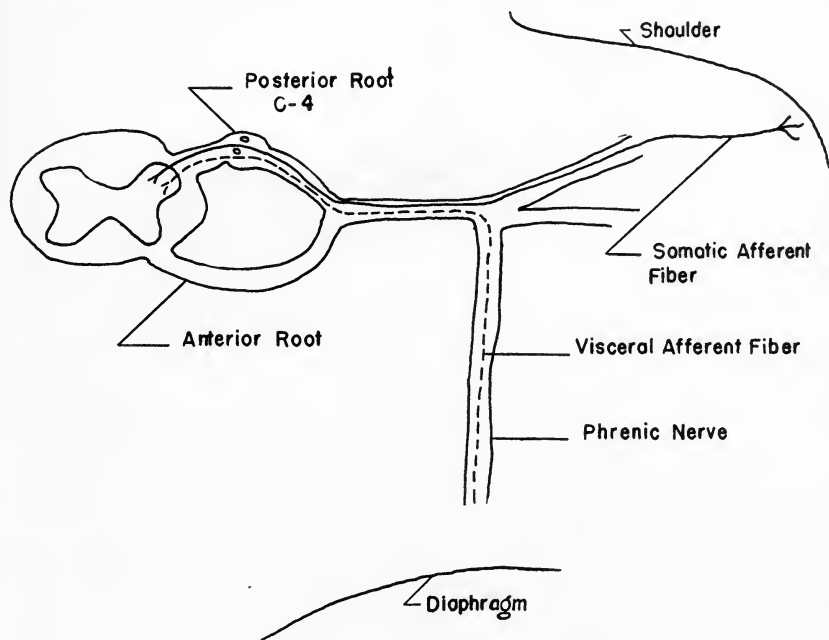


FIG. 16. Referred pain. The diagram indicates that visceral sensations, carried by impulses in the phrenic nerve, enter the spinal cord at the fourth cervical level, in association with somatic sensations from the shoulder region. The visceral impulses entering the posterior horn may so lower the threshold of the cells located there that very slight stimuli for somatic sensation in the shoulder, normally subthreshold, are now effective, and the shoulder is perceived as painful.

of times; sorrow and worry 90 per cent of times; and excitement and anger followed by depression 100 per cent of times. These facts point very strongly towards psychological factors as definite contributing causes.

Referred pain may be difficult to overcome because of the problems of determining the underlying seat of the stimulus. Most of these conditions will yield however to analgesics, surgery, or nerve block, when the neurological networks involved are ascertained. Referred pain

may be intractable just as pathological conditions may produce pain that is intractable. Methods of dealing with intractable pain are limited, since by definition we are dealing with pain that does not respond readily to analgesics. Some methods that have proved effective are nerve

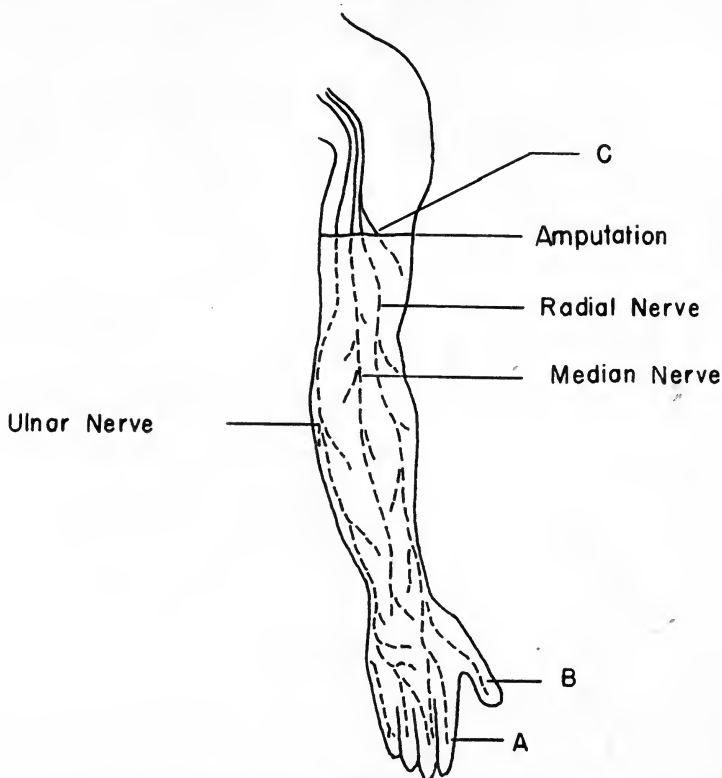


FIG. 17. Phantom limb pain. The diagram indicates the distribution of a few of the nerves in the arm. Nervous impulses originally arising at points A and B were transmitted over trunk C. The formation of neuroma or the pressure of scar tissue at the point of amputation may cause the impulse to be generated at point C. The impulse upon reaching the brain is interpreted as arising in the areas A and B.

infiltration, neurectomy, lobotomy, and hypnosis. Freeman and Watts (114), Van Wagenon (115), and White (116) have demonstrated the effectiveness of the surgical approach by the use of lobotomy or by excision of cortical tissue. These techniques have controlled phantom limb pain and pain arising from carcinoma which did not respond to previous types of neurectomy. Hunter and Rolf (117), and Dorcus and

Kirkner (118) have reported on the control of intractable pain by hypnosis. Two types of patients were at least partially amenable to this type of therapy. Dysemorrhoea patients and paraplegics with spinal damage have been able to hold pain in abeyance either entirely or in part. The following case history (117) shows the effectiveness of the control in dysemorrhoea:³

Mrs. C. J., aged 38 years, requested a panhysterectomy. All previous treatment had given no relief. She had had no preconceived complexes in regard to menstruation. However, her first menstruation was marked by premenstrual tension. After eight hours of suffering and bleeding she revealed her embarrassing condition to her mother. With each succeeding period the girl's suffering grew worse until chills, syncope, and uncontrollable nausea and vomiting accompanied all periods. The usual home remedies and surgical dilatations of the cervix were tried with indifferent success. Marriage and pregnancy gave no relief. Presacral neurectomy was performed without relief. However, a succeeding pregnancy was accompanied by several episodes of painless contractions with bleeding, and was terminated in a precipitate delivery free of pain, demonstrating the sympathetic nerves had been interrupted. This was a marked contrast to her previous deliveries. With return of menstruation, the original intense dysmenorrhoea symptoms reappeared, preceded each time by a week of nervous tension and anticipation, chills, syncope, nausea and vomiting, and bed for three days.

Through partial hypnosis by Dr. Dorcus her symptoms were greatly relieved for two periods, and the patient was able to carry on her household duties for the first time. Estrogen was then given to suppress ovulation, and the next period was so relieved she came to the office to report her appreciation. The next period was preceded by a painless diagnostic curettage, and secretory endometrium was found. This period was more painful. Restriction of sodium and the administration of chloride was tried and gave some relief at the following period. At present, the patient feels greatly relieved and will seek no further help if this status can be maintained. Result: Partial relief by hypnosis; definite relief by suppression of ovulation.

The paraplegics respond only in part to treatment by hypnosis. However, in these cases there is definitely a reduction in requests for analgesics when the therapy is applied.

The treatment of ordinary pain by hypnosis is presented in part in the chapter on "Sleep, Dreams and Hypnosis." We should like however to refer to the work of Kroger and De Lee (119) on the use of hypnosis in managing the pain of childbirth. These workers have been able to inhibit normal childbirth pains in a fairly large percentage of deliveries.

Evidence from numerous sources indicates that pain arising from many causes can be controlled by hypnosis, including teeth extraction, operations, headaches, and pathological conditions. One has to be extremely cautious in suppressing pain since the condition giving rise

³ Hunter and Rolf. Reprinted by permission of Amer. J. Obstet. and Gynec., 1947, 53, 121-131.

to the pain may be of a serious nature and the patient would thus tend to ignore the warning signals of nature.

We should mention that the pain threshold in normal subjects can be raised as much as 30 per cent by placebos, by distraction, and by hypnosis, according to Wolff and Goodell (120). Neurotics seem to have a somewhat lower pain threshold as has been shown by Haman (121). Chapman, Finesinger, Jones and Cobb (122) disagree in part with Haman's findings. They found no difference between psychoneurotics and normals in amount of heat required for perception of pain. They felt, however, that a motor withdrawal or wincing takes place among the psychoneurotics with significantly less stimulation than that required to produce a similar reaction in "normals".

DISORDERS OF THE OTHER SENSES—GUSTATORY, OLFACTORY, KINESTHETIC AND VESTIBULAR SENSES

Disorders of certain other of the senses have not thus far been mentioned. These have been purposely neglected since they are not of as great importance to the welfare of the organism. This is certainly true of the olfactory, gustatory and palmesthetic senses. The disorders of the static (vestibular sense) and kinesthetic senses, however, may be of as great importance for the protection of the organism as the special senses which have been taken up in detail.

It is extremely difficult to discuss the olfactory and gustatory senses separately since they are somewhat complementary. Many of the sensations which we are accustomed to describe as gustatory are actually olfactory. Similarly both senses have tactile components apart from the real gustatory and olfactory sensations, and there is a constant physiologic variation in their acuity. In addition to the physiologic variations that might be called normal, there are a number of conditions that may be called pathologic. The sensations may be exaggerated; they may be lessened; they may be absent; or they may be perverted. There may be a loss of sensation for one particular kind of odor or taste substance, or there may be a uniform loss for all qualities of these senses. In the case of olfaction, the loss may be unilateral or bilateral. Elsberg (123) and his associates have been particularly interested in the effects of various odorous substances in relation to the neuro-pathology of the brain. Elsberg and Spotnitz (124) found that, of 115 patients with convulsive seizures, 50 per cent had impairment of the sense of smell.

The most common form of temporary disturbance of these senses is a hypo-acuteness from inflammation of the mucous membranes. Like-

wise, adaptation to a particular odor or taste substance reduces sensitivity for those particular stimuli. This latter example is recognized as a normal function of the receptors. Fatigue has been suggested as the cause, but this is improbable since the receptors function adequately with a slight change in stimulation and without rest. Hyperesthesia is frequent in people with vitiligo (piebald or irregular skin pigmentation) and in albinos. Vapors of sulphuric and fluoric acid; fumes from rubber, chloroform, and ether; and morphine and cocaine may affect the sense of smell adversely. Prolonged exposure may actually cause a permanent loss. Hyperesthesia is manifested normally in both olfaction and gustation by contrast of qualities. A sweet orange tastes sour by contrast after saccharine has been placed in the mouth. The perversions may be of any quality. Sweet may be perceived as sour; salt may be perceived as bitter and the odor of violets may be perceived as some disgusting odor.

Aguesia for a bitter drug, known as phenyl-thio-carbamide was originally believed to be an inherited defect. Reports indicated that 35 per cent of the people were unable to taste this substance, and if both parents had the defect, the children rather uniformly possessed it. This conclusion needs to be interpreted very cautiously since the experimenters did not take into account threshold differences. Many people who could not taste a given concentration were classed as aguesic for the substance. Hutt (125) has recently encountered hypersensitivity to phenolthio-carbamide which seems to run in families. Miller (126) found that aguesia for the substance may be a fairly good indicator of a pre-diabetic state. The rate of infant death was 8.3 per cent for children of prediabetic women as compared with a 2.0 per cent for the non-diabetic group. All of the prediabetic mothers were non-diabetic at the time of delivery. One hundred per cent of the prediabetic women developed diabetes later, but none before the age of forty.

A complete discussion of the kinesthetic sense would involve almost the whole response mechanism. Many of the more complex adjustments of the organism such as writing, walking, talking and thinking depend to a certain extent upon kinesthesia. Since certain of these topics will need extended elaboration only generalizations will be presented at this point.

The kinesthetic or movement sense has its receptors in the deep layers of the various muscles of the body, the tendons and possibly the joints. It is closely connected with the vestibular, tactual and visual senses.

In fact, the interrelation of these senses enables us to develop space perception. In speaking of the kinesthetic sense, reference is usually made to perception of movements such as are involved in walking, moving the arm, or changing the body posture. Movement of the external eye muscles, and possibly the muscles of the middle ear are equally important.

Perversions of this sense, as well as its close relation with the vestibular and visual senses, can be demonstrated by past pointing following rotation or caloric stimulation. A blindfolded individual, if asked to touch an object directly in front of him and then raise his hand in the median plane, will be able again to touch the object as his hand is lowered. Following stimulation of the type suggested above, he will be unable to accomplish this task. The hand will be deflected to the right or left depending upon the type of stimulation administered.

Drinking of alcohol and other intoxicating beverages influences the movement sense. Whether these operate in a manner which prevents the integration of various senses or whether the symptoms manifested are due to a general hypo-sensitivity of the receptor systems is not easily determined.

In functional perversions, directional movements in both the horizontal and vertical planes are confused. A movement to the right may be perceived as a movement to the left. Inability to touch a portion of the body such as the nose, or tip of the finger on the other hand may occur. These failures of localization are frequent in parietic patients. If the sensory pathway from a finger is severed, the subject will not voluntarily move that finger although the motor pathways are intact. If the finger is flexed by another person, movement will not be perceived.

Hypokinesthesia and hyperkinesthesia may be of functional or organic origin. Movements are perceived as lessened or exaggerated. Which will obtain, will depend upon the type of organic defect present or the psychological factors involved in the functional disorder.

Since the receptors for the kinesthetic sense are located in the effectors (muscles and tendons), the student encounters difficulty in comprehending the relation between sensory and motor disturbances. Loss of muscular response may be due to a lesion in the sensory pathway, the cord, the brain stem, the cortex, the efferent pathway, or may be caused by atrophy of the muscle itself. The exact nature of the organic disturbance can be determined clinically. The situation is clearer for audition. The receptors are located in the basilar membrane in the cochlea, and the effectors are the muscles and glands of the whole body.

The determination of whether the disorder is sensory or motor becomes relatively simple where audition or vision are concerned.

Disorders of sensation of movement may be corrected through a process of reëducation after the psychological or organic causes are removed. This means that reformulation of the patient's experience of space perception is involved.⁴ The task is slow and gradual and calls for considerable coöperation on the part of the patient. A synthesis must be made of the various sensory components. The process of learning would probably follow the same course of relearning to hit a target after having learned to hit it with prisms interposed before the eyes.

The sensations arising from the stimulation of the semicircular canals, the sacculus, and the utriculus are usually attributed to the vestibular sense. There are, in addition, sensations derived from receptors of the kinesthetic sense of the eye muscles and neck muscles and sensations from the visceral or somatic senses which are confused with the strictly vestibular sensations. The responses to these stimuli are eye nystagmus, changes in bodily posture, maintenance of muscular tonus, vertigo and nausea. The pathology of the vestibular sense may arise from any one of a number of factors.

Among the symptoms of pathology of the vestibular sense may be listed: absence of nystagmus, continuous nystagmus, tendency for postural changes such as carrying the head in an unnatural position, flexion or spasticity of various portions of the body, particularly of the homolateral variety. The actual causes of these symptoms are to be found in functional and organic disorders.

De Jong (127) has prepared a summary of the recent work on nystagmus and has devised a scheme for classifying the phenomena. We shall use his work in part as the basis of our discussion. Table 10 will be useful in obtaining a clearer picture.

It would require too much space to deal with all these types of nystagmus in detail. We shall try to indicate briefly the nature of the nystagmus and its etiology:

Opticokinetic nystagmus is elicited by watching a moving object such as a revolving striped drum; it is sometimes called railway nystagmus. Its absence is usually considered pathological and is associated with frontal lobe lesions.

⁴ For a complete picture of the development of perception, the student is advised to review *Elements of Scientific Psychology*, Chapter 12, by Knight Dunlap.

Rotational nystagmus is elicited by rotation of subject in a chair (about ten times) followed by cessation.

Thermal or caloric nystagmus is produced by injecting into the external meatus warm (40 C) or cold (20 C) water.

Nystagmus is induced by galvanic stimulation when weak electrical current is passed through the head.

TABLE 10

INDUCED NYSTAGMUS	PATHOLOGICAL NYSTAGMUS	HYSTERICAL NYSTAGMUS
<ol style="list-style-type: none"> 1. Opticokinetic nystagmus 2. Labyrinthine nystagmus <ol style="list-style-type: none"> a. Rotational nystagmus b. Thermal or caloric nystagmus c. Galvanic stimulation nystagmus d. Compression nystagmus 3. Reflex acoustic nystagmus 4. Reflex sensory nystagmus 5. Chemical or toxic nystagmus 	<ol style="list-style-type: none"> 1. Originating in eye or its adnexa <ol style="list-style-type: none"> a. Nystagmus of optic derivation <ol style="list-style-type: none"> (1) "Ocular" nystagmus (2) Occupational nystagmus (3) Spasm mutans (4) Reflex nystagmus b. Nystagmus of neuromuscular origin <ol style="list-style-type: none"> (1) Parietic nystagmus (2) Fatigue nystagmus (3) Eccentric fixation (4) Latent fixation 2. Originating in centers controlling ocular movement and equilibrium <ol style="list-style-type: none"> a. Vestibular nystagmus b. Cerebellar origin nystagmus c. "Central" origin nystagmus 3. Miscellaneous varieties of nystagmus <ol style="list-style-type: none"> a. Toxic nystagmus b. Congenital nystagmus c. Lesions of cervical portions of spinal cord 	

Compression nystagmus occurs when unilateral pressure is exerted on semi-circular canals.

What the absence of experimentally induced nystagmus means has been the subject of considerable controversy. The absence of the post-rotation nystagmic response was considered by some otologists to be a sign of disorder of the vestibular mechanism. Many aviators were rejected at the beginning of the first world war because the duration of their post-rotation nystagmus was very long or very short. They later enlisted in foreign service and became expert aviators. The experimental findings of the psychologists working under the direction of

Dunlap, Bentley, and Dodge have definitely exploded this notion, since the response lessens and disappears with repeated stimulation. This habituation to rotation is usually explained by a modification of the central nervous system similar to the modification which takes place in learning. Some of the early workers attributed this habituation to a tearing of the membranous canal. One difficulty with the theory is that habituation to rotary stimulation does not necessarily produce habituation to caloric and electrical stimulation. If responses are secured to caloric and electrical stimulation the mechanism must be functionally intact. The period required for normal resumption of the post-rotation response is somewhat in doubt, consequently no conclusion can be drawn about a pathological destruction on that basis.

Variations in response to any one of the forms of induced nystagmus may however be indicative of pathology. Unequal nystagmus, perversion of a response, or dissociation of response with vertigo and past pointing but without nystagmus, indicate possible lesions of vestibular centers or their central connections.

Reflex acoustic nystagmus results from a loud auditory stimulus.

Gerlings and Kleyn (128) believe that acoustic stimuli penetrate directly to the cristae of labyrinth when fistula is present.

Reflex sensory nystagmus may follow stimulation of skin in neighborhood of the ear.

Chemical or toxic nystagmus may be one of the signs of ingestion of barbiturates, lead, nicotine, etc.

Ocular nystagmus is a slow irregular type of movement and is encountered in individuals who have had very deficient vision since birth. It develops shortly after birth but does not occur in persons blind from birth. There is attempt on the part of the organism to obtain fixation which cannot be accomplished because of poor vision. It is observed in persons with congenital cataract, interstitial keratitis, choriore tinnitus, and great errors of refraction.

Occupational nystagmus is believed to be a hysterical conversion symptom by Stern (129), and is encountered in miners, compositors, draftsmen, jewelers, and workers who are subjected to low illumination and frequent eye movements. Miner's nystagmus, which is partly due to improper illumination, may involve any type of eye movement. The severity and type of movement is influenced by darkness, by elevation of the line of regard and by sudden movements. In 83 cases studied by Brock (130), the average time for onset was 23.3 months.

Spasm mutans consists of a rhythmic nodding or rotary tremor of the

head accompanied by a fine rapid nystagmus. It is seen in babies from 6 months to 2 years of age who are kept in dark surroundings. It ceases upon closing the eyes.

Reflex nystagmus is present sometimes in very painful diseases of the eye.

Nystagmus of neuromuscular origin will be found in paretics, in myasthenia gravis, and in amblyopia resulting from strabismus. All of these conditions cause difficulty in neuromuscular adjustment of the eye for clear vision and the inability to maintain or obtain clear vision causes the nystagmic movements.

Vestibular nystagmus is a response to stimulation or destruction of the labyrinth. Pathology brought about by hemorrhage, suppuration due to disease, pressure changes in labyrinth fluids, trauma of inner ear or vestibular sense, meningitis, neoplasm or toxins, is the probable cause of this kind of nystagmus.

Cerebellar origin nystagmus develops from lesions that may be traumatic, vascular, degenerative, inflammatory, or neoplastic in nature.

Central origin nystagmus may result from lesions in the oculogyric centers in the frontal, occipital, or temporal lobe. Nystagmus resulting from involvement of association pathways may be encountered in multiple sclerosis, hereditary ataxia, syringobulbia, and other causes.

Miscellaneous varieties of nystagmus arise from cases specified in the preceding table.

Various diseases of the middle ear and brain will produce continuous nystagmus. In these cases, there is a continuous oscillation of the eyeball in either the horizontal or vertical meridian. The movement may also be rotary; the eye partially oscillates about its visual axis. Destruction of one or all of the membranous canals (the nystagmus is temporary in this case), meningitis, multiple sclerosis and brain tumors may produce abnormal nystagmic responses.

Fitzgerald and Stengell (131) using 50 unselected schizophrenics found that many of them gave abnormal vestibular responses similar to those encountered in verified lesions of the labyrinth. Worschel and Dallenbach (132) in testing deaf mutes demonstrated that pathology of the canals exists in 55 to 60 per cent of the cases. These findings were confirmed in part by histological examination and in part by the absence of nystagmus. Angyal and Blackman (133) in attempting to explain the apathy and apparent loss of muscle tonus in schizophrenics, have investigated the reactivity of such patients to rotational and caloric

stimulation. Using the nystagmic response as their criterion, they found that certain of these patients were decidedly deficient in response, and postulate that the above factors may be explained on a basis of dysfunction of the vestibular mechanism. Fearing (134) has shown that the sensations from the receptors in the vestibule are not absolutely necessary for orientation and maintaining posture although they ordinarily play an important rôle. He has found by removing sections of one or all of the membranous canals in pigeons that nystagmic head movements occur (these head movements in birds correspond to the eye movements in humans) along with marked postural changes. After a relatively short time, both the posture is corrected and the nystagmic head movements disappear. These results seem to dispose of the theory explaining the normal functioning of the semi-circular canals through a displacement of the otoliths by the endolymph in the membranous canals. A comparison of the functioning of the canals in humans with those in birds must, of course, be drawn with extreme caution. Work by Buchanan (135) has further demonstrated that post-rotational symptoms can be elicited in guinea pigs with the cerebral hemispheres and thalamus removed. Neither the saccadic or drift components were altered by decerebration passing dorsally through the superior colliculi and vertically through the mammillary body. Figures 10 and 11 show the neural connection of the sensory vestibular branch of the eighth cranial nerve.

Very little progress has been made in the treatment of abnormal nystagmic conditions, although the removal of brain tumors and other sources of pressure has cleared up some cases.

Another response to vestibular stimulation is vertigo, which is a feeling of movement or dizziness in the absence of spatial dislocation of the subject. Vertigo arises from many causes, and Poos (136) has systematized some of the conditions that give rise to vertigo.

It becomes apparent that vertigo is a complex phenomenon which may arise from visual, vestibular or central causes. Whatever therapy is indicated will depend upon the nature of the etiological factors. Eliaser (137) has evolved a treatment for certain kinds of vertigo which he believes is caused by the disparity between cerebral blood volume inflow and outflow. One condition in which this impairment takes place is arteriosclerosis. He attempted therefore to obstruct the venous return by appropriate placing of an elastic collar. He reports very favorable results on a number of cases treated in this manner. This brief discussion is adequate to acquaint the student with the nature of the

TABLE 11

TYPE OF VERTIGO	SOME CONDITIONS UNDER WHICH VERTIGO IS AROUSED
Ocular vertigo	Looking from tall building
Aural vertigo	Blockage of eustachian tubes Middle ear infection Labyrinthitis Hyperemias or anemias of brain Malocclusion of jaws Meniere's syndrome
Psychogenic vertigo	Hysteria Neurasthenia
Cortical origin vertigo	Petit mal epilepsy Migraine Tumor Hemorrhage Aneurysm Emboli Thrombosis
Cerebellar origin vertigo	Many of causes listed above
Brain stem origin vertigo	Sclerosis Meningitis Syphilis Tuberculosis
Eighth nerve origin vertigo	Lesion
Blood disease origin	Anemia Hyperemia Leukemia
Cardiac disease origin	Insufficiency
Metabolic disease origin	Hypo or hyper thyroidism Hypo or hyper glycemia Uremia Disturbances of water balance Alcohol Nicotine Other drugs
Respiratory tract origin	Frontal sinus infection Asthma Bronchitis Pneumonia

problem, and he will not likely be concerned except in those cases which are functional in origin.

One major type of disorder that is frequently identified with vestibular stimulation is nausea, although it may result from many other causes. We shall limit our discussion however to nausea caused by altitude or excitation of the vestibular sense through motion. This problem is of considerable magnitude when we consider the number of people traveling by plane, railroad, automobile, and in elevators. What percentage of the population is susceptible is difficult to say, since susceptibility depends upon the characteristics of the stimuli, the physical condition of the individual, the environment surrounding the individual, and his mental set toward nausea.

Wendt et al (138), showed that wave energy or volume of the motion rather than its time characteristics (that is, separation of accelerations) is the feature relevant to motion sickness. The length of exposure to stimulation is an important contributing factor, since very few pilots or passengers have escaped nausea at some time when subjected to violent stimulation for a long period of time. The physical well-being of the individual enters into the picture. Hangovers, fatigue, constipation, unwise eating, or minor illnesses tend to enhance the probability of motion sickness. Extreme heat or cold, unpleasant odors, sight of others who are nauseated, and suggestions of illness will add to the probability of nausea. Dorcus, Mount and Kirkner (139) showed one film of an individual becoming nauseated while taking laboratory tests to one group of students, and another film of an unaffected student undergoing the same laboratory tests to another group of students. Both groups were then subjected to the same tests. About three times as many students became nauseated from the first group as became nauseated from the second group. Undoubtedly, expectancy plays a large part, although nausea may result even with a favorable mental set.

Dogs, cats, frogs, and even fish seem to become seasick when subjected to appropriate stimuli. Sjoberg (140) has shown quite conclusively that the labyrinth must be intact to produce motion nausea, since dogs with destroyed labyrinths would not become nauseated by three hours of stimulation on a mechanical device. Prior to the operation this same device produced nausea after 11 to 20 minutes of stimulation.

Jones (141) has refuted the belief that women should not pilot planes and possibly not drive cars during the menstrual period since they may be more susceptible to nausea induced by vestibular stimulation. She did not find any significant difference in susceptibility between men-

strual and non-menstrual subjects on laboratory tests that induce nausea.

Work in this area was intensified during the first world war and the second world war because of the number of potential pilots that had to be rejected because of airsickness, and the number of soldiers who became ill during small craft landing operations. It became imperative therefore to devise some screening technique to weed out those men prone to sea or air sickness, or to find some ameliorating drugs which would inhibit nausea.

Various types of tests have been devised to select individuals who are likely to be chronically motion susceptible. These include rotary tests swing tests, caloric tests, drug tests, and personality tests. Wendt et al (142); Birren, Fisher, and Stormont (143); Birren, Stormont and Pfeiffer (144); and Dorcus and Kirkner (145) have evolved tests having varying degrees of efficiency. Previous histories of sickness on moving objects seem to be a somewhat better indicator than the generally accepted neurotic traits and laboratory techniques in yielding fairly successful results for screening motion susceptible individuals.

Numerous investigations of the effectiveness of various drugs have been undertaken. The work of Holling, McArdle and Trotter (146); Tyler (147); and Lilienthal (148) are typical. Holling and his associates tested scopolamine, atropine, hyoscamine, barbiturates, amphetamine, and chlorobutanol for controlling seasickness. They compared groups who had been given drugs with groups given placebos. They found scopolamine most effective. Tyler tested the effectiveness of barbiturates, neostigmin compounds, and scopolamine, employing 15,000 subjects. He found that in one experiment when 53 per cent of the placebo group were sick (the degree of severity being great in 37 per cent), the incidence of sickness was only 27 per cent in the scopolamine group (the degree of severity being great in only 10 per cent of the subjects). Lilienthal tested a number of drugs for their efficacy in combating air sickness. He found that his results were comparable to those of the previous investigators in that scopolamine was the most effective deterring agent.

An experimental investigation by Wolf (149) is difficult to interpret, since his findings seem to contradict the results of previous investigators. He irrigated the ears of subjects with cold water and obtained kymographic records of stomach motility during the process of becoming nauseated. Nausea was experienced only when the stomach motility was inhibited. He felt therefore that drugs which cause continued

motility prevent nausea. It is probable that spasms of the stomach muscles produce the nauseating effect and that barbiturates or scopolamine tend to prevent spasms.

A recent manual prepared by Van de Water and Wendt (1950) gives a number of practical suggestions on the avoidance of motion sickness. They indicate that learning (conditioning) and expectation play an important rôle. The individual associates previous experience or experiences of others, odors, etc., with nausea and tends to be nauseated for that reason. Other suggestions for the avoidance of airsickness include

1. Making short trips at first
2. Making initial trips in fine weather
3. Avoiding acrobatic maneuvers
4. Not flying until tolerance is established, and not flying when upset by hangovers, fatigue, constipation, unwise eating or minor illnesses

To these may be added the further hints that: (1) the individual should be occupied if possible; (2) avoid reading while in motion; (3) sedatives may be of value if the individual does not have responsibilities of operation; and (4) try to avoid fear associated with the trip.

Very little can be said about functional disturbances of the vestibular sense, although there is no doubt that these types of cases exist, especially in view of the fact that the central nervous system plays an important rôle in habituation as well as in the coordination of the visual and vestibular stimulation in post-rotation nystagmus.

SUPPLEMENTARY NEUROLOGICAL BASES OF CUTANEOUS DISORDERS

For the premedical student and for other students who may be further interested in the neurological foundations of sensory disorders, the following summary of the dermal senses may be useful. Since the dermal senses are highly complex in their organization no more than a brief survey can be attempted. For those students who are interested in abnormal psychology as a cultural course or who are interested in it only in so far as it will enable them to make a better adjustment in life, an examination of this section may furnish a little more comprehensive view of the field. Lesions of sensory nerves of vision, audition, olfaction, and gustation result in rather clear cut disturbances usually without other complicating sensory losses; the cutaneous senses produce many marked and varied disorders dependent upon the level and extent of the lesion.

A complete lesion of a cutaneous peripheral nerve results in the loss

of light touch, cold and heat between 72° and 104°F., tactile discrimination and localization. If the lesion occurs in a mixed nerve trunk, there is a further loss of the temperature sense, pain and pressure (heavy touch). Incomplete interruption produces anomalies of sensation. There is generally a partial loss of sensation of various kinds and paresthesia. In posterior nerve root destruction, such as occurs in syphilitic infection, the afferent system may become more deeply involved. If the lesion involves only one side, the loss will be only on one side; if both roots are affected, the loss will occur on both sides. The area of loss will be determined by the number and level of the spinal segments destroyed. Losses from this cause include those mentioned above and in addition, marked pains, loss of the palmesthetic and kinesthetic senses. All of the cutaneous sensations are not lost at once, but as the disease spreads into the cord (which occurs in *tabes dorsalis*), there is a progressive loss. Posterior nerve root destruction presents a better picture of localized body loss of cutaneous sensations than any other lesions.

The sensory ascending fibers in the spinal cord and brain stem are involved in so many commissures, decussations, and nuclear relays that any simple description of the sensory loss becomes almost impossible, without specifying numerous points of lesion. The loss may be unilateral or bilateral; any one of a number of the cutaneous senses may be involved. In general, a regrouping of the fibers for the various sensations takes place immediately after entry into the cord. Pain, thermal and tactile fibers terminate in the posterior horn of the cord, and a new set of fibers cross over to the opposite side, forming the spino-thalamic tracts. This holds true for all except a few tactile fibers and the fibers conveying the kinesthetic impulses from the deep muscle layers. These continue straight up the same side of the cord in the columns of Goll and Burdach. These columns terminate in nuclei in the medulla oblongata, where new fibers which are joined farther up by those from the spino-thalamic tracts finally enter the thalamus and sensory cortex. In figure 18 some of the pathways of the afferent system are presented. The higher the lesion, in general, the more likely the upper portions of the trunk and head will be affected. If the lesion occurs in the lower segments, only the region supplied by the lumbar and sacral nerves will show a sensory loss; lesions slightly higher may involve the thoracic and cervical regions as well. An upper cervical cord destruction will produce a sensory loss of the cutaneous senses in the face and cervical regions. Lower regions may be involved, depending upon the nature

and extent of the destruction. Limited destruction of the thalamus affects the static, kinesthetic, algetic, haptic (rarely completely abolished), rhigotic, thalpotic, and palmesthetic senses. Both localization and discrimination of touch are diminished and may be abolished.

Lesions of the sensory cortex which result from the hemorrhages of

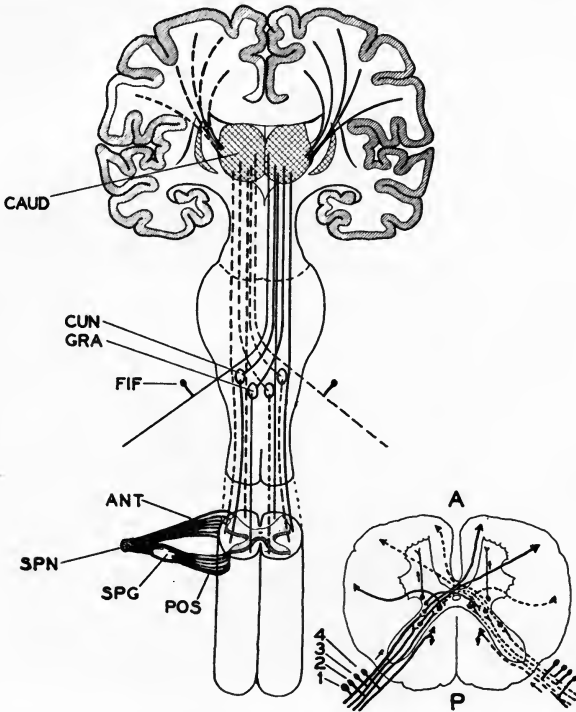


FIG. 18. Diagram spinal tracts. Sensory group. *Caud.*, caudate nucleus; *Cun.*, nucleus cuneatus; *Gra.*, nucleus gracilis; *Fif.*, sensory root fifth nerve; *Ant.*, anterior nerve root; *Spn.*, spinal nerve; *Spg.*, spinal ganglion; *Pos.*, posterior nerve root; *A*, anterior; *P.*, posterior; *1* and *2*, heat and pain; *3* and *4*, muscle sensations, touch (partially). (Modified from Lickley. Reproduced by permission from J. L. Lickley, *The Nervous System*. Longmans, Green and Co.)

blows, wounds, or emboli do not produce complete loss of primary sensations. There are judgment losses, that is the inability to evaluate or distinguish between the relative intensity of a present stimulus with that of a preceding or even simultaneous stimulus. On the whole, cutaneous sensations are not markedly altered by cortical destruction, except in the above way.

COMPENSATION OF THE SENSES

The question whether deprivation of one of the special senses causes the other senses to be more sensitive or acute has been discussed for a long time. The very early records of medicine and philosophy refer to the problem. The three cases which have been more directly responsible for recent controversies are Helen Keller, Laura Bridgman and Marie Heurtin. These cases are especially interesting since they have demonstrated the ability of people who are deprived of most of their special senses to acquire a fairly adequate mental life.

Helen Keller lost her hearing and sight at the age of eighteen months following a serious illness. As a result of these afflictions she became mute. Laura Bridgman and Marie Heurtin were also deaf and blind, the latter from birth. The former was deprived of taste and smell in addition. All three of these individuals through systematic education have developed mentally to such an extent that they possess a fairly good knowledge of the world about them. Their education centered about the sense of touch. Since they made such remarkable progress through this medium and since so many things are accomplished by only this sense, many have insisted that their tactual acuity must be very much exaggerated. The experimental evidence bearing on compensation is rather meagre. Villey⁵ (151) summarizes the early work. He states that Laura Bridgman possessed an esthesiometric tactile sensibility two or three times greater than that of normal persons. Jastrow, according to Villey, did not consider her tactile sensibility to be remarkably superior to that of a normal person. In summarizing the work of Griesbach and Kunz with regard to the sensitivity of the surviving senses of the blind, Villey gives the following account:

1. Tactile discrimination for stationary objects is approximately the same for the blind and for those who see.
2. Congenital blindness is likely to reduce the tactile acuity below that of the normal individual.
3. A strong stimulus is required for provoking a tactile sensation in the blind.
4. Auditory acuity and localization are about equal to the normal.
5. Olfactory sensitivity is not increased.

Work by Renshaw (152) and his associates using seven blind children and four blind adults does not entirely corroborate the results reported above for adults. On the initial trials of tactile-kinesthetic localization,

⁵ Villey's summary is taken from *L'Année psychologique*, Vol. VI, p. 518.

there is not a marked difference for the adults, but in the later trials, the blind make little or no improvement when compared with the seeing subjects. The seeing children acquire tactile-kinesthetic ability more rapidly than do the blind children. The results are given in figure

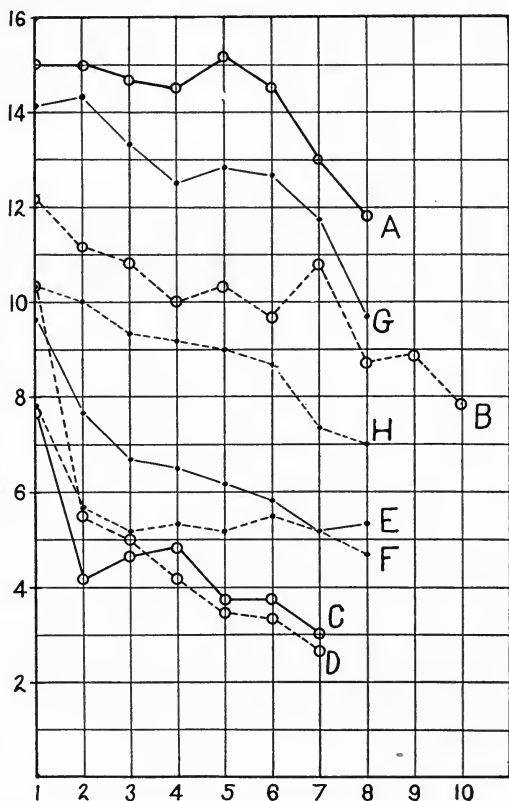


FIG. 19. The relation between accuracy of localization and practice. Curves *A*, *B*, *C* and *D* are for seeing subjects; curves *E*, *F*, *G*, and *H* are for blind subjects. The abscissa represents days of practice; the ordinate indicates mean error in millimeters. Seeing subjects: *A*, adult arm; *B*, adult hand; *C*, child's arm; *D*, child's hand. Blind subjects: *E*, adult arm; *F*, adult hand; *G*, child's arm; *H*, child's hand. (Combined diagrams from Renshaw, Wherry and Newlin. By permission from the J. Genetic Psychol.)

19. In explaining the superiority of the blind adults on the initial trials and the inferiority of blind children on the later trials when compared with their respective normal groups, they propose the theory that dependence upon contact excitation for localizing in childhood becomes replaced by visual receptor function in adults. That is, as

space perception develops, dominance shifts from the haptic to the visual sense.

Dolansky (153) maintains that the blind can sense objects in their pathway which results in an awareness of being lightly grazed across the face when such objects are approached. In attempting to discover what senses were involved, he covered the face with card-board masks. Despite these masks they still had the sensations. He next plugged the ears with cotton and they then felt nothing. He believes that the sensations were derived from auditory stimulation.

In explaining the sensations on the face, Dolansky points out that the blind are fearful of accidents. This fear increases when the warning sound is heard, and fear causes a reflex action in the skin. In states of fear, the muscle fibers attached to the hair follicles cause the hair to rise perpendicular to the surface of the skin, which gives the rustling or grazing sensation on the face. His results do not throw any light on auditory hyperesthesia of the blind since no normal subjects were employed, but the mechanism which he postulates for explaining the unusual sensations is interesting. Dallenbach (154) seems to have proved definitely that reflected sound waves are the means by which the blind avoid obstacles in their environment. He found that when the ears of both blind and blind-folded subjects were stopped or when an interfering sound screen was introduced artificially, the subjects were unable to detect a wall that they were approaching.

SYNESTHESIA

Synesthesia may be defined as a secondary sensation accompanying an actual perception. This subjective impression is always of a different mode from that of the sense through which the perception has occurred. For example, an auditory sensation may be accompanied by a sensation of color. When this occurs, it is referred to as colored-hearing or chromesthesia. Many forms of synesthesia have been reported. Almost any combination of the modal senses may be involved. This disorder, as well as sensory compensation may not belong strictly to sensory disturbances, since a study of perception and association are necessary for understanding their genesis. Synesthesia may be explained on a basis of the normal process of association. An individual who hears one of the classics played for the first time may miss the interpretation of the author in which a storm is portrayed. If he is advised later of the composer's intent, the playing of that particular composition will certainly recall a storm. In colored hearing a strong

emotional association may establish the connection between a certain sound and a color, so that whenever a particular sound is heard the sensation of a definite color is experienced. Some theorists have explained this phenomenon on a basis of special anastomoses between the brain centers involved in the perception of sound and hearing; or by irradiation. The latter is the spread of electrical current in the neural tissue. It is quite similar to leakage of two electrical lines in juxtaposition. If current flows in one line, a glow may be obtained from a lamp in another line even though that line is connected with no other battery or source. Langfeld (155) gives a summary of the work on synesthesia which will enable the reader to get a more comprehensive view of the topic.

CHAPTER III

MOTOR DISORDERS

GENERAL ASPECTS OF NORMAL MUSCULAR ACTIVITY

The human being is primarily a mechanism for response, and by means of response, he tries to adapt himself to the environment or to adapt the environment to himself. Since perception and thought are parts of the response process, he also perceives the environment, perceives himself, and thinks about both his environment and himself. It will be recognized that in responding to any given situation or complex pattern of sensory stimulation, a wide range of muscles or effectors are brought into action apart from those directly concerned with the specific response. Because the effectors are involved to such a great extent in perception and thought, it is impossible to discuss disorders of these functions in later chapters, without referring to the motor disorders which are essential for their occurrence. It is useful to examine these disorders from the viewpoint of the motor processes. In our treatment of motor disorders, we shall include not only those disorders arising from conditions of the effectors themselves but also certain disorders in which the effectors appear to be responsible but in which disorders of the association processes are predominant.

The effectors, which include the striated or voluntary muscles, the smooth or nonvoluntary muscles and the glands, may be the terminal action in complete perception, thought, or reflex activity. In the first group belong all the striped muscles of the body such as those of the arms, legs, trunk, external muscles of the eyeballs, and the vocal cords. Certain of the functions of the striped muscles which occur in what is conventionally called reflex activity appear to be nonvoluntary, since the response invariably occurs upon stimulation. The knee jerk (patellar reflex), the pupillary reflex, and the lid reflex are ordinary examples of this kind of action. These reflexes are not invariable since certain of them have been modified experimentally. Volition has a decided effect upon the facilitation and inhibition of the knee jerk. The striped muscles are too numerous for individual listing, but it suffices to say that almost any single group or combination of muscle fibers may malfunction in any one of numerous ways.

The second group of effectors contains those muscles which are controlled chiefly by the autonomic nervous system. The muscles of the lungs and those of the stomach and intestines which produce peristalsis are of the smooth variety and on the whole nonvoluntary. The cardiac muscle, although having some features of striated muscle, is placed in a class by itself. It is usually designated nonvoluntary.

The glands comprise the third group of effectors. These are of two types, duct glands and ductless glands. The major number of the former secrete substances into the digestive tract through openings or ducts. Saliva and bile arise from glands of the duct variety. This whole group of glands is concerned with the vegetative functions of the organism. The ductless glands or endocrine glands are those which secrete directly into the blood stream and hence their secretions are called "internal." They may secrete into the lymphatic system, although this view is not usually held. The lymph glands themselves do not belong to the endocrine group. The pituitary, thyroid, parathyroids, and the interstitial parts of the sex glands (testes and ovaries) are glands of the endocrine type. The function of these glands, as well as their place in abnormal psychology, will be discussed in detail in later sections of the text.

For a comprehension of some of the abnormalities of muscular activity it is necessary to understand the normal functioning of the muscles and their innervation. The innervation of the muscular system causes voluntary activity, muscle tonus, and so called reflex activity. Voluntary contraction of muscles is brought about by connections from the motor cortex of the brain through the descending fibers of the spinal cord. The motor fibers in the cerebro-spinal tracts originate from cells in the motor cortex. As these fibers descend, there is a partial decussation of some of the fibers in the region of the medulla; others decussate at a lower level in the spinal cord. Ultimately, complete decussation occurs so that the muscles on one side of the body are controlled by nerve fibers which originate on the opposite side of the brain. All of the descending fibers are grouped in the anterior horns of the spinal cord. The pathways which function for muscular tonus have their origin (a) near the corpora quadrigemina, (b) in the red nucleus and (c) in the vestibular nuclei. These descend in columns designated as the tecto-spinal, rubro-spinal and vestibulo-spinal tracts. They terminate by branching in the anterior horns. Figure 20 shows schematically the origin, and descending tract of the motor nerves. The fibers which control all varieties of muscular activity leave the spinal cord by

the anterior root of the spinal nerves. They gradually branch as they spread throughout the body.

Normal motor functioning requires two muscles operating reciprocally. These are conventionally called the extensor and flexor muscles. The former serve the purpose illustrated by the extending or straightening of a finger or a leg and the latter serve the purpose which is characteristically flexing or bending. The movements which can be made

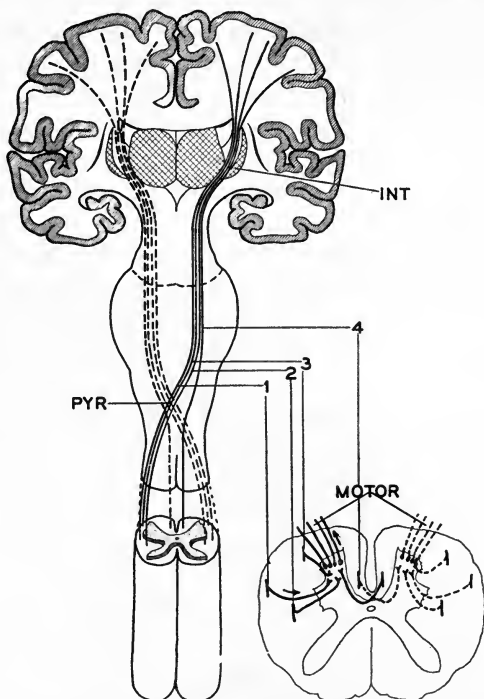


FIG. 20. Diagram spinal tracts. Motor group. *Int.*, internal capsule; *Pyr.*, decussation of pyramids; *Motor.*, motor (anterior) root spinal nerve; 1 to 4, corresponding tracts. (Modified from Lickley. Reproduced by permission from J. L. Lickley, *The Nervous System*. Longmans, Green and Co.)

may be relatively simple and involve relatively few muscle groups or they may be very complex and involve a great many. There are three aspects of muscular response, (a) speed of movement, (b) accuracy of movement and (c) strength of movement. All three of these aspects of muscular control are subject to disorders. Laboratory methods for measuring muscular control have been devised and standardized. Speed of movement may be measured by speed of tapping or by reaction

time; accuracy of movement by a steadiness test, coördination test, ataxiagraph, and so forth; strength may be measured by a dynamometer or ergograph. In spite of the standardization of methods of measuring these aspects of motor control, very few attempts have been made to apply the methods to abnormal subjects. Hunt (156) has reviewed the work of Franz, Gatewood, Boring and others on this topic.

Disorders of movement which involve the striated muscles (so called voluntary muscles) may be grouped roughly under three headings, (a) hyperkinesis, (b) hypokinesis and akinesis, (c) hypertonia and hypotonia. The last group is not coördinate with the other two groups since muscle tonus is derived, to a considerable extent, from stimulation of an interoceptive and proprioceptive nature. The voluntary control of muscular movement is dependent to a large extent upon exteroceptive stimulation although both interoceptive and proprioceptive stimulation are of vast importance.

MOTOR DISORDERS¹: ABNORMAL REACTION TIME, TREMORS, SPASMS, TICS, CONVULSIONS, ATHETOSIS, MYOCLONUS AND CHOREA

Movements during maniacal excitements, tremors, spasms, convulsions, athetosis, and chorea (St. Vitus dance), are all hyperkinetic movements. During maniacal excitement, patients frequently are difficult to restrain. They exhibit over-activity of all kinds of muscular responses including speech. Their movements seem to be speeded up, and their strength appears to be very greatly increased. Almost everyone is familiar with the fact that it frequently requires the combined efforts of several strong men to restrain a maniac of this type. All maniacs, however, do not exhibit this unusual form of activity. Unfortunately, the measurements that have been made to determine the true status of the speed and strength of muscular reactions of these patients are unsatisfactory. That they exhibit either speed or strength above their normal possibilities must be questioned. The probable explanation for their apparent increase lies in increased motivation and the rapid shift of direction of movement. Their coördinations are of an unexpected nature, hence they are difficult to anticipate. Some experiments which deal indirectly with speed of movement of abnormal subjects have been performed by various investigators. Franz (157), Wells and Kelley (158), Lundholm (159), Saunders and Isaacs (160)

¹ For a more detailed discussion of some of the motor disorders, the student is referred to: *Motor Disorders in Nervous Diseases*, by Ernest Heitz and Tracy J. Putnam, Kings Crown Press, New York, 1946.

have measured reaction time. Their conclusions are that in the psychoses the average reaction time is lengthened and the variability is greater or different in type. Lundholm holds that the variability of the reaction time in the psychotic subjects must be considered primarily as a manifestation of an attentional disturbance.

A tremor is a slight muscular rhythmical contraction. These may be coarse, fine or fibrillary; continuous or intermittent; slow or fast. The first distinction depends upon whether the tremor is produced by contraction of separate muscle fibrils. If so, it is a fibrillary tremor. A tremor is arbitrarily called slow if the contraction rate is not more than 6 or 7 per second; fast, if the rate is 10 to 12 per second. Tremor rates are characteristic of the discharge rate of cells located in different parts of the nervous system. Tremor rates of 9 to 15 per second are typical of tremor originating in the cerebral cortex; 5 to 6 per second are typical of tremor originating in the corpus striatum; 3 to 4 per second are indicative of tremor arising in the motor cells of the red nucleus; and, 6 to 7 per second may be identified with cells of the anterior horn of the spinal cord. A continuous tremor is one similar to that seen in paralysis agitans (shaking palsy or Parkinson's disease). It is likely to be remittent and is diminished by voluntary effort. The intermittent type occurs only at intervals and may accompany any voluntary motion.

Booth (161) believes that there is a psychological component in Parkinson's disease. The personality structure is developed from constitutional factors with emphasis on aggressiveness and a tendency to be identified with the dominant parent. This is combined with an inferior position regarding competition in childhood. The disease symptoms of rigidity of behavior and compulsiveness of motor system furnish satisfaction on a symbolic level. A differential diagnostic technique for doubtful cases of Parkinson's disease has been suggested by Gordon (162). There appears to be hypersensitivity to a vibrating tuning fork when placed on metacarpal bones. This hypersensitivity is on the affected side. In hysteria patients, bilateral paralysis agitans, tremors of senility, the vibration is perceived with equal intensity of both sides.

Tremor may be produced in many ways. Normally, it accompanies or is produced by cold, sorrow, or fear. If these cause tremor sufficiently often, it may become habitual. Even a single particularly vivid emotional experience may also be sufficient to predispose toward a tremor response. When the tremor becomes habitual, or fixed, it is called abnormal. In epilepsy and hysteria, both spasms and tremors are encountered. In the latter they are of psychological origin and in the

former they may be. The explanation and therapy of these tremors depends upon their genesis. The following cases cited by Sidis (163) furnish an adequate picture of the phenomena and throw light on their causes and treatment. The first case is quoted; the second summarized.²

M. L., nineteen years of age. Family history is negative, his parents died when the patient was young, and he was left without kith and kin, so that no data could possibly be obtained.

Physical examination is negative. Field of vision is normal. There are no sensory disturbances. The process of perception is normal, and so also is recognition. Memory for past and present events is good. His power of reasoning is quite limited, and the whole of his mental life is undeveloped, embryonic. His sleep is sound; he dreams little, wets his bed since childhood. Digestion is excellent; he can digest anything in the way of eatables. He is of an easy-going, gay disposition, a New York "street Arab."

The patient complains of "shaking spells." The attack sets in with tremor of all the extremities, and then spreads to the whole body. The tremor becomes general, and the patient is seized by a convulsion of shivering, tremblings, and chattering of teeth. Sometimes he falls down, shivering, trembling and shaking all over. The seizure seems to be epileptiform, only it lasts sometimes for more than three hours. The attack may come any time during the day, but it is more frequent at night.

During the attack the patient does not lose consciousness, he knows everything that is taking place around him, he can feel everything pretty well; his teeth violently chatter, he trembles and shivers all over, and is helpless to do anything. There is also a feeling of chilliness, as if he is possessed by an attack of "ague." The seizure does not start with any numbness of the extremities, nor is there any anesthesia or paresthesia during the whole course of the attack. With the exception of the shivers and chills, the patient claims he feels "all right."

Patient was put into a deep hypnoidal condition. There was some catalepsy of a transient character, but no suggestibility of the hypnotic type. In this hypnoidal state it came to light that the patient "many years ago" was forced to sleep in a dark, damp cellar where it was bitter cold. The few nights passed in that cold cellar he had to leave his bed, and shaking, trembling, shivering and chattering with cold he had to go to urinate, fearing to wet his bed, in expectation of a severe punishment.

The patient, while in that intermediary, subwaking hypnoidal state, was told to think of that dark, damp cold cellar. Suddenly the attack set in, the patient began to shake, shiver and tremble all over, his teeth chattering, as if he was suffering from great cold. The attack was thus reproduced in the hypnoidal state. "This is the way I have them," he said.

During this attack no numbness, no sensory disturbances, were present. The patient was quieted, and after a little while, the attack of shivering and cold disappeared. The room in which the patient was put into the hypnoidal state was dark, and, accidentally the remark was made that the room was too dark to see anything; immediately the attack reappeared in all its violence.

It was found later that it was sufficient to mention the words "dark, damp, cold" to bring on an attack even in the fully waking state. We could thus reproduce the attacks

² Reprinted by permission from B. Sidis, *Symptomatology, Psychognosis and Diagnosis of Psychopathic Diseases*. R. G. Badger Co.

at will, those magic words had the power to release the pent-up, subconscious forces, and throw the patient into convulsions of shakings and shivering, with feeling of cold and chattering of the teeth.

Thus the apparent epileptiform seizures, the insistent psychomotor states of seemingly unaccountable origin, were traced to dissociated, subconscious systems, now lapsed and meaningless in the patient's present environment and life reactions. They are recurrent reversions, atavistic manifestations of lapsed, now meaningless groups of psychomotor reactions.

Case 2. Male patient of Russian extraction whose age was 21, was referred to Sidis for epileptiform attacks and anesthesia of right half of the body. This involved all the senses of the right side including olfaction, gustation, vision and audition. The reflexes were normal. No history of venereal infection or nervous disorder could be obtained. The attacks consisted of a series of spasms, rhythmic in character, which lasted for about two minutes. After a thirty second interval the spasms set in again. They would continue for five or six days while the patient was awake and ceased only during the short time which he slept. The attacks began while the patient was fully awake and during the attack the mind was perfectly clear. All sensations of the right side of body were lost; the patient was actually not aware of spasms unless he saw the affected limbs. The attacks occurred only once a year usually about January or February. The history of the case Sidis gives as follows: "The first attack came on after peculiar circumstances, when the patient was sixteen years of age and living in Russia. After returning from a ball one night, he was sent back to look for a ring which the lady, whom he escorted, had lost on the way. It was a lonely road which led by a cemetery. When near the cemetery he was suddenly overcome by a great fright, thinking that somebody was running after him. He fell, *struck his right side*, and lost consciousness."

"By the time he was brought home he had regained consciousness, but there existed a spasmodic shaking of the right side, involving the arm, leg and head. The spasm persisted for one week. During this time he could not voluntarily move his right arm or leg, and the right half of his body felt numb. There was also apparently a loss of muscular sense, for he stated that he was unaware of the shaking of his arm or leg, unless he looked and saw the movements. In other words, there was right hemiplegia, anesthesia, and spasms."

During hypnosis, the patient was made to recall the scenes involved and by this method the dissociated facts relative to his attacks were integrated.

The tremor accompanying alcoholic delirium is of a similar nature. Other patients exhibit tremors following diseases in which the organism is left in a very weakened state. Typhoid, pneumonia, and influenza are typical diseases which result in muscular weakness. Both mental and physical fatigue if sufficiently severe will cause a manifestation of this type of muscular action. Electrical stimulation of the motor nerves or of the muscles may also produce it.

One explanation of tremor of organic origin is the inability of the muscle fibers to respond to their normal innervation because of depletion of the available glycogen by fatigue. The muscles then respond only

partially. Another view based on glycogen depletion is that there is a differential in the rate of fiber depletion, consequently the fibers contract in a nonuniform and uncoordinated fashion.

Other explanations are based on irregular or continuous innervation because of a central paralysis of some kind due to toxins, or to the enfeeblement of innervation so that the muscle fibers are not adequately set in action.

In contrast with the tremor movements which have just been discussed, attention must be given to the energetic contractions of relatively larger muscle groups. When a muscle or group of muscles is continually contracted it is called a tonic spasm; when these contractions occur repeatedly they are designated as clonic spasms. Long, painful contractions are called cramps. The student must recognize the fact that spasms may be either functional or organic in origin. If they are functional in nature, they are referred to as tics or various types of neuroses such as habit neuroses or occupational neuroses. The true organic spasm is due to physical causes and is not directly affected by voluntary or emotional control. A spasm known as a toxic spasm may be induced by an over dose of alkaloids, or by blood poisoning (caused by clostridium tetani). Another typical spasm is the bronchial spasm of asthma. Asthma may be of a reflex nature in conjunction with hyperirritability of the sympathetic system. Asthma has also been attributed to an allergic condition to many kinds of material, such as proteins, dust, feathers, and hair. If this assumption is correct, then the removal of the allergic substance will tend to prevent the occurrence of the spasm. Epinephrin administered in appropriate amounts will tend to break up some attacks and inhibit others. Followers of the psychoanalytic school have placed great emphasis on emotional factors in asthmatic seizures. Such writers as French (164), Freyhan (165), and Goiten (166) present information on this point of view.

French maintains that the asthma attack results from a conflict situation and is tied up with defenses developed to overcome or master the situation. There are three types of defense found in practically all cases:

(1) An urge to seek reconciliation with the mother by means of confession for unconscious wishes directed toward the mother.

(2) Mastery of a traumatic *experience* which has been passively *experienced* by active repetition of the *experience*. For example, sexual temptation may precipitate an attack, whereas sexual gratification of the forbidden impulse rarely does.

(3) Withdrawal from the temptation situation and a substitution of other erotic outlets. There have been cited asthmatic cases whose skin tests showed sensitivity to ragweed, cat's hair, and horse dander. When the psychoanalytic therapy was completed, the allergic reactions themselves disappeared.

It is somewhat difficult to reconcile the psychoanalytic approach with the strict organic approach. If, however, we make one basic assumption, the gap can be considerably narrowed.

Let us assume that prolonged tension or worry is involved in most cases. This may result in an eventual hypofunction of the adrenal gland; hence a crisis situation is not broken up by a loading of the system with epinephrin. Since some attacks may be dissipated by injections of epinephrin and since records exist of attacks being broken up under extreme conditions of fear, we may assume that any procedure that would result in appropriate levels of epinephrin in the system would overcome the condition. The analytic procedure then may resolve the tension factor which may have caused dysfunction of the adrenals; hence the essential mechanism is similar.

Electrical stimulation of the motor cortex, motor neurones or the muscle plates will bring about a muscular spasm. Destruction of brain areas or intracranial pressure are adequate causes for this action. The tic doloieux which is due to neuralgia of the trigeminal nerve is not strictly a tic in the sense in which we have defined tic and is treated frequently by injection of alcohol into the nerve.

It is necessary to discuss further the relation between tics and occupational neuroses. A tic may be defined as a coördinated purposive act, provoked in the beginning by some external cause or by an idea. By process of modification in learning or repetition it becomes habitual and involuntary. The occupational neurosis is the inability to repeat what was originally an habitual voluntary act. Typical examples of occupational neuroses are writer's cramps, telegrapher's cramps, taxi driver's neuroses and sewing machine operator's neuroses. In all these cases the act cannot be executed as it was originally, although the muscles are not fatigued. The evolutionary act does not occur because of a central blocking. Tics also called compulsion neuroses, on the other hand, are accompanied by a consciousness of the act. They are preceded by a strong desire to carry out the act and the performance of it leads to a feeling of relief. Furthermore, these automatisms disappear during sleep and may be mitigated by distraction. The characteristic of the tic is such that it may have little or no resemblance to the causal

factors. Tics may involve practically any muscle group and result in any variety of bizarre actions. Such actions as fluttering of the eyelids, sniffing, wrinkling of the forehead, distortion of the mouth, nodding of the head, shrugging of the shoulders, hand washing and so forth may be called tics. The two following examples summarized from Meige and Fiendel (167) show the etiology of certain actions.

To escape the pain of a dental abscess on the right side, of only 4 or 5 days duration, the patient had acquired the habit of turning the head to the right and maintaining it so, for as long as possible at a time. Very shortly after the healing of the abscess, the head commenced to move involuntarily toward the same shoulder.

A school girl was dissatisfied with the place allotted to her in the school room, and pretended that she felt a draught on her neck coming from a window on her left. The initial movement was an elevation of the shoulder as if to bring her clothes a little more closely around her neck, then she commenced to depress her head and indicate her displeasure by facial grimaces and these eventually passed beyond her control.

The writers have worked with a patient about 40 years old in which there was a marked desire to wash the hands 4 or 5 times before stopping. This patient characterized his actions as foolish but said that he did not feel right until the act was accomplished. He could throw no light on the beginning of the habit nor could he offer any explanation for it. It actually began at about the age of 18 and the system of responses from which it sprang was centered in an unfortunate heterosexual experience.

Levy (168) believes that certain kinds of tics or stereotyped movements in children arise because of restraint imposed on activity. He bases his idea upon observations of animals, such as chickens, bears, and horses, confined to small quarters. These animals frequently develop head movements which tend to disappear when greater activity is allowed. Head rolling and similar rhythmical head movements in children may be related to restraints imposed by the crib or clothing. Actual reaction to restraint of finger sucking is varied, but the most violent reaction is elicited by the elbow splint.

A study by Mahler and Luke (169) with a limited number of cases seems to indicate that the prognosis for tics is not too favorable. They followed up 10 male children from 1½ to 11 years of age after the original diagnosis of tic was made. Of the 7 who had reached military age, 3 were classified 4F; one was in a mental hospital; and 3 were doing well.

The other 3 patients were of school age at the time of follow-up and were found to have slight residual tics. In the 6 cases in whom the present adjustment was favorable, the investigators felt that the adjustment was due to finding an adequate motor release rather than due to either depth or length of psychotherapy.

Convulsions, myoclonic movements, athetotic and choreic movements are classified as hyperkinetic. These are primarily organic in origin with the exceptions of myoclonus and hysterical convulsions. Organic convulsions may be produced by toxins such as those in uremia, numerous drugs, lead, strychnine, or by absinthe. They may be provoked by mechanical or electrical stimulation of the motor cortex. An epileptic convulsion is usually accompanied by loss of consciousness; this differs from the convulsions of hysteria patients in which there is only a pseudo-loss. The second case of Sidis which was cited earlier in this chapter showed characteristic behavior with respect to consciousness of his acts. In convulsions, the muscular system is involved to a greater extent than it is in tremors and spasms. This is particularly true of the large muscles of the arms and extremities. Myoclonic movements are the contractions of isolated muscles without the involvement of the conscious processes. These may be observed during sleep and occur in the normal person in the form of occasional muscle twitches. Those occurring during sleep are usually explained by partial integration at a level below the conscious level. They may also indicate a calcium deficiency. Myoclonic activity is exhibited in the various choreas. These choreas are referred to by specific names depending upon the localization and extent of the muscular contraction and upon the progression and non-progression of the disease. St. Vitus dance (Sydenham's chorea) and Huntington's chorea are the most frequently mentioned forms. Choreas are observed most often in children and they prevail in girls more than in boys; the ratio is approximately 2 to 1. Choreic symptoms may result from brain lesions and brain tumors as well as from other organic causes. Certain choreiform movements may be functional. Their origin and treatment is very similar to that of spasms, tics and cramps.

Athetosis is a condition characterized by tentacle-like movements of the arms and legs. There is a continual slow change of position of the fingers and toes. It can be observed among low grade morons and idiots. Its occurrence is attributed to lack of development of certain parts of the brain, and it appears in normal individuals following certain

brain lesions. A series of pictures illustrating athetoid movements following a brain lesion are shown in Plate I. Keiller (170) reports a case in which Horsley removed the anterior central convolution. This produced relief for the patient. Athetoid and choreic movements are probably due to lesions in the neostriatum or thalamus. Hoefler and Putnam (171) have studied the action potentials in Sydenham's chorea and athetosis. They find that the motor discharges are asynchronous and polyrhythmic. Antagonists are in almost constant simultaneous innervation during both voluntary and involuntary movements, whereas during periods of rest no tonic innervation is noticed in the muscle.

An interesting experiment by Palmer and Zerbe (172) would seem to indicate that athetotic tremors may be influenced by conditioning techniques. A young male with a typical athetoid tremor of right index finger was subjected to a series of loud auditory stimuli. Control of severity and rate of tremor was at least partially obtained. Cessation of the stimuli produced remission of tremor; when the series was completed remission of the tremor lasted for 6 weeks.

In pointing out the differences which exist between the various kinds of hyperkinetic movements, it is possible that the total picture of these disorders has been lost. Tremors, spasms, convulsions, tics, and choreas are only different aspects of muscle functioning and muscle groupings. There is somewhat of a graded series of the size of movement, the rate of movement and the number of muscles involved. All of these specific disturbances may be either functional or organic. Their treatment will depend upon the etiological factors. Practically any one of the disorders may be produced by the same organic cause or by the same psychological cause. A tremor, spasm, or convulsion may result from an over-dose of the same toxic substance or they may all occur in different hysterical patients as a result of the same psychological factors.

MOTOR DISORDERS: PARALYSIS, ATAXIA, HYPERTONIA, ATONIA AND HYPOTONIA

There are other disorders of the effectors which are hyperkinetic in type. These include certain disturbances of gait, writing, gesture and speech. These will be discussed under their respective headings. The aspects of general muscular control which have not been treated are akinesia, hypokinesia, hypotonia, atonia, and hypertonia. The first and second of these disorders are related to the topic of voluntary muscular (striated muscle) disturbances. Akinesia means the loss of

ability to move or motor paralysis. Hypokinesia means a slowing down or enfeeblement of movement. The most common organic cause of these disorders is syphilis. Ravages of this infection in the neural system result in paresis and paralysis depending upon the spread of the infection. Poliomyelitis (infantile paralysis), thrombosis (blood clot in the brain), arteriosclerosis (hardening of arteries), lead poisoning which attacks the peripheral motor nerves, and any lesion of the motor cortex or motor pathways are causes of paralysis. The nature of the paralysis will depend almost entirely upon the position of the lesion. When the paralysis is restricted to a given muscle group or region, a prefix denoting the region is supplied to the term *plegia*. The terms monoplegia, hemiplegia, diplegia, paraplegia, and ophthalmoplegia refer to such localized loss of movement. Monoplegia is paralysis of a single limb; hemiplegia, paralysis of one side; diplegia, paralysis of both sides; paraplegia, paralysis of lower extremities; ophthalmoplegia, paralysis of the eye muscles.

Failure to make voluntary muscular responses is found in many cases of hysteria, catatonic dementia praecox, and schizophrenia. The miracle cures of paralysis happen to those people who are suffering from functional paralysis. Individuals who throw away crutches at religious revivals, those who get up and run after being unable to move for a number of years, when some one screams fire, mad dog, or snake, suffer from functional rather than organic paralysis. The catatonic postures and fixed positions of the schizophrenics do not arise usually in the same way, psychologically. For the present, it is unnecessary to go further into detail concerning the general paralyses.

There are certain disturbances of locomotion and movement which are definitely linked with paralysis. The festinating gait, paraplegic and hemiplegic gait belong in this category. These particular movements result from the inability to move members of the body in a normal way, because of lesions in various portions of the efferent system. The festinating gait is characterized by an increase in speed as the individual attempts to go from one point to another. There is usually a flexion forward of the upper portion of the body. The steps are very short. It appears as though the individual is making rapid short steps to keep from falling on his face. This gait frequently accompanies paralysis agitans. The hemiplegic gait is a result of paralysis of the leg from the hip. Since the leg cannot be bent at the knee, movement takes place by elevating the hip and swinging the leg in an arc. In the typical case of organic paralysis with hemiplegia, the lesion occurs in the motor

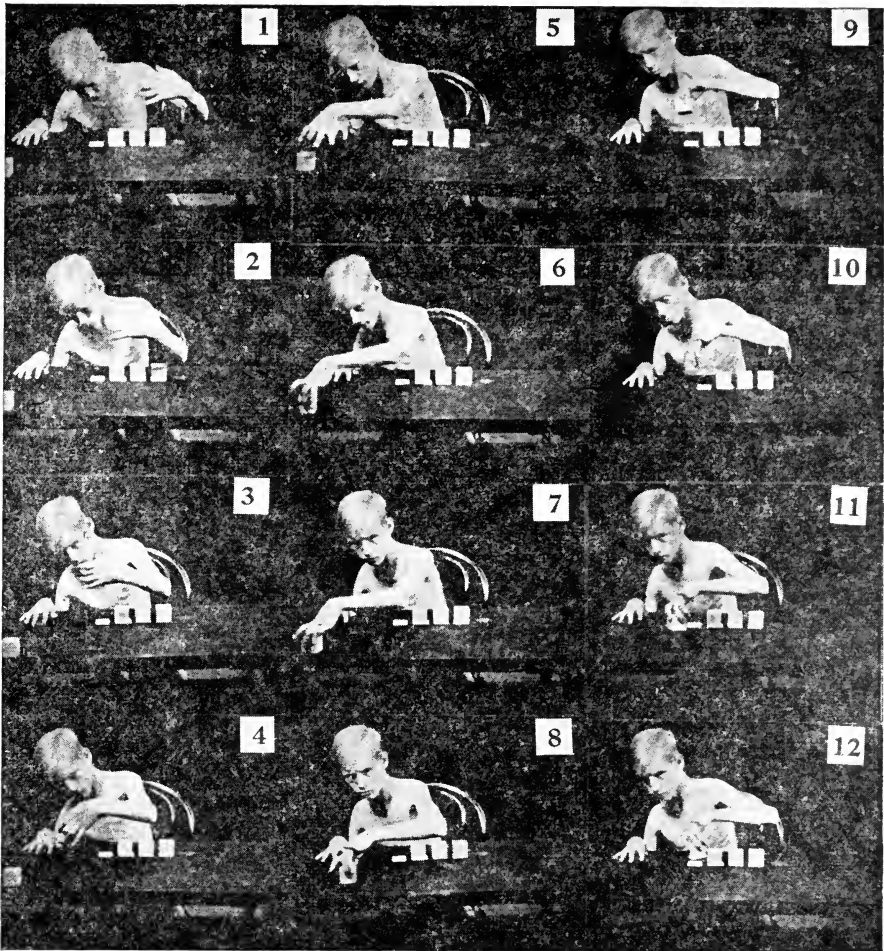


PLATE I

In this series of photographs, which are taken at intervals from a motion picture film, are portrayed athetoid movements resulting from a lesion which occurred during birth. The youngster is reaching for a block on his right which is to be placed on the vacant white square before him. Notice the contorted movements as well as the overflow of activity to parts of the body not actually necessary for executing the task. The drooping of the eyelid and the change in the musculature about the mouth are especially clear in frame 10.

Reproduced through the courtesy of The Training School at Vineland, New Jersey. The original study from which these pictures were taken was made at the Vineland Laboratory under the direction of Dr. Edgar A. Doll in cooperation with Dr. Winthrop M. Phelps with the assistance of Miss Ruth T. Melcher and Miss S. Geraldine Longwell.

neuron. Partial stimulation from the vestibule and cerebellum is still extant. In the paraplegic gait, many of the same factors are involved. There is a loss of movement of both lower limbs and progression takes place almost entirely from the hip movements. The postural stimulation is intact.

Movement and gait are also influenced by muscular weakness and defective afferent muscular sensation. These factors result in clumsy, incoördinated actions, which are designated generally as ataxias. The symptoms of ataxia which have their origin in defects of the kinesthetic sense are inability to walk a straight line and inability to find one's way around in a familiar dark room. Incoördination will be exhibited when the eyes are closed, in such simple tasks as touching the index fingers of both hands; touching the nose or the ear. There is also marked inability to determine the position of the members of the body under the same circumstances. When the eyes are open, these coördinations and movements are executed with much greater precision than when they are closed. When the ataxia is brought about by cerebellar or vestibular tract lesions, it is designated as cerebellar or vestibular ataxia. The gait is that of the drunken man, with the legs spread wide apart. There may be a tendency toward stumbling and inability to maintain equilibrium. These ataxias differ from those originating from sensory lesions in that the ataxias are not increased by closing the eyes. The ataxis is more pronounced on the side of the lesion if it is not bilateral.

Beers and Cheever (173) in a study of 6 generations of kinship found 18 males and 2 females who manifested an ataxic gait. Syphilis was excluded as a cause, hence the probability that this form of gait may be transmitted genetically at least in some cases.

The vestibular ataxias usually show recovery and compensation for the loss in coördination. The explanation of the modification of ataxic movements by closing the eyes is relatively simple. In the normal development of space perception and muscular coördination, the impulses from the visual sense are integrated with those from the kinesthetic sense. When the kinesthetic impulses are removed through some disorder, only the visual sense furnishes clues to the motor areas involved in movement. With the visual impulses removed, the coordination becomes even less exact. Static ataxia manifests itself in the inability to coördinate while standing with the feet placed together and the eyes closed. Swaying and even falling may occur. This is Romberg's sign and may be expected in tabes dorsalis, hereditary cerebellar ataxia and other disorders of the central nervous system.

Static ataxia and certain of the other ataxias are very closely allied with muscle tonus. This is normally supplied by incoming impulses from the skin, tendons, and joints. The afferent impulses from these sources keep the muscle in a partial state of contraction. In certain diseased conditions, the muscles may become flaccid, that is, they may lose tonus. In other forms of disease the muscles may become spastic, that is, the tonus is too great. In either case, coördination is interfered with. Spastic paralysis, (loss of voluntary motion with muscular rigidity) which is of organic origin, is always due to upper motor neuron lesion; flaccid paralysis (paralysis without muscular rigidity) occurs in lower motor neuron lesion, with transverse lesion of the spinal cord, and in some other types of lesion. Temporary spastic and flaccid conditions of the muscles may be found under strong emotional excitement. It is also well known that the striated muscles lose tonus during sleep since most of the afferent impulses are cut off. Ataxias may manifest themselves in some cases of functional disorders. Their origin and treatment is similar to that of functional paralysis, tics and many forms of sensory loss.

REFLEXES FOR CLINICAL DIAGNOSIS

Reflexes are usually considered invariable in their action. It was pointed out earlier that this statement is true only in a rather limited way. Many of them are affected by volition and many others become exaggerated or disappear with pathological conditions. Clinical neurology recognizes a long list of reflex actions which are useful for determining lesions in the brain and spinal cord. The list in table 12 (pp. 106-108) may be helpful in acquainting the student with the reflexes.

The list of reflexes is not complete. There are reflex factors in the control of respiration, the heart rate, peristalsis, the glands of internal secretion and various sex functions. The control of some of these reflexes is through the sympathetic nervous system. Certain of these may be considered as secondary reflexes resulting from emotional disturbances and disturbances of the vegetative functions. For our purposes, the tabulation given shows the reflexes most frequently disturbed by organic conditions occurring in psychopathic individuals. The failure to elicit most of these reflexes indicates in general at least a segmental lesion of the cord. In other central lesions, particularly of the motor cortex and thalamus, certain of these reflexes may be increased or exaggerated. Figure 21 shows schematically the neural pathways involved in a simple reflex.

In the functional mental cases, these reflexes are not usually affected.

TABLE 12
Reflexes

REFLEX	RESPONSE	ELICITED BY	INDICATES
Abdominal	Contraction of muscles around umbilicus	Sharp stroke on abdominal wall from margin of ribs downward	Integrity of cord from 8th to 12th thoracic nerves
Accommodation (monocular)	Change in lens adjustment	Focusing for far and near objects	Integrity of portion of sensory and oculo motor nerves. Branches of 2nd, 3rd cranial nerves
Achilles	Contraction of muscles of calf of leg	Blow on tendon Achilles	Integrity of 4th, 5th lumbar and 1st sacral regions
Ankle	Clonic contractions of tendon Achilles	Pressure of hand against sole of foot	Integrity of 5th lumbar, 1st and 2nd sacral regions
Biceps	Contraction of biceps	Tapping tendon of biceps	Integrity of 4th, 5th and 6th cervical segments
Ciliary—normal	Change in size of pupil	Change in light intensity	Found in some cases of tabes, brain atrophy, paresis, etc.
1. Argyll-Robertson pupil	Change in size for distance accommodation but not to light		
2. Haab's pupillary reflex	Change in size for light but not for accommodation or convergence		
Ciliospinal	Dilation of pupil	Rubbing skin of neck	Cortical lesion
Contralateral	Flexion or extension of leg when one on opposite side is moved passively	Passive movement of opposite leg	Integrity of 8th cervical, 1st and 2nd thoracic segments
Corneal	Eye lid closure	Irritation of conjunctiva. Approach of moving object or puff of air	Indicates hemiplegia, meningitis, etc. Integrity of 5th and 7th cranial nerves

Cremasteric	Retraction of testicle on same side	Stimulation of skin on inner side of thigh	Integrity of cord between 1st and 2nd lumbar nerves
Epigastric	Dimpling in the epigastrum; contraction of rectus abdominal muscles	Stimulation of skin in the 5th or 6th intercostal space near axilla	Integrity of cord from 4th to 7th thoracic nerves
Erector spinal	Contraction of erector spinal muscle	Stroking skin along border of muscle	Integrity of dorsal region of the cord
Femoral	Plantar flexion of first three toes of foot; extension of knee joint	Stimulation of skin on upper anterior portion of the thigh	Disturbance in region of 5th lumbar, 1st and 2nd sacral. May be produced by myelitis
Gluteal	Contraction of the muscles of buttocks	Stroking the skin firmly over the buttocks	Cord integrity in the region of the 4th and 5th lumbar nerves
Plantar	Contraction of toes	Stroking soles of feet	Normal response of adults. Segmental control by 5th lumbar, 1st and 2nd sacral
1. Babinski sign	Extension of great toe	Stroking soles of feet	Normal response in infants to 6 months. In adults this response indicates a pyramidal lesion or a lesion of the pyramidal fibres. May result from a toxic condition
2. Oppenheim reflex	Extension of great toe	Stimulation of inner border of tibia	Pyramidal tract lesion
3. Gordon's reflex	Extension of great toe	Pressure on deep flexor muscles of leg	Pyramidal tract lesion
Psychogalvanic	Change in body potential or change in skin resistance. Probably activity of sweat glands	A sudden stimulus, such as noise, light. An emotional situation	Integrity of motor nerve in region of application of electrodes. Also of sensory and central system when those portions are involved. Absence does not necessarily indicate a lesion

TABLE 12.—*Concluded*

REFLEX	RESPONSE	ELICITED BY	INDICATES
Jaw	Clonic movements of jaw	Striking lower jaw lightly with downward stroke. Jaw should be supported lightly with hand	Not present ordinarily. Is found in sclerosis of lateral columns of cord
Knee	Contraction of quadriceps muscles	Blow on patellar tendon	Absence indicates lesion of lower part of cord which occurs in locomotor ataxia, infantile paralysis, meningitis, etc. Increase indicates lesion in pyramidal tracts or hyperirritability of the motor cortex and cord.
Laryngeal	Coughing	Irritation of mucous membrane of larynx or throat	Controlled normally by 2nd, 3rd, and 4th lumbar segments
Nystagmus	Saccadic movements of eye alternated with drift movements	Rotation, injection of water in ear, and faradic stimulation	Integrity of 10th and 12th cranial nerves
Palatal	Swallowing	Stimulation of palate	Integrity of vestibular branch of auditory nerve. Absence does not indicate lesion. Spontaneous occurrence may indicate cerebellar lesion
Palmar	Contraction of hand	Tickling the palm	Integrity of 10th and 11th cranial nerves
Periosteal	Contraction of muscles of arm or leg	Blow on bones of these members	Integrity of cervical region of cord; 8th cervical and 1st thoracic
Pharyngeal	Swallowing	Irritation of pharynx	Disease of lateral columns of spinal cord Integrity of 9th, 10th and 11th cranial nerves

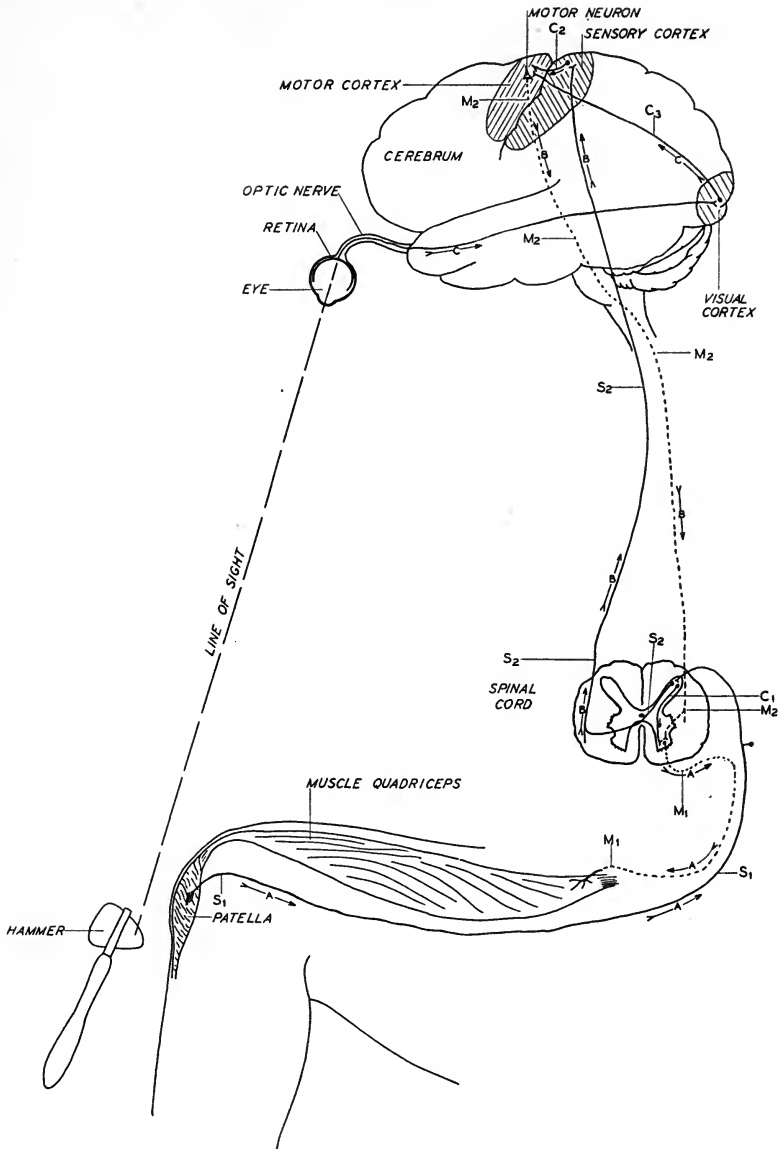


FIG. 21. Patellar reflex, showing the simple route and two possible modifications. The arrows indicate the direction of the impulse, the sensory tracts are shown as solid lines, and the motor tracts as broken lines. S_1 and S_2 , sensory tracts; M_1 and M_2 , motor tracts; C_1 , C_2 and C_3 , connecting fibers. The simple reflex is shown as route *A*. The central modification as route *A* to cord, *B* to cerebrum and back, and *A* to muscle. The visual modification is shown as route *C* to the visual cortex and motor cortex, route *B* to the cord and route *A* to the muscle.

In fact, one method frequently employed for detecting functional losses is to determine if the reflexes are still present.

SPEECH DISORDERS

Speech is subject to a very great variety of disorders. They range from verbomania to mutism and many perversions are exhibited. These disorders are intelligible only if a complete picture of the development of normal speech and the speech mechanism is presented. Normal speech is dependent upon the correct functioning of several of the special senses. Not only the receptors for these senses must be intact but also their afferent pathways with their specialized areas in the sensory cortex must function adequately. The auditory sense, the visual sense and the kinesthetic sense function directly in the development of speech and communication. On the motor side, the muscles of the larynx, the tongue, pharynx and those involved in respiration must be organically and functionally intact. These muscles are controlled efferently by the motor cortex and the motor tracts in the brain stem. There are certain disturbances in speech which must be attributed to the central or association mechanism. Thus far, this mechanism has not been discussed. Association and its mechanism will be given consideration in this chapter only in so far as it affects speech.

Speech is an incorrect term for the whole topic which will be treated. Language or communication disorders would be more appropriate. Since individuals communicate with each other to a large extent by vocal means, speech is loosely used to include written communication, sign communication and gesture. It is obvious that these latter ways of communicating are not controlled in an identical way as speech, but their development and their function are primarily the same.

DISORDERS OF ACQUIREMENT

The development of speech commences at birth and possibly in utero. Among the first speech reactions are those of crying. These early crying reactions are not differentiated. That is, there is not a particular cry for pain, hunger, wanting attention, and so on. The cry serves the purpose of bringing relief to any undesirable stimulus and may even be for exercise of the vocal mechanism. As the youngster grows older, there is an increase in both the quantity and quality of stimuli to which it is subjected. The speech mechanism ordinarily develops *pari passu* with these stimuli. There is a gradual differentiation in the cry response. Other vocal sounds such as gurgling and indistinct speech

sounds gradually are made. These indistinct sounds become progressively more distinct and from about fourteen months to two years speech comparable to that of the adult has begun. Since speech normally develops gradually, disorders of acquirement may result. It must be remembered that vocabulary, pronunciation, and enunciation are constantly being modified throughout life by the environment in which the individual finds himself. If we assume that speech is ever normally acquired or reaches its full development, then we may expect certain disorders to arise in acquired speech under the influence of environmental and pathological changes.

One of the earliest disorders of speech that can arise is a delay in beginning to talk. The failure to begin talking can be attributed to various causes. Faulty training and motivation can be suspected in most cases, although microcephaly and sensory disturbances, particularly congenital deafness, may be responsible. In the case of the feeble-minded, it has been found that an unusually large number show speech defects. Some imbeciles acquire speech at a very late age; others do not acquire it at all. Idiots, who have a lower order of mentality, seldom develop speech. Town (174) has shown that from 50 to 85 per cent of imbeciles manifest speech defects, depending upon the extent of the enfeeblement. Other studies by Wallin (175) have shown a high percentage of retardation in school by pupils having speech defects and a higher percentage of speech defects among colored children than among white children. While these studies do not give information on the delay in beginning to speak, they do show that speech disorders are more frequent among the mentally defective. It has been argued by some that defective speech is responsible for enfeeblement. It is true that poverty in speech and defectiveness in speech are indicative of amentia and may be partially responsible for lack of mental development. In many low grade feeble-minded that portion of the brain that lacks full development is the cerebral cortex. This lack of structural development is influential in causing a retardation of all the so-called mental functions in contrast with the motor functions. Morphological brain conditions may be used as the basis for explaining the failure to begin talking at the correct age. Other morphological factors may be the basis for lack of speech development. Congenital deafness, abnormalities in size of tongue, cleft palate, abnormalities of uvula, arch and palate maldevelopment, or various conditions of nasal passages, such as adenoids and changes in turbinate bones, are potential causes. With the exception of deafness, the above conditions are more

likely to produce disturbances of articulation and phonation rather than a delay in beginning to talk.

Once speech has begun, the vocabulary acquired will depend upon the "intelligence" of the individual as well as his environment. Many intelligence tests include as a part of the battery a section dealing with the use and acquisition of language. One presupposes that these language sections are made up in such a way that they will include the vocabulary ordinarily acquired by the particular age level to be tested, under specific environmental influences. In this connection, some of the environmental influences on vocabulary acquisition are interesting. Brogues employed by national or stock groups are environmental in origin. Typical of these is the so-called Irish brogue. In contrast with the brogue, which is dependent to a large extent upon language development of groups, are the qualitative changes in pronunciation. The speech of the New Englanders or Bostonians, the speech of the so-called East Siders in New York, and the drawl of the Southerners are typical of qualitative changes. There are provincialisms which center in specific groups of words such as bag, toot, sack, spider, fry pan, stew pan, and so on. Trade and profession certainly influence the vocabulary which is acquired. Compare for example, the terms used by a carpenter with some employed by the biologist or chemist. In the vocabulary of the carpenter belong words such as mortice, tenon, stud, splice, and plumb; in the vocabulary of the last two will be listed brachycephalic, parthenogenesis, mitosis, diethylbenzine and esterification. The acquisition of these words by individuals who have occasion to employ them is to be expected. Excessive use of curses and oaths may depend to a large extent upon environmental influences. At least the acquisition of such words and phrases will depend upon whether the individual hears them. In the same category with provincialisms and expletives should be included excessive use of slang. The habits of speech which involve the use of slang are undesirable, although there is a tendency for slang expressions to be admitted into general use. Slang undergoes rapid changes, and most people are familiar with the jargon of adolescents and perhaps with the terms employed by the so-called gangsters. These slang expressions have a definite meaning that cannot be conveyed by ordinary words unless one is willing to engage in circumlocutions, and hence are very apt for conveying meaning to the initiated. Their acquisition depends upon environmental factors to a large extent. A few examples of the changes through which slang goes will illustrate the folly of attempting to use it without keeping up to

date. Certainly no form of speech is more ridiculed than the use of outmoded slang. Its use does not make for clear, concise thinking since it is constantly undergoing changes and since it is not understood by the majority of people. The following expressions have been used to apply to a man who is a "snappy dresser" and has the ability to entertain the feminine sex: "Macaroni, Jim Dandy, Gay Blade, Spark, Fox, Coxcomb, Heavy Swell, Masher, Dude, Cake Eater, Lounge Lizard, Cowboy, and Neck Artist." These expressions have been applied to those who have indulged in the offerings of Bacchus: "Got a Bun On, Skate On, Jag On, Three Sheets to the Wind, Half Seas Over, Potted, Stewed, Oiled, Tight, Canned, Sopped, Slopped Up, Soused, Pie-eyed, and Shot." Some of these expressions are derived from particular circumstances and have slightly different shades of meaning. Their incorporation into one's vocabulary will depend upon hearing them or reading the type of literature in which they are embodied.

The use of brogues, provincialisms, "swear words" and slang has its place. It is only when they are employed excessively or employed out of place that they must be viewed askance. Affectation of provincial speech, the use of slang by elderly people, and swearing under unwarranted circumstances are not indications of speech disorders *per se*, but are symptoms, in all probability, of some form of mental aberration.

Montagn (176) holds that swearing may not belong in the same category with slang and provincialisms. He thinks that swearing results from frustration and serves to release tension caused by aggressive feelings. The differences between the two sexes with respect to the usage of this means of relieving tension is explained on social grounds. Women tend to resort to infantile weeping instead.

The most prevalent and wide spread disorder of speech which arises frequently during the period of acquirement is stuttering or clonic spasms of the muscles of speech. The tonic spasms of the speech mechanism are called stammering. Fletcher (177) in his book on *The Problem of Stuttering* discusses the various speech aberrations that have been called stammering and stuttering. He also gives an account of the history of the present terminology along with the proposals of various writers for changes in terminology. The terms originated according to Fletcher from the use of the two German words "Stammeln" and "Stottern." Schulthess employed these words about 1830. They came into general use through Meumann, and later differentiation was made by Scripture, who applied the term "lispings" to certain types of speech defects which are usually classified as stammering or stuttering.

For purposes of discussion, the older and lay differentiation will be followed. Stammering is characterized by the inability to produce any sounds, although there is a definite voluntary effort to do so. This volitional effort may be accompanied by movement of the muscles of the jaw and tongue. Stuttering is characterized by the irregular repetition of initial syllables of words or an impulsive breaking forth of the voice.

Hahn (178) has catalogued the speech sounds that give stammerers the greatest difficulty. On the whole, consonants are more troublesome than vowels and, among the consonants, g, d, l, th, and ch are high on the list. Longer words were found by Brown and Moren (179) to be more difficult than shorter ones. The above arbitrary distinction is useful for descriptive purposes, but its usefulness clinically is practically *nil*. Both stammering and stuttering have to be treated in much the same way clinically. Bluemel (180), as well as other writers, has pointed out that these terms have been used to mean just the reverse. Other definitions and other terminology will lead to confusion of the reader and hence will not be presented. It was mentioned above that these disorders are quite prevalent. No distinction will be made between the two in discussing their frequency. Fletcher has estimated on a basis of Wallin's survey of the public schools of St. Louis that there are approximately 1,210,000 people in this country who have or have had this speech difficulty. This means about one per cent of the total population. An estimate made on a basis of figures given in the publication of the White House Conference on Child Health and Protection is slightly higher. The number of stutterers would be closer to 2 per cent.

There are many factors which seem to have some bearing on stuttering. These may be considered independently of the actual theories which have been advanced for explaining these speech anomalies. Heredity, sex, age, intelligence, handedness, ocular dominance, and racial factors have been scrutinized to determine their rôle in stammering. Studies of the symptomatology of stuttering include breathing, reflex action time, cortical destruction in relation to handedness, traumatic injuries of the brain, voluntary and involuntary muscular activity. These have added information which has been useful in formulating additional theories and opening up new lines of research.

Before undertaking a discussion of the theories for explaining these speech defects, it is expedient to go more into detail concerning each of the above related phenomena.

Studies on the hereditary aspects of stuttering are fairly numerous; two studies will illustrate, however, the general results. Meyer (181) found that stutterers were 10 times as frequent in families with histories of stuttering as in families without such histories. He could not discern an apparent Mendelian pattern for its inheritance. Nelson (182) studied 69 pairs of apparent monozygotic twins and 131 pairs of apparent dizygotic twins. Thirteen and seven tenths per cent of 138 monozygotes stuttered, whereas 6.4 per cent of 262 dizygotes stuttered. In addition, both members of the monozygotic pairs stuttered, while usually only one member of the dizygotic pair stuttered. These studies lend some credence to inheritance as a possible factor in the disorder, but the studies are not conclusive because of environmental factors that enter into the picture. The incidence of stuttering in the two sexes has given rise to various theories for explaining speech difficulty. The ratios usually stated vary from 2 to 1 up to 10 to 1. This discrepancy among various investigators is due partly to differences in age groups examined and partly to their inclusion of various speech defects which are sometimes not classified under stuttering. One theory on the point of sex differences is that advanced by Dunlap (183). His theory centers in the conflict of the acquired vocabulary which is taboo in the usual home life and other social situations of the boy. Dunlap states that boys acquire a vocabulary of obscene and profane words when they associate with other boys at an early age. Girls do not ordinarily acquire this vocabulary. Since the vocabulary is taboo at home and in school, the boy has to be constantly on guard lest these words creep into his speech. Some boys do not have difficulty in keeping their linguistic patterns separate, due to rugged innate constitutions. Others are not so fortunate in having a constitution that will withstand the constant strain necessary to maintain separately these two speech systems. The boy who is carefully brought up will likely hesitate; this hesitation will occur especially in connection with words that sound similar to, or in which the initial syllables are similar to obscene or tabooed words. This hesitancy spreads to all kinds of words. Schnell (184) gives this theory a slightly different interpretation. He contends that males are supposed to develop aggressiveness and independence while females presumably are not expected to develop these traits. Aggressiveness and independence are the factors which are penalized in our cultural system hence stuttering is more frequent in the male.

Differences in type of breathing and earlier development of the motor centers of the left cerebral hemispheres in females have both been offered

as the causal factors of the sex ratio obtained. It has been held in this connection that women have predominantly a thoracic type of breathing in contrast with the abdominal type of breathing of men. This change in breathing was supposedly induced by corsets and girdles. Since thoracic breathing is theoretically most favorable for good speech habits, women manifested fewer disturbances. Fletcher criticizes the validity of the theory on a basis of the fact that the majority of

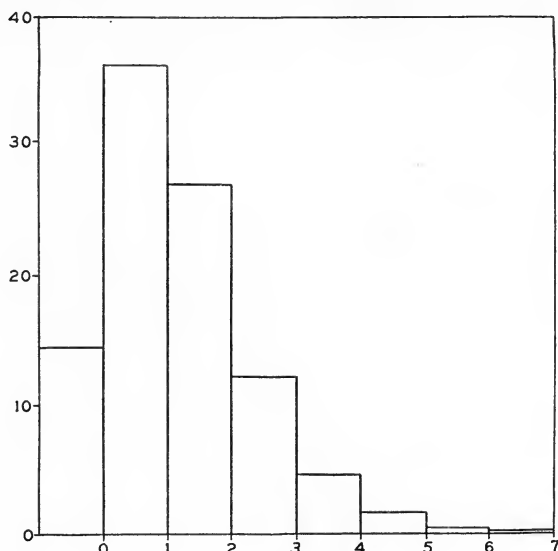


FIG. 22. Distribution of degree of retardation for 599 school children who stutter. The abscissae represent successive years of retardation. The ordinates indicate frequency of cases for each year in terms of percentage. (Constructed after Wallin's data.)

stutterers commence before the age when these influential conditions become operative. He made an additional check of the Japanese, among whom the dress of the two sexes was very nearly alike. In a report from the Bureau of Education of Japan, 135,852 boys and 20,637 girls were affected with this disorder. These findings indicate that dress, in so far as it modifies breathing and in turn influences stuttering, is insignificant. In connection with the theory of Dunlap which has already been outlined, age may be expected to play an important rôle. Since the majority of stutterers begin the habit before entering school or in the first few years at school, it is not unreasonable to suppose that in this period of time, the child comes most directly in conflict with

parental and outside authority. It is also the period when the youngster must begin to express his views or thoughts verbally before a critical audience. This latter idea has been developed by Fletcher in his theory of stammering. These conflicts with authority and possible fear of criticism of their verbal ideas, apparently lead to speech disorders. The rate of incidence is higher at these ages than in later years, due in all

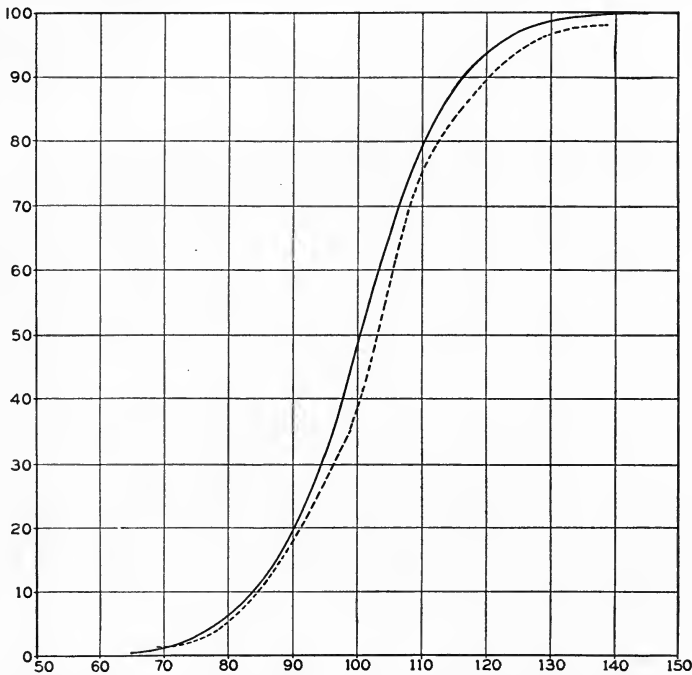


FIG. 23. Cumulative frequency curves representing distribution of intelligence quotients for 905 unselected children and for 73 stuttering children. The solid line indicates the cumulative frequency of intelligence quotients for normal children; broken line indicates same for the 73 stutterers. The abscissae represent intelligence quotient scores; cumulative percentages are shown on the ordinates. Compiled from data in Travis' *Speech Pathology* and Terman's *The Measurement of Intelligence*.

probability to the fact that pressure is more pronounced at a time when formation of speech habits is taking place. It has been suggested earlier that intelligence is related to speech defects. The next problem is to determine just how closely intelligence is related to stuttering. In special classes in the public school system an unusually large number of stutterers will be found. These classes in the majority are made up, of course, by those pupils who are mentally retarded. Superficial ex-

amination of the preceding distribution curves (figs. 22 and 23) seems to deny and affirm the relation at the same time. Figure 22 is a representation of data secured by Wallin in St. Louis. Figure 23 shows the actual distribution of I.Q.'s for 73 stuttering children superimposed on the distribution of I.Q.'s for a large number of normal children. It must be remembered that language is an essential element in the majority of intelligence tests. Since stutterers are deficient in this respect, it might be expected that they would be very inferior when compared with normal children by these standards. In spite of the fact that a large number of stutterers are retarded, there are quite a few that are advanced or above the average mentally. Most people can point out cases of stutterers who have become successful business men or teachers. Galton (185) was among the first to show that men of genius were afflicted in this manner to a greater extent than is found in the average population. Jacobson (186) later founded a theory for genius based upon neural instability and pathological conditions. To say that intelligence is the chief factor in the development of stuttering must be questioned.

Personality differences have been scrutinized in many ways, but in general the only major conclusions are that stammerers tend to have some of the traits usually found among neurotics. Richardson (187) employing the Rorschach and the Thematic Apperceptive Tests found a difference between normals and stutterers in the movement and color responses on the former test, but no significant differences on the latter. We have already mentioned the disagreement concerning inferiority and aggressiveness.

HANDEDNESS IN RELATION TO STAMMERING AND STUTTERING

The relation of handedness to stuttering has occupied such a prominent place in many discussions that one might be led to believe that the whole problem of speech was one of handedness. The information on the point cannot be ignored, but the weight assigned to handedness needs to be decreased by a wide margin. Before attempting an analysis of stutterers who are left handed or who have been changed from left handedness to right handedness, let us examine the explanations offered for the preferential use of the left hand. Most individuals exhibit a preference for the use of the right hand; the estimated number of people who at one period in their lives exhibited preference for the use of the left hand is 20 per cent. There is considerable disagreement on this point, since the various estimates range from 2 to 20 per cent. Carrothers'

(188) recent survey of 225,000 pupils in the schools of Michigan, reveals that 8.2 per cent are left-handed. There are certain others who do not show a preference and are termed ambidextrous. It must be remembered that preferential handedness is a matter of degree. Those who prefer either the one hand or the other perform many tasks with the hand that is not preferred.

Travis (189) has developed the theory that handedness is determined by the development of a dominant gradient of excitation in the right or left hemisphere. He assumes that in the right handed individual the left hemisphere dominance occurs and in left handedness the right hemisphere dominance occurs. There is a lack of dominance, according to his theory, in the ambidextrous individual. He has summarized various experiments to explain this dominance of the left hemisphere. It has been explained on a basis of a quantitative difference in blood supply and on fetal position. In regard to the first causal factor Travis summarizes the theory of Jordan. Jordan (190) maintains that in the fetus, the branches of the aorta are so arranged in the majority of people that the left hemisphere and right arm receive a greater quantity of blood than do the opposite hemisphere and opposite arm. This accounts for the more adequate development of these neurological and anatomical structures. Any disarrangement of this circulation may result in a reversal of development and consequently in left handedness. Peterson (191) questions the validity of Jordan's theory. He ligated either the right or left carotid artery in rats before vascularization of the cortex occurred. Eighteen rats were treated in this fashion. When tested later for handedness, of 9 animals with the left carotid ligated, 4 were left handed, 3 right handed, and 2 somewhat ambidextrous. Of the 9 with the right carotid ligated, 2 were right handed, 6 left handed, and 1 ambidextrous. It may be concluded that dominance of one hemisphere of the brain of the rat is not due to unequal blood supplies coming from the carotid arteries. Travis also cites the work of Tsai and Maurer (192) to prove his hypothesis. These investigators report that a vitamin B deficiency produced a greater number of left handed rats than is normally found. The author cannot see in the case of these animals why the deficiency should not operate towards producing an effect on both the cerebral hemispheres. There is another piece of work by Peterson (193) which has a greater bearing on Travis's theory. Peterson employed 7 rats in his experiment and used as his criterion of handedness the number of times out of 50 trials a rat reached for food with either its right or left forefoot. Of 6 rats, 3 were right handed,

2 were left handed, and one ambidextrous. Cortical areas were destroyed on the left side of the right handed animals and on the right side of the left handed animals. On the animal that was almost ambidextrous a portion of the cortex on the left side was destroyed. After recovery from the operation, 5 of the animals showed a definite transfer in the use of the hands. One did not. The ambidextrous animal changed from the slightly favored hand to the use of the nonfavored hand. Milisen (194) in attempting to ascertain whether handedness in rats is innate or determined environmentally reached the conclusion that it is caused by the interaction of the two factors.

The rôle that fetal position plays in developing cerebral dominance is not so well established. Travis maintains that stimulation arising from the vestibular apparatus is essential for controlling the normal fetal position. In this contention he may or may not be correct. He summarizes the work of Seaman and Precechtel, in which they have attempted to show the relation between abnormal fetal positions and speech defects. He has not tied this up directly with handedness although the implication is that many motor disturbances, including handedness and speech, must be controlled by these abnormal positions. Just how these positions influence the development of cerebral dominance he does not make clear. It has been suggested in connection with fetal position that the left arm is less capable of moving in utero. This may result in a general neural organization favoring the left hemisphere, since the right hand and arm are capable of slight movements which give rise to afferent kinesthetic impulses. It may be inferred theoretically then, that the causation of left handedness is definitely linked with the causation of stuttering. Overstreet (195), however, has compared eyedness and handedness with birth attitudes as obtained from the obstetrician in 85 subjects. She found practically a zero correlation. Cortical control of speech for right handed persons is located normally in the left hemisphere; for left handed persons it is located in the right hemisphere. When a change in the use of hands is forced upon the individual, an incoördination of the function of the two hemispheres occurs. Travis (196) says:³

My point of view is that in most cases the act of stuttering is a neuromuscular derangement secondary to general reduction in cortical head control. The latter is conceived to be due to transient and mutually inhibitive activities of the right and left cerebral

³ Reprinted by permission from L. E. Travis, *Speech Pathology*. D. Appleton-Century Co.

hemispheres. In the stutterer, instead of nervous energy being mobilized by one center of greatest potential, it is mobilized by two centers of comparable potential. Because both of these centers when operating singly function in reaction patterns of opposite motor orientation and configuration, there is produced in the peripheral speech organ an undesirable competition in the resulting muscular movements.

Proof of the influence of change of handedness on stuttering centers in those cases in which the speech aberration develops concomitantly with the change in handedness. Bryngelson (197), according to Travis, studied 200 cases of stuttering and found that 62 per cent of them had been required to shift from the use of the left to the use of the right hand. Clinical studies by other investigators of some cases indicate that a change in handedness produces stuttering and when the individual is allowed to relapse into the use of the preferred left hand the speech difficulty clears up. War veterans, whose arms have been amputated because of injury, are reported to have developed a speech difficulty when forced to acquire new motor habits with the remaining arm and hand.

There is one factor which Travis has ignored in his discussion, namely, *the widespread belief* that a change in handedness produces stuttering and stammering. It is *possible* that suggestion or *belief in this idea* is the predominant element in the situation. Since stuttering may be relieved by suggestion in many cases, auto-suggestion is not an improbable cause. Several cases treated by the author have been able to talk in quite fluent fashion while under hypnosis. Before the suggestion treatment has been completed, the old speech habits immediately manifest themselves, when the patients are awakened. Morsh (198), as well as others, has successfully transferred writing from the left to the right hand without any deleterious results. Fletcher (199) has criticised the importance of change in handedness in influencing speech. Using the data obtained by Wallin in the St. Louis Schools, he concludes that the notion is erroneous. It was found that only 4.9 per cent of the pupils who show speech defects were left handed and if those who had been changed from one hand to the other (so-called dextrosinistrals) were added, the percentage would be 9.9. Among those changed, only 9.4 per cent exhibited any speech defect. Fletcher states "The fact that 90.6 per cent of the children who were thus forced to change to right handedness suffered no such effects seems out of agreement with the theory as a whole." Further on in his discussion he says, "A rule that goes wrong in 90 per cent of cases will *ipso facto* lead one to suspect that other causal agencies in the case may have been overlooked." Parsons

(200) contends that not a single case of stuttering could be found in the public schools of Elizabeth, New Jersey, that could be attributed to a change in handedness. This state of affairs existed in spite of a 4 year effort to change all left handed pupils. The writer wishes to stress the fact that a change in handedness in itself may not cause stuttering, but the method employed in changing the manual habits is of paramount importance.

Preferential handedness has been attributed to preferential eyedness by Parsons. In contrast with this point of view, the student should remember that Travis assigns both handedness and eyedness to cerebral dominance. Eyedness can be determined very simply by Miles' A.B.C. Test. This is nothing more than a cone shaped cardboard, large enough at one end for taking in both eyes and tapering to about an inch and one half at the other end. Have the individual look at you through this cone and notice which eye is visible. The visible eye will be the preferred eye. Parsons found about 30 per cent of school children were left eyed, and of these 12 per cent were left handed. This discrepancy is explained by the fact that the motor habits of the right hand must be developed by those whose natural tendency is to be left handed in order to meet every day situations which are constructed usually for the right handed person. Although Parsons' contentions are interesting, they are not adequately proved. His idea presupposes that the eye mechanism functions before the muscular mechanism of the hands and arms. It would be interesting to know in this connection how congenitally blind individuals compare with normals in preferential handedness.

The most important contribution to the whole field of cerebral dominance has been made by Smith (202). We should like to present a quotation from his work since it tends to disprove most of the contentions set forth by the previous exponents of the theory of laterality and cerebral dominance:⁴

"Another aspect of the theory of lateral cerebral dominance which is contradicted by the results of this study is related to the effects of section of the corpus callosum upon language functions. In the theories advanced by Orton, and Travis, speech disturbances as well as other types of psychological dysfunction are accounted for in terms of lack of dominance of one hemisphere. It is supposed that the absence of specific dominance in some cases gives rise to motor blocks which are

⁴ Smith, Karl U. Reprinted by permission of J. Gen. Psychol., 1945, 32, 76-77.

evident especially in the complicated motor adjustments of speech. The present observations, including as they do data on a fairly large sample of individuals in whom the neural connections basic to intercortical integrations have been abolished, provide an adequate basis for an evaluation of this hypothesis. Speech disorders were not evident in any of the patients subsequent to section of the commissural pathways of the corpus callosum. One patient stuttered as a child and had a recurrence of this defect in combination with aphasic signs after a brain abscess, which occurred some three years prior to this experiment. This man's speech became neither better nor worse after complete division of the pathways of the corpus callosum. Case 13 displayed before operation a tendency to stutter under emotional excitement. He could speak very well on the day after operation but his speech blocks during emotion were later evident. These observations seem to prove that speech functions are independent of intercortical integrations which may be mediated by the commissure systems at this level. Accordingly, it may be questioned whether or not cortical dominance and subordination are related to the phenomena of stuttering and speech dysfunction as intimately as has been suggested.

It is the opinion of the writer that the results of the experiment point toward a comprehensive revision of all present ideas about cerebral dominance and intercerebral coördination of function. They prove without much question, that the concept of lateral cerebral dominance as it has been variously modified to explain facts related to laterality in behavior, has been improperly interpreted. In terms of this experiment, it cannot be asserted that the commissure systems of the hippocampus and the anterior commissure take over the functions of the callosum in its absence, for it has been shown that the motor organization of the individual is not greatly changed by the section of these pathways in conjunction with partial and complete division of the fibers of the callosum. As far as the neural basis of laterality and its relation to cortical dominance and subordination is concerned, it seems likely that, if any kind of cortical or cerebral dominance exists at all, it has very little significance in determining sidedness in comparison to inequalities of function that must exist at lower levels in the nervous system.

The neurological concept of lateral cerebral dominance logically is based upon the fact that lesions in one hemisphere, contralateral to the preferred side of the body, generally produce symptomatic disturbances, such as speech dysfunction, which are not found as a result of similiar

lesions occurring in the other hemisphere. This view seems to be fairly well supported by facts in human neurology, not only in respect to speech functions (Weisenburg) but also in regard to some perceptual activities. No evidence is provided by the present observations in support of or in contradiction to this view. But it is clear from this study that the predominant significance of one hemisphere in motor and perceptual capacities is not based upon direct neural connections between the two cortices of the brain, as provided by the corpus callosum or other cortical commissures. Presumably, therefore, lateral cerebral dominance must rest upon imbalance in function at levels below the cortex, in which interaction between two sides of the system is important, or is the result of explicit anatomical localization on one side of the cortex of certain complicated speech and perceptual functions. It seems clear that direct neural interaction between the two cerebral cortices carried out by commissural fibers is not indispensable for the development of maintenance of this functional localization."

PHYSIOLOGICAL CONCOMITANTS

The symptoms of stuttering are numerous and varied. The first of these symptoms is the manifestation of repetition of speech sounds and blockings in the attempt to speak syllables, words, or sentences. Other manifestations which may to a certain degree be observable are detectable by laboratory methods. The primary derangements of the speech mechanism include disturbances in breathing, control of the abdominal and thoracic movements, control of larynx, control of tongue movements and the muscles of the jaw. Records of disturbances of the above mechanisms have been made by many investigators. The methods employed for this purpose need not be discussed here, although it may be noted that the pneumograph and galvanometer have been most frequently utilized. The results of these investigations show rather clearly the lack of synchronism between the various parts of the speech mechanism. Different cases present different types of lack of synchronism. Strother and Kriegman (201) disagree with the general conclusion that stutterers suffer from a general arrhythmokinesis since they found that stutterers could reproduce as well as normal subjects a given rhythmic pattern with movements of the jaws, lips, tongue and forefinger.

The lack of complete understanding of the causal factors in asynchronism has led to different theories and types of therapy. These therapeutic measures call for exercising of the part of the mechanism asynchronized. Asynchronization in stuttering does not occur because

of a pathological condition of the central nervous system, but must be explained by some functional disturbance, so that these various muscle groups are innervated in an irregular order. The muscles of speech respond then in a nonrhythmical incoördinated fashion.

Stutterers show many physiological disturbances and muscular incoördination of other parts of the body. According to Gardner (203), the balance of such delicate muscles as those of the pupil of the eye tends to be affected during the speech spasm. Since the hands and arms are a medium of communication, disorders might be expected to occur in the function of these members. Travis (204) and his co-workers have found that the rate of tremor movements of the hands is different for the normal and the stammering subject. These involuntary movements are ordinarily under cortical control. Since they are modified in stutterers, the investigators have concluded that the cortical control must be modified. The innervation of the 2 arms in the right handed subject during voluntary contraction is found to take place in the right arm first, followed by innervation of the left arm. In stutterers, the order of innervation is varied, occurring frequently in the nonpreferred arm first or simultaneously in the 2 arms. In a study of mirror drawing, it has been found that right handed stutterers do much better with the left hand than they do with the right. This is in direct opposition to the results found in the normal individual. All of these facts, according to Travis, point to the lack of cerebral dominance in the case of left handed individuals. He offers these experiments in support of the theory mentioned earlier. These phenomena are concomitant with the speech defect and are not necessarily etiological factors. The same explanation will suffice for both the speech aberration and the muscular peculiarities.

Vasomotor changes and changes in the psychogalvanic response accompany stuttering. That these changes precede the onset of the speech attack is doubtful. They are more probably symptoms of a general emotional disturbance. Certainly both kinds of response occur in normal emotional situations, and no speech difficulty is encountered. Just why they should be so important under certain circumstances and not in others is not clear, unless still other physiological or psychological conditions are the controlling causes. Robbins (205) reports that there is a congestion of blood in the brain during stammering. This was observed in a patient with a trephined skull. The volume returned to normal when speech occurred without stammering. The significance of this observation must be evaluated in light of the above discussion.

THEORIES

The theories advanced for explaining stammering and stuttering are closely associated with the various symptoms ascribed to these defects.

The following list includes the majority of the theories.

1. Dunlap's Theory of Vocabulary Taboo.
2. Fletcher's Theory of Fear Conditioned by Social Situation.
3. Travis's Theory of Reduction of Cortical Dominance.
4. Bluemel's Verbal Image Theory.
5. Swift's Visual Central Asthenia Theory.
6. Adler's Inferiority Theory.
7. Psychoanalytic Theory.
8. Imitation Theory.
9. Various Anatomical Theories.
10. Various Physiological Theories.

Dunlap's theory has already been discussed (page 115) in explaining sex differences in stuttering. Travis's theory has also been stated (page 119) in the discussion of eyedness and handedness. These theories will not be commented on further at this point.

Fletcher (206) has stressed the importance of social situations in the etiology of stuttering. The following quotations from Fletcher will aid in understanding his point of view. He says, "All communication demands a social adjustment, either intellectual or emotional, or else both at once." "The stutterer's adjustment, therefore, is not unique in being of a social character. It is unique only in that it invokes an exaggeration, or morbidity of certain factors of social adjustment, especially those of feeling attitudes." He does not limit his concept to include only fear of using tabooed words as did Dunlap. He includes any emotional condition which arises from the realization of the social relationship between speaker and auditors in which anticipation of possible unpleasant consequences of failure to meet these social adjustments is the predominating element.

In support of this theory, Fletcher has pointed out instances of permanent and temporary disappearance of stuttering when the social situation has been modified. Distraction and the removal of consequences of the failure to meet a social situation will serve this purpose. Some individuals can swear or sing, although they cannot speak, without stammering. In these forms of communication, there is a change in the social relation between the speaker and auditor, or else other emotional factors such as occur in swearing dominate the usual relations

involved in speech. The ability of stutterers to read and speak while alone, or when they believe they are alone, adds additional evidence to the concept of social interaction. For example, some stutterers can speak normally into the transmitter of a telephone when the receiver is left on the hook. As soon as this is removed by another person, disturbed speech reasserts itself.

Eisenson and Wells (207) corroborated experimentally this notion of Fletcher. They introduced an element of responsibility in communication in choral reading and found that there was an average increase of 60 per cent in stuttering spasms over that found in the same group in choral reading when carried on without responsibility.

Fletcher also calls attention to the teacher who speaks normally when teaching but who stammers when he assumes the rôle of student in the summer time. There is in this case a complete change in the social adjustment required. The writer wishes to call attention to a case which he saw after the lapse of about 4 years. This college man stuttered quite badly at the time he left college. In the interim he had been stationed in South America, where he acquired a speaking knowledge of Spanish. While speaking Spanish, the speech defect disappeared, but upon his return to this country the speech difficulty reappeared. The speech defect reappeared, however, only when he attempted to talk with someone who knew him previous to his going to South America. Self consciousness and embarrassment arising from old social situations were sufficient to reinstate his old speech habits.

Blanton (208) has attempted to analyze the fear factor rather than the failure of the social adjustment. Among a group of soldiers studied, 6 began to stutter with service at the front; 7 were stutterers who relapsed with service at the front; 6 who had stuttered previously relapsed with service in this country when confronted with a dangerous situation such as a fight, a runaway horse, and a narrow escape from an explosion.

The theories of Bluemel and Swift may be grouped together, since the underlying assumptions of both are quite similar. Bluemel assumes that the stutterer's difficulty is due to transitory auditory amnesia. The individual cannot reproduce a sound or word because he or she has no auditory image of the sound to be reproduced. Swift's (209) theory is essentially the same except that he attributes the inability to speak correctly to lack of visual imagery. These theories deny the primary rôle of embarrassment and fear and state they are only secondary. They further assume, especially Bluemel, that the temporary auditory

amnesia is the result of circulatory changes in the brain which produce congestion or anemia. Swift places more emphasis on a general weakness for visual imagery than he does upon a temporary condition. The basis for their assumptions has been a study of the imagery of stammering and stuttering cases. Both claim to have found by means of questionnaires that individuals who have these speech defects are weak in auditory imagery or visual imagery. Both theories are open to criticism on a basis of the methods employed for determining imagery. Both are open to a more serious criticism in that they have to assume that the motor responses are dependent upon and are similar to the ideas which initiate them. The whole theory of ideo-motor activity has been questioned and to make it the sole agent for the fine adjustments necessary for speaking seems to be stretching the point.

Bluemel's (210) view on the importance of auditory amnesia in stuttering seems to be altered to a considerable extent in his later writing. He has adopted conditioning (conditioned reflex theory) as a general explanatory principle. His theory does not differ greatly from that of Fletcher, except that he emphasizes causes other than the social situation in the conditioning and couches his theory in conditioned reflex terminology.

The inferiority theory of Adler (211) and the psychoanalytic theories may well be considered together. These theories assume that the speech difficulty arises because of some marked anxiety due to unconscious emotional complexes. The nature of these depends upon the school with which the analyst is identified. Some points of the psychoanalytic theories do not differ appreciably from those set forth by Dunlap. While Dunlap maintains the acquisition of obscene and swear words leads to hesitation in speech, he insists that they are conscious factors. The analysts, on the other hand, insist that the memory of these words or desires tabooed by society are repressed. The repressed memories center in sex words and sex acts to a large extent in the concepts of the analysts. Coriat (212) even goes so far as to maintain that infantile oral eroticism with its accompanying sucking movements and pleasurable sensation is the basis for these speech defects. In other words, he has to postulate a repressed stage of infantile oral eroticism for stutterers. Whenever an individual who has a repressed condition of this kind begins to talk, certain movements of the mouth are comparable to the erotic movements and result in the reestablishing of the emotional situation which accompanied the erotic act. Certainly it may be questioned with propriety whether all stutterers have gone through a stage

of oral eroticism and if they had, whether any emotional situation was aroused that would produce all the secondary symptoms accompanying stuttering.

Adler's inferiority theory does not lay so much stress upon the sex element. He assumes that stuttering is a compensation for a deficiency. It is the method by which a particular type of personality asserts his "ego." Satisfaction is secured; the individual obtains superiority or sets himself off from the group by punishing himself. The affliction enables the stutterer to say that he would be great or that he would accomplish much greater things if it were not for the handicap. The only difficulty with this theory is that stutterers cannot be shown to have a feeling of inferiority except in regard to their speech. This feeling concerning speech may be the result of their inability to speak correctly rather than the cause of it. Meyer (213) (214) from clinical studies of stutterers fails to find evidence of inferiority but does think there is good evidence of anxiety and schizoid traits. His idea is that stuttering is a conflict between a conscious desire to speak and an unconscious desire not to speak, as is exemplified by the classical stuttering of the marriage proposal. The foundations of more deeply rooted stuttering may be traced to the child's failure to attain oral satisfaction, leading to pain, anxiety and hunger with attendant verbal aggressiveness which is dangerous before feared persons.

Some people attribute stuttering to imitation. It is probably true that a few individuals do begin to stutter from hearing other people. Imitation will not explain why they imitate incorrect speech rather than correct speech. Since there are more people who do not stammer than those who do, everyone is exposed more to correct speech habits. Johnson (215) has made an interesting observation on the Bannock and Shoshone Indians. He was unable to find evidence of stuttering; furthermore, the language contained no word for it. He suggests therefore that semantic environment may be a causal factor. This interpretation has some of the elements of suggestibility as a factor and is therefore mentioned along with imitation.

The anatomical theories have been limited only by the various mechanisms involved in speech. The tongue, teeth, nasal passages, and other parts of the speech mechanism have been altered in numerous ways in order to test out these theories. Unfortunately these changes have little to do with stuttering, although the distraction brought about by the changes is sufficient in some cases to cure the speech defect. Physiological theories involving breathing, vasomotor changes, and

differences in endocrine secretions do not offer any better results. The stutterer manifests many alterations of these functions during his abnormal speech, but does not exhibit any decided differences when not stuttering. These are symptoms of stuttering and not etiological factors.

Gordon (216) has attempted to show that the stammering symptoms are linked up with still other forms of aberration. His studies indicate that stammerers frequently have symptoms common to allergic disturbances and that many of the stammerers also suffer with enuresis.

THErapy FOR STAMMERING AND STUTTERING⁵

The therapy for stuttering has undergone a variety of changes, although the old method of Demosthenes seems as effective as some of the other methods suggested and used. Distraction has received much attention as a therapeutic method. In many types of therapy, ordinarily called organic, the sole efficacy has been in distraction. Demosthenes's method of holding pebbles in his mouth and allied methods of cauterizing the tongue, cutting the tongue in various ways, cutting of the branches of the glossopharyngeal nerve, paying strict attention to breathing, and applying bitter substances to the oral cavity have all been successful in curing some cases. Most of the cures have been effected because attention has been directed away from the fear of speaking and its consequences. Another method of curing stuttering which involves distraction to a certain extent, as well as conditioning, is that of performing some act, such as beating time with each spoken word. This may be done in time with a metronome or in rhythm with the hand movement of the subject. When attention is directed to beating time, it cannot be placed on the speech process. The conditioning aspect of this method is analogous to Pavlov's conditioned reflex. Since most stutterers can beat time with a metronome without difficulty, it is assumed that if a word is spoken with each beat, this time sequence or rhythm can be established definitely through practice. Later the beating may be dropped. Unfortunately, the method frequently leaves other muscular habits which are as bad if not worse than the original defect. Suggestion, either direct or indirect, and hypnosis will bring about cures in some patients. If the stutterer has confidence in the doctor or in the speech instructor, a statement that

⁵ For a more extended survey of this area, the student is referred to *Speech Correction; Principles and Method*, by Charles Van Piper, 2nd ed. Prentice-Hall, New York, 1947.

the subject will no longer stutter is effective. Certain quacks apparently succeed by bullying the individual. Various people have reported cures of stammering and stuttering by means of hypnosis. The general technique is to hypnotize the patients and give them post-hypnotic suggestions that they will not have any difficulty when they awake. The technique is not quite as simple as has been stated, but this description of it suffices for our present purposes. The efficacy of this method may lie in bolstering up the individual's self confidence. Most subjects can speak correctly if a brief time limit is given at first in a post-hypnotic suggestion. Once they find that they can speak correctly, this enables them gradually to carry on the process in all their speaking.

The next method which needs consideration is applicable only to those cases where a strong emotional shock has produced the speech difficulty. This type usually develops almost immediately following the traumatic condition. Psychoanalysis or hypno-analysis may be satisfactory methods of discovering the source of the difficulty. Taylor (217) and McDougall (218) both cite instances in which the emotional element has been discovered by means of hypnosis. A case cited by McDougall points out clearly the factors that operate in establishing this variety of stuttering. A young soldier, with a strong religious tendency as a result of strict training, was buried by an exploding shell. Just before losing consciousness he swore violently. He stuttered when he regained consciousness. During hypnosis he was carried back to the original incident and memory was entirely recovered for the lost events. His speech defect also disappeared. This case demonstrates that the symptoms exhibited may be referred back to incompatibility of feelings centered in his early religious training.

Adjustment of the environment has been most strongly advocated by Fletcher for relieving stuttering. In some instances, this is practical; in others, it is not. Most of the difficulty occurs with parents and teachers who attempt to correct speech difficulties by punishment or by continually calling attention to them. This treatment usually accentuates the condition. Class recitation does not usually aid stutterers, since it makes them the center of jibes from the other pupils. This may result in withdrawal from many other group activities. Since they cannot be segregated in many schools, the problem of handling them is exceedingly difficult. More tact is usually required than the average untrained teacher possesses. Any situation which involves the least embarrassment should be utilized for allowing the individual to express

himself. These situations have to be determined for individual cases. The writer wishes to cite, in this connection, the case of a stutterer which he has observed.

Girl twins about eighteen years old were in college together. The one took a very active part in college life and was a good student; the other was socially very agreeable, but not so active in college life and was not such a good student. The latter stammered. In working with this patient it was found that the parents constantly favored the first one mentioned. She was given charge of spending money and allowed to make almost all decisions for the other one. There was a gradual onset of stuttering, which was accentuated by constant parental attention. The parents were advised to send the girls to different schools, and a few other therapeutic measures were instituted. The stutterer showed considerable improvement from this change. Later, the girl married and moved to a different section of the country. Her speech problem, in the meantime, has disappeared. This case and the case cited earlier of the man who had little difficulty in speaking Spanish indicate clearly the importance of environmental influences.

Dunlap (219) has suggested a method of treating stuttering that is different from any advanced in the past. He advocates having stutterers stutter in order to rid themselves of this difficulty. Actual treatment by this method should not be undertaken by anyone who is not thoroughly acquainted with it. The psychological implications of the method are as follows:

Stuttering is an involuntary form of response and, since it is involuntary, cannot be controlled by voluntary influence. The way in which this voluntary control is secured, is to practice making the response with the idea that the response will disappear or will be brought under voluntary control. This method has been successful in treating some cases of stuttering and in breaking other bad habits. Whether it will be effective in the case of traumatic stuttering cannot be said for the moment. Case (220) in working with this method, found that it was desirable to consider two types of stammerers, (a) those occasioned by a strong emotional blocking which still persists and (b) habit residual cases that were originally induced by emotional conflict which has disappeared. He felt that the negative practice technique was particularly effective with the latter group, whereas a combination of therapies was desirable in the former group. Recently the use of electric shock has been employed in the treatment of stutterers. The results are not uniform. This may be expected since the treatment of psychoneurotics

generally by electric shock has not been too satisfactory. There are two possible explanations for whatever efficacy is claimed: (a) the shock destroys the underlying anxiety condition, or (b) the stuttering is the most recently formed speech habit and the more recently acquired responses are eliminated in some manner by electric shock. Owen and Stemmerman (221) think that the shock makes the patient more amenable to psychotherapy and to speech reëducation.

LISPING, PARALYTIC SPEECH, MUTISM, APHONIA, ECHOLALIA,
AND VERBIGATION

In addition to vocabulary acquisition, delay in speaking, stammering and stuttering, there are many other disorders. Travis (222) lists 7

TABLE 13
Distribution of various types of defects in 10,000 cases

Sound substitution.....	4,623.8
Stuttering.....	2,214.96
Oral inactivity.....	1,146.44
Structural articulatory.....	860.02
Dialectal.....	575.64
Functional voice.....	230.67
Structural voice.....	181.38
Hard of hearing.....	80.69
Paralytic articulatory.....	49.28
Paralytic voice.....	0.17

major groups with 43 subdivisions, Bridges (223) gives 13 special disorders with many variations. These will not be treated in detail and a selection will be made of the disorders which are treated. At the White House Conference on Child Health and Protection (224) the frequency of occurrence of various speech disorders was presented. This information is given in table 13. This table indicates, then, that of 10,000 speech defectives about 22 per cent will be stutterers, and less than 1 per cent will suffer from aphasia. An examination of the classification used reveals the prevalence of both functional and organic types.

Lisping is one of the defects with which most persons are familiar. Lispers tend to pronounce the sibilant letters like linguals, especially *s* as *th*. It is frequently attributed to faulty movements of the tongue, but may be due to any one of a number of organic causes. The shape of

the oral cavity, the size of the tongue, weakness of the muscles of the tongue and partial paralysis of the lips may be counted among the causal factors. Corrective exercises for articulation or operations may be tried therapeutically in some cases.

The paretic and paralytic speech represent disorders resulting from a total lesion or partial lesion of the central nervous system. Cerebellar lesions produce slowness, drawling, monotony, with a tendency toward staccato. The speech may be irregular and jerky. This speech is found in multiple sclerosis and after injury to the vermis. Cerebral lesions produce slurring, indistinct, and thick speech. Patients with dementia paralytica exhibit slow, halting, uncertain, stumbling and irregular speech. Lesions of the corpus striatum produce monotonous explosive speech. At times the voice becomes shrill and high pitched. The speech of the patient with paralysis agitans may be of this type. Pyramidal lesions in the medulla are usually bilateral. These lesions may be due to vascular hemorrhage or sclerosis of the pyramids involving the hypoglossal, facial and accessory motor nuclei. Difficulty in speaking becomes progressively worse as the lesion increases. Much effort is expended in trying to talk. Mutism is a disorder of speech which superficially may resemble paralysis. Patients who suffer from this are quite capable of speaking but will not. The etiology is linked with hysteria and schizophrenia and will be discussed later.

Other patients with mental disorders exhibit speech anomalies that have been classified under still different headings. Aphonia, echolalia, verbigeration, verbomania, pseudolalia, and neologisms are types that may be encountered.

Aphonia is a weakened whispering speech often encountered in hysteria and anxiety cases. One hundred sixteen cases of war aphonia were studied by Sokolowsky and Junkermann (225). They found the precipitating factor in most cases was a cold, sore throat, or laryngitis. The underlying cause is usually to be found in an attempt to escape from a problem for which the patient could find no solution, according to Risemann and Aagesen (226). One patient seen by the author was a female college student, referred because the teachers could not hear her in class. The cause seemed to be her inability to cope with her home environment. She learned of an extra-martial affair of her mother and became afraid lest she reveal her knowledge to her father. When removed from the home environment, her speech rapidly returned to normal.

Echo reactions or echolalia may occur under the following conditions:

1. Aphasia of the transcortical type, and advanced dementia
2. Low grade mental deficiency
3. Chronic epilepsy
4. States of clouded consciousness
5. Catatonic states
6. Early speech development in childhood
7. States of fatigue

It is usually brought about by impairment of cerebral functions in pathological cases; by discrepancy between strong impulse to speak and poor ability to understand in children; by attempt to understand spoken words (reinforcement) in other cases; and by simple imitation in still other cases.

Verbigeration is the repetition of the same word or sentences. This corresponds in a way to the obsessional and fixed ideas of certain psychopathic individuals. Verbomania is excessive use of words or garrulity. The chattering of some women has been described as belonging in this category. Pseudolalia is applied to the production of meaningless sounds. This has been applied to all forms of defective speech other than stammering and stuttering. The interpretation of "meaningless" leads to some difficulty, since some speech sounds may be meaningful to the speaker but meaningless to the auditor. Baby speech and sounds of idiots have in all probability a meaning for the user. Neologisms are the use of high sounding and misapplied words. They are frequently manufactured for the occasion. The stories attributed to negro ministers and the stories of Octavus Roy Cohen illustrate this type of speech.

DISORDERS OF WRITING AND GESTURE

The aspects of communication which are yet to be covered are those of gesture, writing, aphasia, and apraxia. Aphasia and apraxia are closely linked with the association process and will be discussed in a later chapter. Automatic writing and certain forms of dissociated speech may be treated more effectively at the same time.

There are found in written communication, aside from the kinetic disorders mentioned earlier in the chapter, disorders such as graphomania, pseudographia, and mirror writing. Graphomania is the tendency to write great quantities of material. Many dementia patients have this tendency. It may be a substitute means of expression where

vocal communication is hampered. Normal examples of this type of activity can be found by examining the telephone book, note books of students, and desks or tables. It is sometimes considered as a dissociated activity. When the written symbols are meaningless the activity is termed pseudographia. Scribbling of children up to the age of four or five may appear to the adult to be meaningless but it is not for the child. The same difficulty is encountered here in interpreting symbols as meaningful as was encountered in pseudolalia. Schizophrenic

THE BETHROWAL OF TOO BOO ROO TO SO LOON

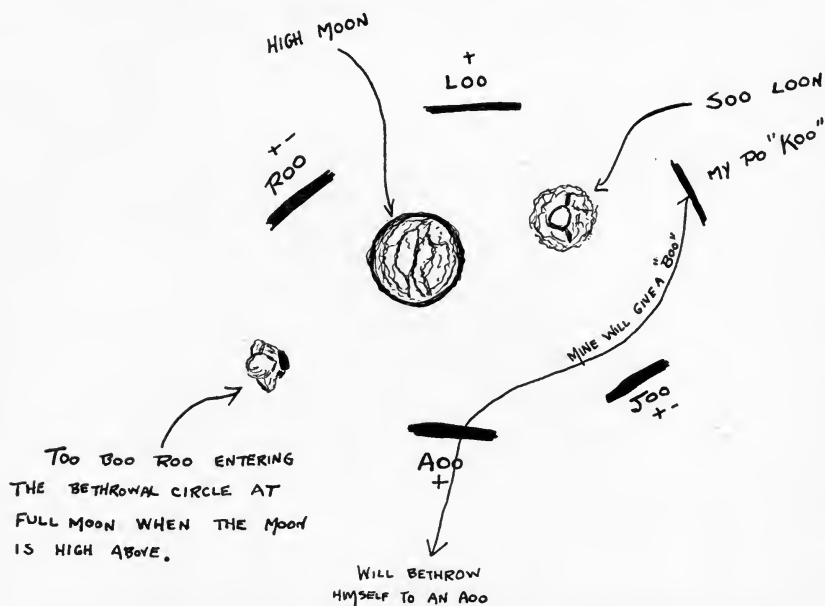


FIG. 24. Drawing of a schizophrenic patient. The coinage of characters and the unreality of symbolization are typical.

patients are wont to express themselves by strange and bizarre symbols. Contained in their writing will be found stereotyped expressions, neologisms and various combinations of symbols. An example of this kind of writing appears in figure 24.

In figure 25 an example of paretic writing is presented. The incoördination, lack of coherence, and omission are typical of the lack of muscular control and the mental ability of the individual. Quinan (227) in comparing the writing of 148 paretics with 200 normal persons found

A. It is a beautiful day
in the country and the
flowers are in bloom.

B. It is a beautiful day
in the country. The trees are
green and the flowers are in bloom.

FIG. 25. 4., Reproduction (actual size) of a sample of writing of a parietic patient. B is material which the patient was asked to reproduce. Note the incoördination and the inability to retain the sample material for even very brief periods of time.

that they wrote more slowly, omitted more words and gave the line an upward slope. The etiology of this type of writing is similar to the etiology of the paretic speech and gait.

Other psychopathic patients tend toward certain types of writing. The depressed patients (involuntional melancholia and the manic depressive in the depressed state) show a slowness and deliberation in their activity. Their writing may be small and very precise as illustrated in figure 26. In contrast with these, the hysterical and paranoid patient may show a style with flourishing and flowing letters. The former patient tends to do quite a bit of underlining. Paskind and Brown's (228) work shows that the letters of the words are taller for deteriorated epileptics than for non-deteriorated epileptics. This is explained on the basis that children tend to write larger than adults and that the centers controlling writing of the deteriorated patients never attain

*rhyme. It rhymed wonderfully, I remember
distinctly. The piece was in one of my readers.*

*I remember so well when I first learned
to read. There was a rhyme about a bird. I
know that it was a bluebird.*

FIG. 26. Reproduction (actual size) of writing by a patient with involuntional melancholia. Small precise writing is characteristic of many of these patients.

full maturity. Mühl (229, 230) has investigated handwriting and automatic writing as a possible means of discovering sources of conflicts and classifying psychopathic patients.

The sample of printing in figure 27 is typical of that done by some children in the beginning stages of writing. This form of mirror writing is abnormal when found in adults. The explanation for mirror writing is not very clear. It is assumed that the child has not yet grasped the significance of all the signs of space perception. It is quite possible that the child recognizes the difference in the spatial relations but sees no reason for changing his own procedure. A description of a case of this kind is presented by Billings (231). Morlass (232) postulates a disturbance of cerebral dominance to account for mirror writing in adults.

In communicating, meaning is partially conveyed by gesture. Some

languages depend upon this more than others do. The Latins use gesture much more than do the English. The usual jokes about the Hebrews and French employing gesture point to stock and language differences. The use of gesture is normal; some individuals carry it to an extreme. This is designated as hypermimia and may be the result of vocabulary impoverishment. It may be attributed to weakness of the speech mechanism or to faulty training in speaking. The use of the wrong gesture is called paramimia. There are certain characteristic gestures applicable to communication that are as definite as words. Pointing a finger or pounding on the table will be understood always as a gesture of emphasis. The acquisition of proper gesture depends upon environmental influence and training. Organic disturbances which

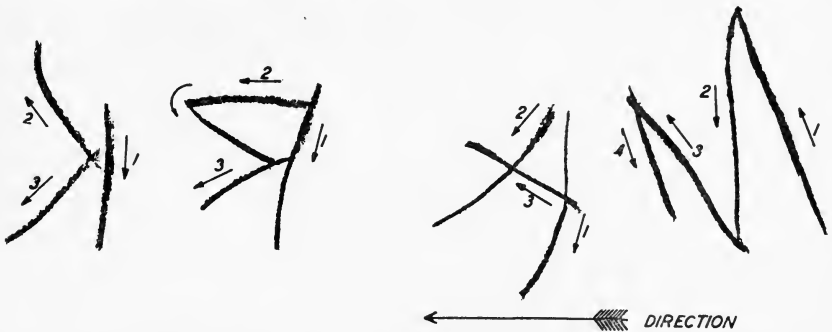


FIG. 27. Typical example of mirror writing. The word MARK was written in the directions and order indicated.

affect the sequence of muscular movements may cause improper gesture due to lack of synchronization of various muscle groups.

DISORDERS OF ELIMINATION

Motor disorders connected with the elimination processes of the organism have not usually been accorded recognition. Both urination and defecation are subject to disorder that may be of organic or functional origin. Aside from the inconvenience and embarrassment that are associated with such disorders, they may be symptomatic of other disorders or may cause other organic disorders. The control of the muscles of the anus and bladder is through nerves in the inferior mesenteric ganglion and the pelvic ganglion (parasympathetic system). In early life, the bladder and bowels empty automatically, but with the development of the pyramidal tracts and training, the muscles are usually brought under voluntary control. The cortical center involved in this

voluntary control is probably in the anterior central gyrus. There are also probably infracortical controls since some pyramidal lesions do not cause loss of control, whereas others may result in difficulty in inhibiting or initiating urination.

Obviously weakness or paralysis of the sphincter muscles will result in inability to retain fecal matter or urine. Similarly, faulty innervation through the reflex system, which is initiated by distension of the bladder or rectum may result in loss of control of the sphincter muscles so that they will be relaxed too readily or be contracted too much. Unquestionably habit and ideational factors play an important rôle. These disorders will be discussed more fully in a later chapter.

CHAPTER IV

BRAIN DAMAGE DISORDERS

(Topographical and Cytoarchitectural Relationships)

PATHOLOGICAL AGENTS IN BRAIN DAMAGE

In the preceding chapters we have discussed the disorders arising from sensory and motor difficulties. We are confronted at this point with the problem of tying these groups of disorders together through the central nervous system. It will become progressively apparent that structure and function are dependent upon each other. There are, however, many symptoms that are only indirectly related to the organic defect (structural defect) since symptoms not caused directly by the organic defect may be the means by which the organism responds to the damage. Symptoms are, however, related to dysfunction and dysfunction is in turn dependent upon organic involvement.

There are at least 5 major types of agents that produce pathology of the brain:

- A. Trauma (severance of nervous tissue by mechanical insult)
- B. Exogenous toxic agents (alcohol, lead, bromides, carbon monoxide, etc.)
- C. Endogenous toxins created by disease (typhoid, encephalitis, meningitis, etc.)
- D. Circulatory or blood conditions (arteriosclerosis, embolism, hemorrhage, etc.)
- E. Neoplastic conditions (tumors, thickening of meninges)

These various agents do not lend themselves equally well in working out the localization of functions of nervous structure. The effects of the agents in groups B and C are more likely to be generalized than specific, and this is partly true of circulatory or blood conditions. The effects of hemorrhage and embolism may, however, be relatively well localized. Tumors may be definitely localized, but pressure exerted on other parts of the neural structure or the interference with the circulation of non-involved structures may complicate the picture.

Our best sources of information, then, come from either experimental or accidental destruction of portions of the brain. It is obviously

impossible for us to include all the material that the student would derive from a course in neurology or clinical neurology, but this general survey will serve as an introduction to the general status of the field.

LOCALIZATION OF FUNCTION: GENERAL PROBLEMS

The effects of lesion or destruction of brain tissue are best known from experimental ablation in animals, experimental ablation in humans on whom no other method of therapy is available, and accidental brain damage which was quite frequent in the war. One of the major problems that arises is whether specific topographical (gross superficial) areas control specific psychological functions. Another of the major problems is how the cytoarchitecture (tissue composed of cells of similar size, density and shape) is related to specific function. We shall discuss primarily the first of these topics since relatively little is known about the clinical manifestations of disorders of cytoarchitecture of the brain. The correlation of histopathological conditions and psychological disorders is fraught with many difficulties and has aroused many differences of opinion. These differences are exemplified in part in Lashley's work on mass action versus localization of function. Lashley (233) has summarized the experimental work related to the theories of localization and mass action. He has also presented some of his original work in his book entitled *Brain Mechanisms and Intelligence*. Holding the extreme point of view of nonspecificity of function, he¹ says (234): "The most surprising outcome of the work has been the number of lines of evidence pointing to the equivalence of function of all parts of the cerebral cortex for learning. When the first study of mass relations was undertaken, I fully expected to obtain varied results from lesions in different areas, exhibited both through unlike effects upon the rate of learning and through qualitative differences in the solutions adopted by different animals. No indication of this has been obtained in any of the experiments. Selective effects upon habits already formed appear after diverse cerebral injuries, but in all tests upon learning subsequent to brain operation the effects of injuries to different areas seem to be qualitatively identical. There is no indication of a slower acquisition which can be related to the locus of injury, of one rather than another element of the problem."

Cobb (235) in writing on the problem of localization states:² "Twenty

¹ Reprinted by permission from K. S. Lashley, *Brain Mechanisms and Intelligence*. University of Chicago Press.

² Cobb, Stanley. Reprinted by permission from *Personality and Behavior Disorders*. J. McV. Hunt, Editor. Ronald Press Co., 1944.

years ago a wave of anti-localization disturbed the small pond wherein worked the specialists in cerebral function. The brain was said to be equipotential in function and clinical localization was belittled. The experimentalists, however, have enlarged their sphere, used more highly developed mammals (Fulton, 1938; Kluver and Bucy, 1939), and shown that the quite definite areas of functional localization on the cerebral cortex of man are phylogenetically predicted by less and less definite but still recognizable areas, all the way down the mammalian ladder. In short, rats show less specific localization and more equipotentiality, while man shows the opposite (Lashley, 1929). 'Centers' are still under suspicion, but 'areas' are quite proper."

There is, moreover, another factor even with animals that has apparently been overlooked. If animals were subjected to operations before the various areas had become functionally connected, would the specialized areas then be capable of assuming functions that belong ordinarily to another area? It is highly probable that the equipotentiality of function is due to the use of pathways which have been occasionally traversed but which are not normally employed.

Kennard (236) has thrown some light on this problem. From operative data on chimpanzees, monkeys, and humans, it has been ascertained that less motor disorder results from an injury to the cerebral cortex at an early age. The infant possesses considerable capacity for reorganization that does not exist at later ages. A relative functional non-specificity of cortical areas in the younger age groups is partially responsible for this fact.

Clinical observations of patients show rather clearly that the age at which lesions occur seriously influences the nature of the clinical symptoms. While autopsies of encephalitis victims of different ages often reveal similar lesions, the symptomatology exhibited before death in older people differs from the symptomatology in younger people. The adults may have headache, fever, diplopia, and insomnia, with very little disturbance of emotional or intellectual functions. Children in addition to headache, fever, and insomnia, may show restlessness, inattention, impulsiveness, moodiness, and negativism. These differences may be due to the incomplete development of neural systems and the instability of physiological processes in the younger age groups. The older age groups are less pliable in regard to reorganization and their response patterns are firmly fixed.

Goldstein (237) believes that additional factors operate in controlling the disparity between symptoms (function) and changes in structure. He holds that there are four types of observable symptoms: (a) defects

of performance; (b) symptoms due to the effects of separation of an undamaged area from a damaged one; (c) irradiation symptoms; and (d) symptoms which represent protective mechanisms against the effect of the defect on the total organism.

(a) Defects of performance are not solely dependent upon the location of the lesion. While lesions of the posterior central convolution produce sensory loss and lesions of the anterior central convolution produce movement disturbances, the losses are not uniform, but there is rather a modification of performance which is manifested in a retardation of psychomotor activity. This characteristic holds true for all neural regions as well as psychological levels. In addition there is usually some loss of abstraction. (b) In the organization of the nervous system each part functions in interrelation with the whole. Activity arising from a localized area is therefore partially dependent upon the functioning of other areas. (c) Irradiation effects are somewhat similar to those in (b). Scar tissue (resulting from lesion) may arise in an area that is in functional relation with another area, and the two may represent a functional unit. Impairment in either area would destroy the function of the unit as a whole. Goldstein (238) holds with respect to the symptoms under (d) that the organism has a fairly constant structure and a fairly constant function. When the individual is confronted with a task that he can perform, his performance and whole adjustment gives the appearance of an organism functioning at a normal level. This same individual when unable to accomplish the task confronting him may become fumbling, evasive, temperamental. His behavior pattern is one of considerable disorganization. Symptoms which may appear to stem from pathology are only a flight from the situations with which he is unable to cope and are a part of a protective pattern.

We shall present at this point a summary of the results of damage to the gross topographical areas of the brain. The topographical arrangement is presented in figure 28, and the architectonics are shown in figures 29 and 30. Since we have much information related to the visual area of the occipital lobe, this area will be discussed first.

VISUAL AREAS

It has been known since about 1800 that sensory functions are represented in certain parts of the sensory cortex and that destruction of certain relatively well-defined areas in the brain would produce a loss of the corresponding senses. These observations were established from the work of Flourens, Hitzig, and Minkowski. This earlier work has been extended by investigators such as Lashley (239), Franz (240),

Poljak (241), Holmes (242), Marquis (243), Kluver (244), and Smith (245). Work on tracing the sensory cortical pathways has produced very good results with regard to understanding the neuro-anatomy of the occipital lobes, but the mediation of various functions is not nearly so well understood. Tests for sensory impairment involve discrimination, judgment, memory and learning, and in many situations the

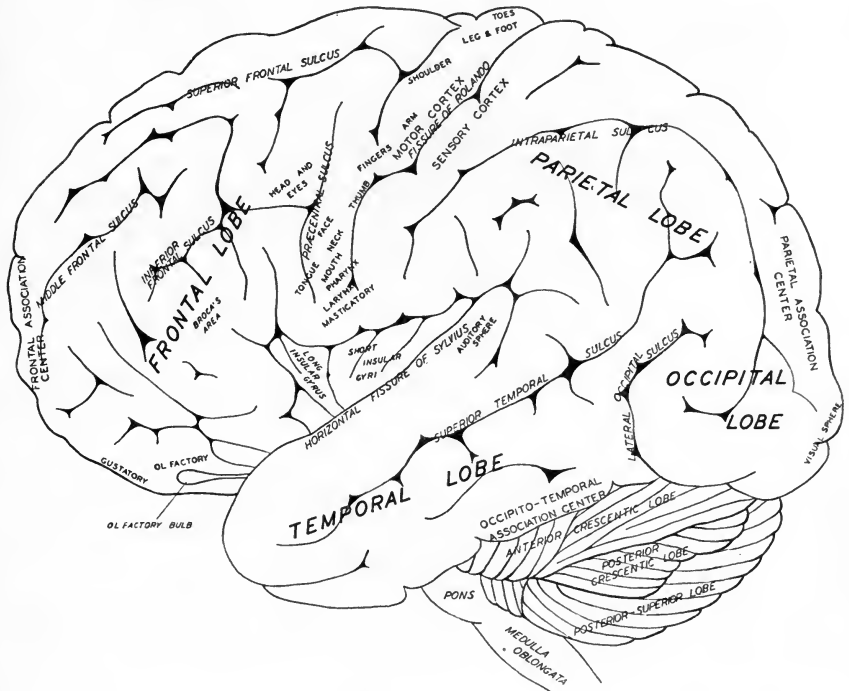


FIG. 28. Left cerebrum and cerebellum. Anatomical details in italics, functional details in roman capitals.

problem of what areas and what levels of the neural structure are involved is not at all precise. For example, Lashley (246) has shown that the simple brightness discrimination habit may be formed by rats in the complete absence of the cortical visual areas. The question arises, then, as to what areas are now serving this function. Freeman and Papez (247) have suggested subcortical areas. Their experiments with injury through the colliculi and posterior level of the thalamus, and Kapper's experiments on the thalamus show that lesions in these areas influence adversely the formation of the brightness discrimination habit.

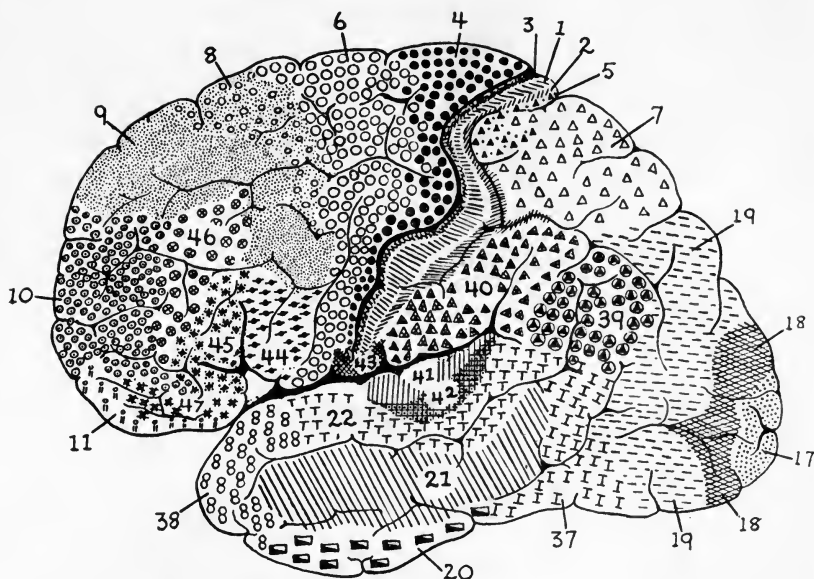


FIG. 29. Cytoarchitectural map of the human cortex, convex surface (after Brodmann). Reproduced by permission from O. S. Strong and A. Elwyn, *Human Neuroanatomy*, Williams & Wilkins, 1943, p. 360.

Key to cytoarchitectural maps*

General Area	Brodman's Area	Name and/or Function
Frontal Lobe	4	Motor; so-called 'voluntary' motor areas
	6	Premotor; extrapyramidal motor areas (there are others also)
	8	Frontal eye field; motor for eyes
Parietal Lobe	9, 10, 11, 12	Prefrontal; frontal association areas
	44, 45	Broca's area; premotor area for face, speech
	3, 2, 1	Postcentral area; somatic sensory functions
	5a	Preparietal
	5b	Superior Parietal } parietal association areas
Temporal Lobe	7	Inferior Parietal }
	41, 42	Primary acoustic area
Occipital Lobe	possibly also 22	
	17	Striate cortex; primary visual area
	18	Occipital area; visual association area
Allocortex	19	Preoccipital area (strictly speaking this is in the parietal lobe); visual association area
	28, 29	Probably sensory areas for taste and smell

* We list here only those subdivisions which are fairly well established and are of physiological significance.

Ghiselli and Brown (248) in discussing this problem state that "the brightness discrimination habit can be formed in the absence of any (but not all simultaneously)³ of the primary visual structures." That

³ Writer's insert.

this view will hold for all visual functions is of course doubtful. Lesions in area 17 (figure 29) which is the receiving point for visual stimuli result in disorders such as anopsia, hemianopsia, and scotomas, which were discussed earlier. Contiguous areas 18 and 29 (figure 29) are involved in more complex visual processes such as recognition of visual objects, form, distance, and movement. More will be said of these disorders in our discussion of agnosia.

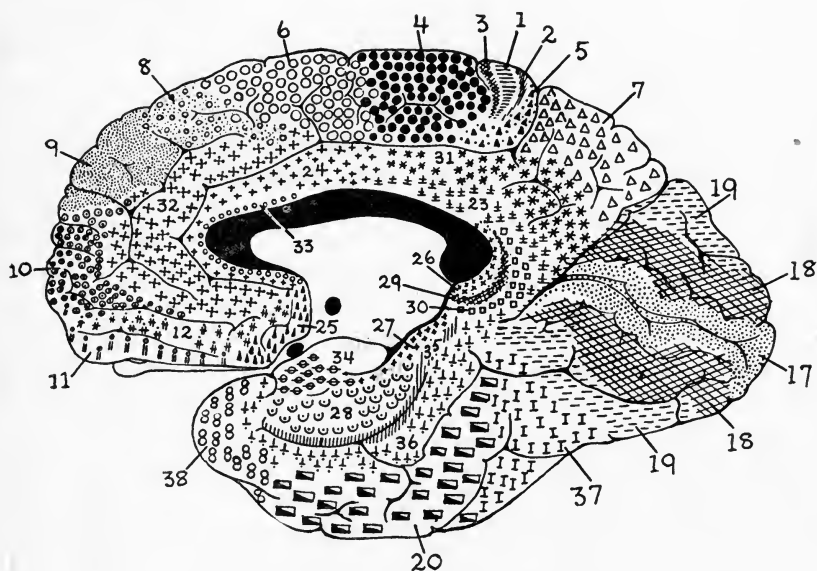


FIG. 30. Cytoarchitectural map of human cortex, medial surface (after Brodmann). Reproduced by permission from O. S. Strong and A. Elwyn, *Human Neuroanatomy*, Williams & Wilkins, 1943, p. 360.

AUDITORY AREAS

Area 41 is the primary reception center for audition, and areas 21, 38, and 42 are related to the more complex processes of perceiving of words, language, and music. These areas are grouped together in the temporal portion of the brain and are joined in complex fashion by connecting nervous tracts. Testing the effects of destruction of area 41 is again not a simple matter since tests on animals involve learning or conditioning processes, and observations of residual hearing in humans following operative procedures are not definitive since the effects of the injury and the operations are not precisely limited. The early experimental work

of Ferrier, Munk, Luciani, Schafer, and Hitzig and Golz demonstrated the fact that there was an area associated primarily with hearing. Their work was based on the behavior of lower animals following brain insult. The early clinical observations on humans by Dejerine and Von Monakow led them to somewhat similar conclusions although they did not agree upon the precise area. The work on the lower animals, while again not conclusive for humans, shows that there is fairly punctiform representation in the temporal cortex for auditory reception. Tunturi (249) using intact dogs and amplifying brain potentials found that the various auditory frequencies were primarily represented in the Sylvian gyri. Somewhat similar findings have been reported by Ades (250) (251) in his work with cats and monkeys. Hunter (252) using the auditory discrimination of rats, in a simple choice situation, found very little relationship between bilateral damage to the auditory area and loss of discrimination habit following destruction. Wiley (253), Pennington (254), and French (255) working on somewhat different problems do not support Hunter's contentions. Pennington worked on the post-operative retention of auditory localization habit in rats. In animals with lesions in the primary auditory area and in animals in which the damage was bilateral the results were not the same. Bilateral lesions were most disturbing, although there were some positive relations between disturbance of habit and extent of lesion when unilateral. French studied the discrimination of auditory rhythm in rats. The animals were trained to discriminate simple rhythms and then were operated upon. His measure of loss was the rate of relearning. He concluded that the task could be relearned after complete destruction of auditory cortex. Loss follows any cortical lesion but is not marked until about 70 per cent of the auditory cortex is destroyed bilaterally. Brogden (256), Rosenweig (257), Girden (258), Mettler, et al (259), and Kluver and Bucy (260) have used cats, dogs, and monkeys in attempting to trace out the functions of the various levels of the temporal lobe. The results of these experiments agree in a large measure with those of the preceding investigators. Any lesion of the cortex results in some loss of sensitivity for sound but bilateral lesions are more disastrous than unilateral lesions. Performances involving learning may be relatively intact since subcortical elements seem to function adequately for these purposes. In bilateral removal of the temporal lobes of monkeys it is found that they react to sounds but cannot use them for cues in behavior. The clinical observations on humans are extensive but the post-mortem examinations show that damage of rather large

areas of the temporal lobes have been involved in most cases. In the immediate discussion, attention will be given only to the effects produced on audition. Dandy (261), Cushing (262), and Gibbs (263) supply data on this point. Variations are reported from almost no effect to gross impairment. This seems to depend upon the bilaterality of the organic involvement.

SOMESTHETIC AREAS

The parietal region of the brain contains the receptor representation for the dermal and somatic senses. If reference is made to figures 29 and 30, the areas most directly involved are 1, 2, 3, and 5. The methods of mapping the cortical areas include: (a) the recording of electrical potentials set up by peripheral stimulation and derived from the cortex; (b) degeneration of functional units; (c) ablation; (d) electrocoagulation, and (e) freezing. Some of these techniques are more applicable in determining intra- and inter-motor pathways than in aiding in the localization of sensory representation. Kennard (264) gives a very good summary of these techniques. The functions of the sensory cortex of the parietal lobe are exceedingly complicated and only a bare outline of the situation can be presented here. The various sensory elements from the skin and soma are grouped closely as they enter the vertical part of the lateral thalamic nucleus. They are then closely grouped in separate cell groups, probably in the dorsal lateral nucleus of the thalamus. Lesions in this region may produce a loss of one or more of the sensations arising from the dermis or soma. Awareness of these sensations may take place at the thalamic level. In order to determine the effects of lesions in the sensory cortex, resort is usually made to complex tests of sensory capacity such as discrimination of qualities, distance, form, weight, etc. Such tests involve complex sensory synthesis as well as association and memory and hence include areas other than the sensory cortex. While the various anatomical parts of the body (toes, fingers, face, larynx, etc.) are well represented in fairly distinct areas in the motor cortex, anatomical representation is not nearly so well localized on the sensory parietal region. Those parts of the body that are most utilized as sensory organs seem to have the greatest cortical representation and are the ones most affected by cortical lesions. For example, in limited lesions of the sensory cortex the sensitivity of the fingers is more likely to be involved than the proximal portions of the limbs. Parietal lesions produce sensory losses that are distributed anatomically over a single limb or body member and in addition a localized lesion is

not likely to result in a total loss of primary sensations in any part of the body. Lesions involving the subcortical parietal region and capsular lesions usually affect many types of sensation and are frequently concomitant with aphasia, apraxia, and plegia of varying degrees. These conditions arise through involvement of the motor cortex and association areas. Ruch (265) states that the sensory somatic areas overlap the motor areas to a limited extent. The overlapping is greater in the lower animals than in man. The following quotation from the above source will clarify the picture. Ruch says:⁴ "The preponderant representation of sensory function behind the central fissure in man suggests a continuance of the migration of sensory function caudally on the cortex, without implying that the precentral gyrus has lost all sensory function. The condition obtaining on the human cortex may be considered to be a hierarchy of somatic sensory areas, superimposed one behind the other, and subserving successively higher levels of sensory integration. The lowest member in this hierarchy is probably a primitive sensory motor area located in the precentral gyrus and the highest member is the supramarginal and angular gyri." Klebenoff (266), after reviewing the literature, comes to the conclusion that the alterations accruing with parietal pathology are of a psychophysical nature rather than of a more strictly psychological nature. There is still some question as to the representation of pain and taste in the parietal cortex. Bornstein (267) believes that the sense of taste is represented at the base of the parietal lobe. His observations are derived from clinical material. Ury and Oldeberg (268) contend that the pupillary reflex of cats with ablation of the parietal cortex did not respond differentially to painful electrical stimulation when the stimulation was inflicted on a leg neurally connected with an ablated area and when it was inflicted on a leg represented by an intact parietal cortex area. Discussion of some of the more complex functions associated with the parietal area will be carried out later.

MOTOR AREAS

Areas 4 and 6 (see figures 29 and 30) are the motor areas and participate in the operation of the effector system of the body. These have been discussed in part in Chapter III. We shall, however, relate damage in these areas more specifically to loss of motor function at this point. The best compendium dealing with these areas is that by Bucy, et al (269). The function of area 4 is chiefly motor and its function is the

⁴Ruch, T. C. Reprinted by permission of: *Sensation: Its Mechanisms and Disturbance*. Williams & Wilkins Co., 1935.

integration of discrete voluntary movements. Representation of somatic musculature follows a somewhat definite pattern. The lower extremities, toes, foot, and legs, are represented near the top of the fissure of Rolando, while the head and face musculature is represented near the bottom of this fissure (figure 28). There are more points in area 4 that produce movement of fingers than produce movement of wrist, and more points that produce movement of hands than feet. A small portion of area 4 acts as a suppressor or inhibitor and governs in part the relaxation of peripheral muscular contraction. Focal epilepsy is often encountered with small lesions in area 4. Flaccid paralysis is an accompaniment of destruction but is usually transient. Complete destruction of an area representing a limb is followed by loss of voluntary movement which is not regained.

Area 6 possesses sensorimotor characteristics. Its subcortical connections are in the main extra pyramidal. This area functions bilaterally to a much greater extent than area 4. The outstanding sign of disturbance in this area is reflex grasping. Reflex grasping is normal in infants, disappearing within about 6 months, and is reinstated with pathology of area 6. With bilateral lesions, apraxia, perseveration, apathy and hypomotility are found. In contrast with flaccidity, spasticity is usually present in lesions of this area.

The thalamus, basal ganglia, and the cerebellum exert influence on the functions of the motor cortex. There are pathways from the cerebral cortex to the cerebellar cortex and back to the prefrontal cortex by way of the thalamus. Aring and Fulton (270) and Fulton, Liddell, and Rioch (271) have demonstrated that tremors which originate with removal of the cerebellum disappear upon extirpation of areas 4 and 6 and that tremors in decerebellated cats were stopped by decerebration. Extirpation of area 6 alone accentuates such tremors. Kennard holds that the present evidence shows that interaction of area 6 and the basal ganglia smooths out and coordinates voluntary motor performance. Reorganization of function in these areas seems dependent upon motivation, cortical organization within a hemisphere, and age.

AUTONOMIC FUNCTIONS

It is generally agreed that several parts of the cortical structure influence the action of the autonomic system. Area 6 and to a somewhat lesser degree areas 4 and 8 are important in this relationship. The frontal and temporal areas are also interrelated but for the present our discussion will be restricted to those areas mentioned first. The autonomic functions that are influenced by lesion or damage in area 6 are,

(a) activities in gastro-intestinal tract, (b) circulation, (c) sweat secretion, (d) pupillary change, (e) bladder functions, (f) pilomotor changes, (g) shivering, (h) respiration, and possibly (i) sleep.

FRONTAL CORTEX

The frontal cortical areas, numbers 9, 10, 11, 45, and 32 in figures 29 and 30, are association areas and are connected with each other by association fibers and are joined with projection areas and probably the thalamus by projection fibers. In view of the complexity of these areas we will review some of the pertinent studies of both the lower animals and man. The early observations of Ferrier, Hitzig and Bianchi were followed later by the observations of Franz (272) on cats. He contended in opposition to the claims of Bianchi that the frontal lobes are normally used for forming simple sensory associations and that lesions in this region destroy recently formed habits. Relearning was possible, however, and older fixed habits were not affected. Jacobsen (273) in working with monkeys felt that learning of problem boxes was not affected by lesions and recently acquired habits were not lost. Franz and Lashley (274) later removed a considerable portion of the frontal lobes of rats and found that the retention of learned reactions was not interfered with. Cameron (275) felt that the maze learning of rats was somewhat inferior after frontal lobe loss if the complexity of the task was increased. Loucks (276) also arrives at a somewhat similar conclusion from his tests of frontal destruction in rats that were required to learn a delayed alternation pattern. Maier (277) attacked the problem of "reasoning" as well as "learning". He destroyed different amounts of tissue in both hemispheres by thermocautery. He concluded that loss of "reasoning" was related to amount of tissue destroyed whereas "learning" was little affected unless more than 40 per cent of the tissue was destroyed. Jacobsen (278) in working with monkeys with bilateral frontal lesions tested visual-kinesthetic-motor behavior with a series of problem boxes. He concluded that frontal association areas are not necessary for the mediation of simple manipulatory habits or of visual pattern discrimination. In later experiments with delayed response tests, he contends that extirpation of the parietal association areas does interfere with performance either in accuracy or in length of delay. Jacobsen (279) (280) (281) associated with either Haslerud, Elder, or Nissen worked out a series of problems designed to test specific functions of the frontal lobes in primates. The conclusions of these experiments were that deprivation of frontal association areas produces a succession of temporally discrete units rather than an inte-

grated performance. It might also be added that complex performances such as are involved in double and triple platform tasks are disturbed by unilateral lesion of the frontal lobes. This is verified in part by the investigations of Jacobsen, et al, and Warden, Barrera and Galt (282). Morgan (283, 284, 285) and his co-workers Stellar, Yarosh, Wood and Epstein, returned to experimentation on rats to determine the brain area involved in symbolic functioning. Their results led them to the general conclusion that behavior involving symbolic processes is mediated by the frontal areas and destruction of these areas adversely interferes with such behavior. Following ablation of the orbital surface of area 13 of Brodmann in monkeys, Ruch and Shenkin (286) encountered hyperactivity of running and pacing of a stereotyped nature. The work on animals indicates fairly clearly that unilateral lesions of the frontal lobes do not result in great impairment of a variety of behavior patterns. Bilateral destruction interferes with behavior to a rather high degree. More complex behavior is disturbed to a greater extent than simpler behavior. Well-fixed behavior is disturbed to a lesser degree than more recently acquired behavior. All of these foregoing statements refer of course only to those types of behavior mediated by the frontal areas.

The observations and studies on man tend to show a somewhat higher degree of specialization of function than is encountered in lower animals. The findings are largely taken from cases with accidental lesion, with tumor and surgical removal of the frontal lobes or parts of them for the treatment of mental disorder. The observations of Goldstein (287), Feuchtwanger (288), Poppelreuter (289), and Kleist (290) on World War I cases with frontal lobe injury are of outstanding value. Many cases that reach the neurologist in the ordinary course of events have both organic involvement as well as psychological involvement. Soldiers are presumably healthy and have no history of difficulty before injury. It may be assumed that disturbance of function is therefore the result of injury or lesion. While there is not complete agreement on the effects of lesions of the frontal lobe due to injury and tumors, there is sufficient evidence in common to justify certain conclusions. The left frontal lobe seems to be dominant over the right and bilateral injuries. cause more disturbance than unilateral injuries—Dandy (291), Penfield and Evans (292), German and Fox (293), Stookey, Scarff and Teitelbaum (294). Most authors agree that there is some intellectual deterioration—Donath (295), Foerster (296), Bolton (297), Grunthal (298), Pfeiffer (299), Baruk (300), Holmes (301), Kennedy (302). Inability to sustain attention is a characteristic reported by Bolton (303), Poppelreuter

(304), Goldstein (305), Williamson (306), and Frazer (307). Sachs (308), Goldstein (309), Grunthal (310) have emphasized loss of initiative and apathy. Recent memory becomes defective and abstract thinking as contrasted with concrete thinking is impaired. It is the latter of these changes that has been attacked principally by psychosurgery techniques. The two operations most frequently employed in the past are leucotomy and lobotomy. The former consists of removing a series of small cores at different levels of the brain structure, while the latter consists essentially of transecting fibers connecting the thalamus and the prefrontal region. We shall not consider at this point the question of whether operations of this kind are desirable from a therapeutic standpoint, but shall consider only those factors related to frontal area functioning. Grinker (311) says that there is a reduction in anxiety, less introversion, less interest in personal well-being. There is a marked expression of emotional tone but the emotions are shallow and quickly pass. There is an elevation of the mood. The patient's behavior is somewhat childish, cheerful and unselfconscious. Hebb (312), and Hebb and Penfield (313) find little change in intellectual level after removal of the temporal lobe as measured by intelligence test scores, although there is impairment on the non-language tests. Porteus (314), Rylander (315), and Halstead (316) are of the opinion that the classical tests of intelligence do not yield differences between pre- and post-operative conditions. Other workers have attacked the problem from the point of view of determining the particular components of intellectual functioning that may be disturbed by frontal lobe injuries—Weigl (317), Goldstein (318), Nadel (319), Rylander (320), Yacorzynski and Davis (321), and Halstead (322).

Among the changes that occur with frontal lobectomies (excision of a lobe) are interference with perceptual processes, involving: a longer time for impression, stereotypy, and reduction in range of perception. Power of abstract thinking is reduced.

Halstead's (323) study is perhaps the most elaborate and the results will be presented in more detail. By means of a factorial analysis method he concludes that biological intelligence is composed of four factors which he describes as follows:⁵

"1. A central integrative field factor C. This factor represents the organized experience of the individual. It is the ground function of the 'familiar' in terms of which the psychologically 'new' is tested and incorporated. It is a region of coalescence of learning

⁵ Halstead, W. C. Reprinted by permission from *Brain and Intelligence*, University of Chicago Press, 1947.

and adaptive intelligence. Some of its parameters are probably reflected in measurements of psychometric intelligence which yield an intelligence quotient.

2. A factor of abstraction A. This factor concerns a basic capacity to group to a criterion, as in the elaboration of categories, and involves the comprehension of essential similarities and differences. It is the fundamental growth principle of the ego.

3. A power factor P. This factor reflects the undistorted power factor of the brain. It operates to counterbalance or regulate the affective forces and thus frees the growth principle of the ego for further ego differentiation.

4. A directional factor D. This vector constitutes the medium through which the process factors, noted here, are exteriorized at any given moment. On the motor side it specifies the 'final common pathway', while on the sensory side it specifies the avenue or modality of experience."

His test battery for the factors yield data which lead him to state in part that:

"1. In comparison with other types of subjects, individuals with damage to the frontal lobes have high impairment-index scores.

2. This relation holds whether the lesion is unilateral or bilateral and whether it is on the right side or on the left side of the brain.

3. There is no relation between the degree of impairment and the extent of the lesion. The obtained correlations are not significantly different from zero.

4. This is true for the brain as a whole, for the cortical area of the prefrontal lobes, and for cortical areas outside the frontal lobes.

5. No evidence for a general principle of mass action is yielded by this study. On the other hand, the available data do not bear upon mass action in restricted cytoarchitectural areas.

6. Bilateral subcortical lesions of the frontal lobes, as in lobotomies, do not disturb the functions reflected by the impairment index.

7. There is no quantitative evidence of hemispherical dominance yielded by this study.'

While Halstead's conclusions are interesting from the point of view of approach and should be given careful consideration, further evidence should be adduced before accepting his conclusions without caution.

PARIETO-TEMPORAL AREAS

The last major area to receive consideration is the parieto-temporal, which is designated by the numbers 39, 40, 41, 42, and 43, in figures 29 and 30. These areas are primarily concerned with language, learned skills, meanings of acts and symbols. There are two sources which are recommended for more extensive reading in this field: (a) Goldstein: *Language and Language Disturbances* (324); and, (b) Neilsen: *Agnosia, Apraxia, Aphasia* (325). These portions of the brain are tied up inextricably with some of the materials presented in the following chapter. We shall attempt therefore to separate the material somewhat along the lines of reserving certain kinds of descriptive material for the

succeeding chapter and incorporating that material related to brain damage and localization of function in this chapter. The evidence of brain damage as related to the psychological function described above is largely derived from clinical observations on humans, although work on animals has contributed its share to our understanding. The pioneer writings of Wernicke, Lichtheim, Liepmann, Head, and others established the bases upon which later investigations have proceeded. Neilson holds that there are 11 association areas in each hemisphere that are involved in some manner with memory and association. He lists the areas as follows:⁶

1. Prefrontal lobes
2. The frontal writing center (foot of the second frontal convolution)
3. Broca's convolution
4. Pars triangularis of the third frontal convolution (area 45 of Brodmann)
5. Anterior end of the superior temporal convolution
6. Wernicke's area (posterior third of the superior temporal convolution)
7. Area 37 of Brodmann
8. Angular gyrus (area 39 of Brodmann)
9. Area 18 of Brodmann
10. Area 19 of Brodmann
11. Convolutions of Gratiolet

These areas of the brain are so complicated in function that it is almost impossible to discuss them separately in detail and we shall indicate briefly what the function of each is. Area 18 of Brodmann is concerned with visual recognition; area 19 with revisualization of images; area 45 with vocal music and playing of instruments; area 38 with auditory recognition and interpretation; areas 41 and 42 (Wernicke's area) with comprehension of spoken language; area 37 of Brodmann with selection of words and formulation of sentences; Broca's area or area 44 of Brodmann with memory for making the vocal movements for articulating words; the convolutions of Gratiolet with naming parts of the body and designating laterality. Disturbances growing out of lesions of each of these areas are given specific designations and will be discussed in more detail in the chapter that follows.

Let us conceive of the total process of understanding or intellectual functioning as following somewhat this scheme. A stimulus impinges

⁶ Neilson. Reprinted by permission from *Agnosia, Apraxia, Aphasia; Their Value in Cerebral Localization*. Paul B. Hoeber, Inc., 1946.

upon the appropriate sense organ and if the receptive or perceptual area is not intact, blindness or deafness for example will prevail. If this area is intact but the recognition area is destroyed, the stimulus will not be recognized. That is, the individual will see an object but will be unable to tell you what it means. Further, if the first and second of these areas are intact but a lesion occurs in the revisualization area, there is inability to remember relationships and sequences. The individual may recognize a street and houses on the street, but still will be unable to get home. The motor side of the picture is equally complicated, especially with respect to language. One must remember words presented either visually or auditorially if one wishes to speak. Some individuals can repeat words just heard but cannot initiate speech of their own volition. Others can think of the words or acts they wish to employ but are unable to recall the motor patterns required. Hence we have disorders of the types just mentioned growing out of lesions of association areas controlling these activities.

CHAPTER V

DISORDERS OF ASSOCIATION AND MEMORY

It was indicated in the preceding chapter that some of the more descriptive material related to disorders of association and memory would be treated in this chapter.

Morgan (326) approaches abnormalities of association somewhat along the lines laid down in the introductory textbooks on psychology. In our presentation, we will take up the conventional topics but will modify Morgan's classification slightly. We will deal with aphasias and amnesias in separate categories. The disorders to be discussed follow:

1. Retardation of association
2. Flight and incoherency of association
3. Dearth and perseveration of association
4. Blocking of association
5. Aphasias
6. Amnesias

RETARDATION OF ASSOCIATION

Retardation of association is nothing more than the slowing down of the associative processes; for example, the time elapsing between a stimulus word and a response word. In thinking, however, one word or idea serves as the stimulus for the next, so that we conventionally mean by retardation the time elapsing between two successive ideas or words employed. Retardation might include complete blocking, but for reasons that will be obvious we prefer to treat the latter as a separate topic.

Experiments on normal subjects have demonstrated that various factors influence the speed of association. The connecting of a finger response to the flash of a light or to the sound of a bell is one of the simplest associations established in the laboratory. This is the well-known reaction time experiment which has been discussed in part in an earlier chapter. When the individual has to make a choice in response, associative recall is retarded, i.e. the associative time is increased. Sometimes the so-called free association method is employed in the labora-

tory and it is this particular type of association that concerns us to a much greater extent, since it more nearly represents the situation in thinking. The subject is given a stimulus word or chooses one himself and continues to name the words that occur to him. The time between the successive words spoken is the normal free association time. It has been found that these times may be as much as eight or ten times as great as those in the simpler forms of association reaction mentioned above. If further restrictions are imposed on the subject by having him name words belonging to a specific topic such as gardening or by having him respond with only verbs or adjectives, it may be found that the association time may be further retarded. Practice, up to a certain point, in both the simple and more complex associations will, of course, tend to decrease the time involved in association. This brief discussion of association reaction time indicates that a wide variety of factors are at work in controlling such times. The physiological condition of the subject, the mental set of the subject, and certain aspects of learning are all important items. In many types of mental disorder retarded associative response is one of the frequent symptoms. It may be exhibited by manic-depressive (depressed stage), neurasthenic and involuntional melancholia cases. Sedatives in large doses, exhaustion or extreme fatigue, strong emotion, old age, and even sluggish habits may be responsible for slowness in association reaction.

Wells (327) tested schizophrenic and manic-depressive patients by the Kent-Rosanoff list. His results have confirmed those obtained through routine observation. Most of the patients displayed long association times. With an improvement in their condition, there was usually a decrease in the association time. It has been suggested that associations tied up with emotional problems might be lengthened because of inhibitory effects of the emotion. Wells was unable to establish the validity of this thesis with psychopathic patients. The work on the detection of guilt by delayed reaction or prolonged association time is certainly not unequivocal. Hull and Lugoff (328), Crossland (329), Hubbard (330), and Crane (331) have attempted to establish the reliability of association time as an indicator of an emotional situation. In some instances retarded associations are found; in others, they are not found.

Although the organic basis of retarded association might be expected to be localized in the association fibers, neither histological nor biochemical examination of the nervous tissue would enable anyone to differentiate between the normal and abnormal in the majority of cases.

FLIGHT AND INCOHERENCY OF ASSOCIATION

When an individual changes the nature of the content of the associated ideas frequently, he is described as having flight of ideas. This change from one sequence of ideas to another is usually quick, but some cases may manifest flight of ideas with relatively slow association time. The associated responses lead from one to the other without logical or critical control. Within a short sequence the associations are usually logical; in a longer sequence of associated responses the shift from topic to topic is frequent and incoherent. It should be pointed out that although the connections between the longer sequences may appear illogical, this may not be the case. The connections which seem to be lacking to us may be perfectly clear to the patient.

Incoherency is not entirely dependent upon flight of ideas, since people may make many associations that are both retarded and incoherent. This is encountered in both the controlled and free association methods in which we find inappropriate and unrelated responses to discrete stimuli; meaningless responses; and a series of unrelated words or unrelated topics.

The chattering of some men and women, the behavior of some children who when in amusement parks think of riding on the roller coaster while still on the merry-go-round, and activities of people who must sponsor at least six different reform movements simultaneously may be forms of behavior indicative of flight of ideas. These activities, however, are usually classed as normal. Exaggerated flight of ideas is encountered in some manic-depressive (manic phase), in some paranoid, and in some organic psychoses. The feeble-minded often exhibit such associations.

The experimental data obtained from people with mental disorder do not throw much light on the flight of ideas (time aspect). On the contrary, there is considerable evidence on the incoherency (incoherent to the examiner) of associations. Kent and Rosanoff (332), and Wells (333) have found in schizophrenia and manic depressive psychoses that there is a decrease in the "commonality" of response. The subjects give many unusual associations. With the return of the subject to a more nearly normal condition, the associations gradually become less individual or unusual. Murphy (334) in working with similar groups of patients concluded that classification was impossible on a basis of the logical relation of association since the mental disorder does not greatly influence the speech habits which are firmly rooted. His efforts to determine whether certain types of psychotic patients reverted to infantile associations turned out negatively.

The etiology of decreased association time that is manifested in flight of associations is rather obscure. Reduction in time, either in simple reactions or association reactions, is usually attributed to lessened synaptic resistance, lowered threshold of receptor sensitivity, or increased irritability of the nervous tissue. All three assumptions may be correct, but how are we to account for the changes in the nervous system? Tobacco, small doses of alcohol, and certain stimulants produce such effects on nervous tissue, and we do find concomitant changes in speed of association. Tobacco and alcohol do not act in the same way. It is highly probable that the tobacco increases neural irritability, whereas alcohol modifies inhibitory tendencies. Some theorists have argued that the individual who is capable of making a wide variety of associations is the one that will be able to associate quickest. If this is actually true, then association time depends upon ability to learn or rather upon the amount of learning that has taken place.

The underlying sources of incoherent associations may be either psychological or organic. Lesions in paresis (syphilis of the cortex of the brain), multiple sclerosis (hardening of the nervous tissue) and deterioration from old age cause aberrations of association. Some paretics may show exaggerated flight of ideas and incoherency before treatment with fever therapy but after treatment exhibit relatively normal associations. If the initial cause were lesion alone, the destruction of the spirochete should not remove the cause, since fever therapy does not repair the lesion. Senile people have more coherent associations on some days than on others. This indicates that variable organic conditions are responsible. Similar disturbances of association are produced, at least in some people, by large quantities of alcohol. Why the associations should be incoherent at certain times and relatively coherent at other times is one of the questions that cannot be answered satisfactorily with our present knowledge.

The psychological origin of the kind of association under consideration can be described, but this is not necessarily an explanation. Patients who are preoccupied with themselves and their feelings may be unable to break through their circular chain of thinking, consequently associations supplied to exteroceptive stimuli are likely to be those linked with their preoccupation. These associations may therefore appear to be irrelevant but are actually closely allied to the patient's feelings. The feebleminded may be unable to give coherent association because either they are unable to understand the stimulus or they have not learned the expected association.

DEARTH AND PERSEVERATION OF ASSOCIATION

If we examine again a typical list of words given in the course of free association by a normal person, it will be found that as the time is increased the number of words in a given unit of time is diminished; in addition many words appear over and over again. This repetition of words is called perseveration. What has been found in speech associations will also be manifested in other forms of response. For example, one of the authors witnessed a man who exhibited behavior typical of perseveration as he tried to start an automobile. After turning on the ignition, he stepped on the starter but the engine did not respond. He turned the ignition off and on again, and repeated his efforts to start the motor by stepping on the starter. Failure still resulted. He then raised the hood, looked at the motor and stepped on the starter, but still no explosions took place in the motor. Repetition of similar activities exhausted his battery. No real steps were taken to discover the cause of motor failure and after each casual inspection the same response was forthcoming. Sometimes perseveration is manifested by recurring tunes or the tendency to stick at a piece of work. Such behavior is also encountered in animal learning. Rats will enter a particular blind alley, long after the other blind alleys have been eliminated. The examples of perseveration cited are normal associative responses, but it is evident that the term perseveration must be defined in a number of different ways if it encompasses these diverse activities. Partial surveys of the literature on the topic are given by Dorcus (335), Hunt (336), and Ryans (337), and the reader is referred to these sources for additional usages of the term.

Dearth of associations and perseveration of associations are characteristic of certain types of mental disorder. Amentia (feeble-mindedness) is a possible cause of both types of difficulty. Rethlingshafer (338) has compared normal and feeble-minded children with college students in their tendency to resume interrupted activities. She found that there was little difference between the groups studied. This study was not primarily concerned with language associations; hence it would not rule out the situation in which the person has not acquired an extensive vocabulary and is unable to use correctly the vocabulary that he has acquired. Beck (339) and Pfister (340) by means of the Rorschach Test confirm earlier observations that perseveration is very common among the feeble-minded. Perseveration in these cases seems dependent upon failure to perceive relations rather than upon blocking of associations. Patients with dementia (deterioration) caused by

old age and neural destruction might be expected to show similar difficulties in associative response, since the aged forget their vocabularies through disuse and since neural lesions interfere with normal associations. Mental patients of some other types exhibit stereotypy to a great extent. These groups of patients are referred to the classes of dementia praecox (schizophrenia), compulsion neuroses, and anxiety neuroses. Their repetitions and stereotypes may consist of motor activities or fixed ideas of compulsion and obsession. The catatonic schizophrenic may maintain fixed postural positions for long periods of time or may repeat phrases over and over; the compulsion neurosis patient may have a compulsion of stamping his foot in a particular fashion while walking; and the obsessional case may have a recurring fear of contamination. Two interesting forms of perseverational motor responses are catalepsy and cerea flexibilitas. The first is encountered in hysteria, epilepsy and hypnosis; the second in schizophrenia. There is no doubt that both involve disturbance of the associative processes. In catalepsy, there is a strong contraction of antagonistic muscles so that the body becomes rigid and will strongly resist bending. In cerea flexibilitas, the subject's body and members remain in any position in which they are placed. The tonicity is no greater, however, than in normal maintenance of bodily positions. Disturbances of association in these two disorders are taken into account in the clinical examination and are used in part as a means of classifying the disorders.

Various investigators have endeavored to find out if the clinical observations of perseveration are accurate and if they may be used for classification purposes without additional criteria.

Test batteries for measuring perseveration have included: rate of light adaptation, rate of fusion of two colors, limen for sound after a loud noise, persistence of habits established while making strokes slanting in one direction when strokes are made in the opposite direction, extended arm endurance, swaying with suggestion, inhibition of speed of line drawing or writing, strength of the psychogalvanic response, and rate of extinction of the psychogalvanic response.

Wiersma, according to Bernstein (341) found that melancholic patients were stronger and that manic patients were weaker in perseveration when compared with normal subjects. Pinard (342) also supports this theory. Jones (343) disagrees with their conclusions with regard to manic patients. Mays (344) in seeking an explanation for perseverational activities thought that they might be controlled by the autonomic nervous system. He reasoned that, if such were the case, the

psychogalvanic response may continue for a much longer time in catatonic dementia praecox patients who are known to have a tendency toward perseveration, than in normal subjects. Shipley (345) extended this work to include the rate of extinction of the response; in addition he used as subjects, manic-depressives and psychoneurotics. Both authors found a high degree of perseveration as measured by their techniques.

Cattell (346) summarizes the causal factors in perseveration as follows:

1. Perseveration of response through the referring of different ideas and stimuli to a single major sentiment or complex (delusions, melancholia, consistency of character).
2. Perseveration due simply to mental asthenia and lack of spontaneity which permits any process of thought or action once started (by external stimulation) to proceed unusually long without interruption.
3. Perseveration due to the very nature of the nervous tissue and analogous to the inertia of the physicist, i.e., something which shows itself as a lag in all nervous processes, resulting in some interference of all consecutive mental activities.
4. Perseveration as an obstinacy of old habits in the face of habits being newly formed, or vice versa.
5. Quite apart from these varieties of what might be called true perseveration one meets instances, such as the mental defective's useless repetition of old and inappropriate responses in new situations, . . .

Studies employing the Rorschach technique (associations to standard ink blots) and the Thematic Apperceptive method (story writing about a standard situation) tend to bring out the characteristics of association that are observed in the different types of mental disorders. These methods have been used to confirm uncertain clinical diagnosis. Klopfer and Kelley (347) present the methodology and summarize much of the work that has been done with Rorschach technique. Murray (348) and his co-workers have been instrumental in the development of the thematic approach and its application. A recent study by Wittson et al. (349) shows fairly clearly that the group form of the Rorschach is inadequate for distinguishing groups of normals from abnormals. By the suggested criteria forty-four per cent of normal recruits would have been classified as neuropsychiatric and forty-one per cent of definitely known neuropsychiatric cases would have been classified as normal. It appears, then, that the Rorschach method is useful only as an adjunct to clinical diagnosis.

Most of the experiments with disordered people do not furnish any answer to the question of etiology of the association disturbance. Forbes (350), and Forbes and DuBois (351) have investigated cerea flexibilitas and catalepsy. They found that during sleep the cerea flexibilitas disappeared and that the cataleptic's motility approached

that of the normal sleeper. The experiments show that integrative or associative factors are primarily responsible rather than some organic factor. The work with insulin shock, metrozol and benzedrine sulphate demonstrates that some cases of dementia praecox with their perseverational tendencies can be improved. Whether improvement in association under these treatments is due to a change in neural tissue condition or whether the shock breaks through the circular and repetitive association that is taking place in the patient will have to be decided in view of further work. More will be said of these forms of treatment of mental disorder in a later chapter.

BLOCKING OF ASSOCIATION

Blocking of association is the inability to make any form of motor response. This comprehensive definition must be accepted even though only verbal response is usually implied. The blocking may be complete or partial; it may hold for only one response or a number of responses involving a single topic; and it may have certain features related to the time factors of memory. For our purposes, blocking can be discussed best under the topical headings of aphasia and amnesia.

APHASIAS

The associative processes are dependent to a certain extent upon the neural structure and the coördination of the various parts of the brain. This is clearly established in the chapter on brain damage. Aphasia is a partial or complete loss of voluntary ability to express ideas by speech or writing. This inability of speech may be produced by lesions either of the sensory areas, the association fibers, or the motor areas. If speech is lacking because of a lesion in a motor area, it is referred to as motor aphasia; if the lesion is on the sensory side, the loss is called sensory aphasia; and if the lesion is of the commissural fibers, it is designated conduction aphasia. The motor and sensory aphasias may be restricted still further by specifying the locus of the lesion; thus we may have cortical, transcortical and subcortical aphasias.

Other writers have attempted to localize speech and communication dysfunction in a more discrete fashion. They believe that a lesion in a specific portion of the brain such as the first temporal convolution (Wernicke's area) would destroy sound images which are necessary for understanding words or speech (sensory aphasia), or that a lesion of the third frontal convolution of the left hemisphere (Broca's area) would result in the inability to produce voluntary speech (motor aphasia).

A slightly different method of classifying the disorders related to

communication (speech, gesture, and writing) is on a basis of symptomatology. Individuals may be unable to speak, to write, or to make gestures for any one of a number of reasons. If the patient is unable to understand certain spoken words or certain sounds or cannot understand certain written or printed words, he is suffering from sensory aphasia, but more specifically he has word blindness or word deafness. Some neurologists prefer to use the terms optical alexia and acoustical alexia respectively for the preceding terms. Inability to recognize objects by touch is called tactile aphasia (sensory type) and has been ascribed to lesions in the central parietal lobe. In the case of acoustical alexia it has been assumed that the area for the retention of auditory images has been affected in some manner so that the image for calling into use the correct sound in voluntary speech is not available. A similar mechanism is involved, theoretically, in word blindness. The brain area for the retention of visual images is affected. The scope of localized areas may now be extended to include areas for all varieties of sensations and images.

Many of the performances of aphasic patients indicate that they may understand what is said to them, but the proper associations for speaking are lacking. The individual may be unable to tell the name of an object placed before him, but he can write the name of it or point to it when it is placed before him in a group of objects. The inability to speak or write or to perform specific parts of these functions has given use to such terms as amimia, apraxia, anarthria, and agraphia. These terms have been defined in different ways by different authors, but for our purpose the following definitions will serve. Amimia is the inability to imitate or to make gestures. Apraxia is the inability to execute movements of indirect purpose. It includes those movements which are concerned with communication as well as other movements of the hands. The subject has difficulty with kinesthetic images or is lacking in kinesthetic memory. Anarthria is the inability to execute articulate speech. Agraphia is the inability to write. Amusia is the inability to understand or reproduce musical sounds. If the loss consists of the inability to comprehend musical sounds, it is called sensory amusia; if the music is understood but the power of singing or reproducing music is lost, it is referred to as motor amusia. Gerstmann (352) feels that there is a well defined syndrome which includes finger agnosia, agraphia, and acalculia (disability of calculation). While these usually are grouped together, it is possible that they may occur singly. This syndrome results from a lesion in the parieto-occipital

region of the brain (specifically in the angular gyrus in its transition to the second occipital convolution). The patient cannot orient himself with reference to the individual fingers of either hand; he cannot differentiate between his fingers; he cannot name them; and he cannot imitate finger postures of the examiner. Very often a patient cannot recognize laterality of his own body; he is unable to write and he may be unable to perform simple arithmetical calculations. Gerstmann ties these complex functions together on the basis that in the development of writing and calculating the fingers play an important rôle.

The variety of conditions that may be encountered can be ascertained by referring to Neilsen's (353) appendix in his treatise on "Agnosia, Apraxia, Aphasia". He lists 24 different varieties of agnosia; 11 varieties of agraphia; 12 varieties of alexia; 1 variety of amimia; 1 variety of amnesia; 16 varieties of aphasia; 6 varieties of apraxia; 1 variety of autopagnosia; and 15 varieties of irremembrance. He defines the major categories somewhat in accordance with the definitions presented above. We will however redefine the categories in his terminology.

Agnosia is a loss of function of recognition resulting from an organic cerebral lesion involving one sense organ only.

Agraphia is a descriptive term and when not qualified means loss of ability to write.

Alexia is a descriptive term meaning the inability to read, without reference to the physiologic cause except that it is due to focal cerebral lesion.

Amimia is a purely descriptive term used to designate loss of ability to mimic gestures.

Amusia is a descriptive term meaning a disturbance of the musical sense.

Aphonia is defined as "loss of language association with."

Apraxia is loss of ability to perform as desired or as requested, through loss of memory of how to perform.

Autopagnosia is loss of ability to recognize parts of the body.

Irremembrance is a term coined to designate a disturbance of ability to recall.

Neilsen's classification system represents an extreme organic and specific point of view with regard to aphasia and allied disorders. In contrast to this point of view, the work of Marie (354) and Head (355) and Goldstein (356) on aphasia differs sharply. Marie was among the first to question the idea that speech was composed of a number of

separate processes, such as the primary sensation of audition, the primary sensation of vision, the primary sensation of the tactile sense, corresponding sensory and motor images and the motor component itself. He viewed speech as a complex process which involved the whole cortex in contrast with the view that small isolated parts (mosaics) served for each of the above processes. He argued that any central lesion would produce some major symptoms, but in addition there would be a general lowering of efficiency which he translated into a lowering of intellectual ability or thinking. The outstanding symptoms of the patients suffering from aphasia may correspond roughly to the locus of the lesion, but there are, however, effects produced which have a much wider influence in the total functioning of the nervous system. Head holds a similar view. Disorders of communication or language cannot be referred to lesion of special brain centers, since speaking, writing and gestures are not distinct psychic functions and do not have specific areas any more than do a large number of other motor activities that require the integration of the sensations arising from the special senses. Since speech is a very complex process in its development, it must be assumed that the total functioning of the cortex and other related tissue must be involved, even though no disturbance is noted. Head insists that there is probably no clear-cut case which exhibits a dysfunction of only an isolated aspect of speech; he further states that the severity of the lesion will, to a considerable degree, determine the amount or degree of dysfunction rather than the nature or kind of dysfunction. He differentiates aphasias on a basis of the outstanding defective characteristics of the use of words. These symptoms of aphasia may be referred to as disturbances of understanding symbols and attaching meaning to them.

DYSLEXIA

We mentioned acoustical and optical alexia in our previous discussion. These forms of aphasia have been suspected of playing a major rôle in reading disability (dyslexia), and we will present a discussion of the problem at this time because it fits in rather closely with both the preceding and subsequent material.

Reading is a process as complex as speech and writing, and disorders may be manifested in the total process predominantly because of malfunction in one part or another of the process. Reading involves the visual mechanism, possibly the auditory mechanism, the kinesthetic mechanism, the central mechanism and various parts of the motor

mechanism. The proper integration of the different sensory impulses coupled with adequate motivation leads to the development of normal reading habits. Unfortunately individuals are encountered who do not develop or who have lost the normal ability to read. Such people are said to have dyslexia. Some people with a specific form of dyslexia (sensory alexia) are unable to recognize printed or written words; others can recognize printed or written words but are unable to comprehend their meaning; still others may recognize and comprehend the meaning of words but are unable to read aloud what is written or printed. This latter form is called motor alexia.

All of the above disorders may be either congenital or acquired. That is the individual may never have developed the ability to read, or he may have completely mastered the art of reading but due to lesion or other causes may have lost it.

In addition to the general dysfunctions which are identified with recognition, comprehending and reproduction, there are a number of specific alexias that are more difficult to fit into the picture. These involve the inability to read music, mathematical formulae, and foreign languages when reading ability is otherwise normal.

If the dyslexias are not viewed as "all or none functions," then we might anticipate only a partial loss or a weakening of the various functions which would result in a graded series of dysfunction. This seems to be the case, since many individuals read slowly and have poor comprehension. These same people, if given adequate time, can demonstrate that they comprehend material that is seen, as well as faster readers. The rate of reading may influence comprehension; on the contrary, the rate of reading may be determined by the ability to comprehend what is read.

The problem of reading disability involves the whole field of memory, association and learning, but our discussion will be confined only to those factors that play a major rôle.

The most obvious cause of reading disability of the congenital type is mental deficiency. Neural development must proceed to a stage that will allow the organism to function normally, otherwise the complex patterns involved in reading cannot be established. The specific factors that cause mental deficiency are numerous, and we need not determine the exact degree of enfeeblement that will interfere with reading. Mental deficiency is not the cause of many cases of dyslexia, since standardized performance tests have shown that the scores of many nonreaders are quite comparable to those of normal readers.

Cases of acquired dyslexia may be accompanied by mental deterioration, but in some cases at least, the deterioration of other mental functions is not coexistent with dyslexia.

Visual disorders have been suspected as a contributory cause. Writers have argued that since the visual stimuli do not arouse adequate or appropriate sensations, comprehension of these stimuli must be interfered with. Almost all visual functions have been investigated. Gray (357), Monroe (358), Eames (359), Selzer (360), Fendrick (361), Stromberg (362, 363) and others have been interested in visual defects. Gray and Fendrick have found that the visual acuity of poor readers is inferior to that of good readers, although in many poor readers, inferiority of visual acuity is not found. Monroe also suggests that visual acuity may be a contributory factor. Stromberg states that fast and slow readers cannot be distinguished on a basis of peripheral sensory tests. Eames and Selzer find muscular imbalance of the eyes in poor readers which may result in noncorresponding images, thus producing a blurred or indistinct object or form. It is possible that exophoria and esophoria may influence reading ability in some particular cases. In our discussion of strabismus, we pointed out the fact that the function of corresponding and noncorresponding points is in part a learned function. If the noncorrespondence has existed from birth, it may not cause any appreciable error in perceiving form. Furthermore, some cases of reading disability do not have muscular imbalance. Erratic eye movements during reading have been suggested as a possible cause. Numerous records of the eye movements of fast readers, slow readers and nonreaders have been made. The proponents of this notion have found that the nonreader's eye movements are unlike those of normal readers. The movements differ in a number of respects. While such difference in movement may account for differences in speed of reading, they do not afford a basis for explaining the acquisition or lack of acquisition of reading ability. These eye movements are more likely the result of reading habits than the cause. Fernald (364) has reported cases of total reading disability in which the eye movements have been abnormal after reading ability has been established at a normal level. The writer has seen a case of continuous nystagmus that showed no dyslexia, yet the eye movements would certainly not conform to those of normal readers. One important point must be remembered in connection with studies of eye movements of nonreaders. Even though individuals are presumably attempting to read, they would not be expected to have eye movements comparable to eye movements during reading since they are not actually reading.

The auditory and speech mechanisms play a part in the reading process, therefore, disorders of audition and speech have been postulated in the etiology of reading disorders. Monroe (365), Gates (366), and others have contended that poor hearing is a handicap in reading. Bond (367) has found that this is true only if the students are taught by the phonetic method rather than by the look-and-say method. Kennedy (368) has shown that a loss in the frequency range above 2048 d. v. is of greater importance for good articulation than losses below this level. If these contentions are reliable, then the difficulty is not a reading dyslexia but one of audition.

We find that reading disability frequently is accompanied by speech disorders of various kinds. While inability to form the necessary speech movements for reading orally may interfere with the acquisition of normal reading habits, it appears that the speech disability is just another symptom of a more general malfunctioning of the association processes. Bond (369), for example, found that the incidence of speech defects was approximately the same for good and poor readers, although there was some difference depending upon whether oral or silent reading was used as the criterion. Theories of eye, hand and cerebral dominance have followed from the theories of stammering and stuttering. The results of testing these theories of reading disability have not been especially fruitful. Some reading disorders are associated with dominance or lack of dominance of a specific function, but the rate of incidence is no higher in groups with poor reading ability than in control groups. Fernald (370) has summarized the theories on dominance and has critically evaluated the work of Orton, Monroe, Dearborn and Gates. She also furnishes evidence from her own cases that tends to disprove the cerebral dominance theory.

The dyslexias (true alexias) are those in which there is total inability to perceive letters or words, and the disorders may exist without other language or agnosic complications. These alexias may be caused by a lesion of the first temporal convolution, or of the angular and supra-marginal convolutions. If the theories of mass action could be extended sufficiently, cases of alexia due to specific lesion should be able to recover reading ability through adequate training. If, on the contrary, specificity of function holds for humans, no amount of retraining would overcome the difficulty. Fernald (371) reports that Sullivan has had success in retraining two organic cases of alexia.

Cases in which the individual is unable to learn to read but in whom there is no known lesion are more numerous than the organic cases encountered in medical practice. The inability to explain why certain

people are unable to acquire reading habits leads to the belief that is founded on clinical material, that a particular portion of the brain corresponding to the areas in which lesion had been observed was maldeveloped. If maldevelopment is the causal factor, then the disability for understanding certain kinds of printed or written symbols should be no greater than for other kinds. Specific disabilities of this kind are encountered, and since most of these congenital cases can be taught to read, we must view with a certain amount of skepticism the maldevelopment theory. How many of these cases are due to emotional blocking, improper motivation, inadequate techniques in instruction, and suggestion is difficult to estimate. In the clinic at the University of California at Los Angeles cases that may be attributed to each of the above causes are encountered. Fernald attributes many of the cases of word blindness to the techniques used in the educational system in teaching reading. She says, "it seems that most cases of reading disability are due to the blocking of the learning process by the use of limited, uniform methods of teaching. These methods, although they have been used successfully with the majority of children, make it impossible for certain children to learn because they interfere with the functioning of certain abilities which these children possess. At present one of the main blocks is the use of the extremely visual method of presentation with suppression of such motor adjustments as lip, throat and hand movements." Fernald (372) has amplified her theories and has presented an excellent discussion of remedial methods in her volume on Remedial Techniques in Basic School Subjects.

Almost all of the people who attempt to correct alexia or word blindness proceed on the general theory that reinforcement of the visual stimuli with either auditory or kinesthetic stimuli will somehow establish the visual-speech relationship which has never properly functioned in the absence of these reinforcing stimuli. While the technique seems to work, our understanding of its operation is almost nil. Explanation necessitates postulation of mass action, vicarious functioning of neural centers, summation of stimuli which intensify the effects on the visual speech centers and other vague concepts.

If the case is one in which emotional maladjustment toward the reading problem has arisen because of some other failure in adjustment, improvement in reading ability will take place with better social adjustment.

Inadequate motivation has been suggested as a possible cause. Youngsters frequently do not understand the necessity for acquiring

reading ability, and unless the disability seriously handicaps them in their interests, they may be unwilling to expend the necessary energy to learn. A negative attitude develops, and the youngster no longer attends to printed material. This explanation is similar to Hurst's inattention theory for explaining functional sensory losses. We have presented in brief survey the material related to dyslexia. While much material on the general subject of reading has been omitted, our survey should orient the student to some of the problems.

AMNESIAS

We have discussed certain disorders that occur in linking our perceptions together. This linking of perceptions must make use of imagination and memory. Some psychologists distinguish between these various concepts only in a perfunctory way. We have described the connecting of perceptions and ideas as association; others call this learning. The one factor that differentiates memory and imagination from certain phases of association is time. Human experiences consist largely of perceptions, and when these are reproduced in the form of ideas or images, memory is involved. We say, therefore, that memory includes only those aspects of mental life that have previously been perceived. In other words, memory is personal and the temporal reference is always to the past.

Memory, for convenience of discussion, can be broken down into four phases: 1. Impression, which depends upon stimulation and resulting sensation. Whether the impression needs to be liminal to give rise to memory is an important question that need not be answered at this point. 2. Retention, which depends upon neurological condition. 3. Recall, which involves re-excitation of the neural pathways that have been modified by previous impression. 4. Recognition, which signifies identification of previous perceptions and which sets off true memory from imagination. These phases of memory are, of course not separate and distinct events that can be set apart introspectively. Memory, on the contrary, is one continuous process. This must be kept in mind during our discussion of memory disorders, but there are certain disorders of memory that can be attributed to one phase rather than another.

Theoretical objections may be raised against the usage of the term memory as outlined, since some conditioning experiments show that learning takes place when only the motor cells in the ventral horn of the spinal column and the motor end plates are stimulated. It is also true

that many habitual responses occur in which memory originally played an important part but is no longer of any significance. An attempt to relate learning of these types to a theory of memory would carry us too far afield.

The three major categories of memory disorder are amnesia, paramnesia, and hypermnesia. Amnesia is loss of memory, yet it may be questioned whether one can have a total loss of memory and still be conscious. A partial loss of memory is really implied when the term amnesia is employed. Either a period of time is blocked out or certain events cannot be recalled.

Amnesia may have as its basis any one of the first three phases of the process. Whether a stimulus is in focal or marginal attention determines to a considerable degree whether it will be remembered at a later date. We are constantly reacting to numerous stimuli that we cannot later recall. We may answer a question that someone asks while we are busily engaged in writing and be unable to remember either the answer or question a short time later. Stimuli occurring while under the influence of drugs or an anesthetic, while in the throes of a high fever, and while extremely fatigued, may invoke activities or responses. Girden (373) found that conditioned responses could be established in curarized monkeys but that such learning or conditioning is completely repressed upon recovery from the drug state. Memory for such stimuli is very likely to be poor and is ascribed to weak impression. Either the intensity of the stimulus is not strong enough to bring it in focal attention, or the condition of the nervous system is such that the resulting neural activity is somehow modified. Emotional states and injury may prevent adequate impressions, although such states usually interfere also with recall.

If the amnesia has a forward time reference, that is, extends to events just after an injury or emotional shock, it is called anterograde amnesia, and the tendency is to explain the loss by improper or inadequate impression. Of the two cases immediately following, the first is a typical case of anterograde amnesia; the second may be considered a partial case of amnesia due to poor impression.

1. A man about 40 years old was involved in an automobile accident in which he killed a pedestrian. He professed memory of seeing the man standing by the edge of the road, of seeing another car, and of his own actions controlling his car up to the moment of the impact; but he was unable to remember anything that transpired after that until the injured man was placed in an ambulance. The events occurring in the

interim, striking the man, calling the ambulance, and talking with other people, were completely blocked out due to the emotional shock. It is highly improbable that memory for these events can be restored. Anterograde amnesia is in this respect in sharp contrast with retrograde amnesia which will be discussed presently.

2. A business man consulted one of the authors. He complained that his business had slumped because he could not remember necessary data. In discussing his problem the conclusion reached was that his chief difficulty lay in the fact that he was not trying to remember. He had convinced himself that his memory was poor because he was unable to quote figures and dates as well as some other men. It happened that his work required knowledge of the affairs of some five or six companies whereas the people with whom he was comparing himself had knowledge of one company. Their ability to remember figures without reference to notes was to be expected since they had fewer to deal with. On actual memory tests, the patient was slightly better than average. In this case, lack of attention based upon the belief that a poor memory was at fault operated against adequate impression.

Neural deterioration and lack of neural development prevent proper impression. The feeble-minded child or adult is unable to learn many things. His nervous system is undeveloped to such an extent that there is probably both weak impression and retention. The individual who has senile dementia or dementia from other causes may be able to remember remote events but cannot remember relatively recent events. Senile patients can recall events of their childhood, even though they may ask you the same question over and over again. This behavior points to disorder of impression rather than recall, since the childhood experiences that are recalled were fixed under more favorable neural conditions.

Hunt (374) has summarized the work of Hull, Wechsler, Liljencrants, and Moore who have tried to separate the factors of impression and retention in the memory disorders of psychotic patients. Hull (375) found that dementia praecox patients and paretics learned much more slowly than normal people, but material once learned was retained as well by the patients as by the normal people. Wechsler (376), Liljencrants (377) and Moore (378) worked with patients having organic psychoses, including Korsakow's psychosis, paresis, cerebral arteriosclerosis, and senile psychoses. While the evidence indicates that the various phases of memory all suffer to a certain extent, the greatest impairment is in impression. Krechevsky's (379) work on rats adds

to the other evidence that supports the contention that improper impression caused in part by inattention is one of the major items in organic lesions. Rats with varying cerebral lesions were inferior to normal animals in learning a dark-going habit; but when electrical shock was administered to sustain attention, the differences in learning capacity of the two groups were sharply lessened.

The second phase of the memory process was called retention. Retention itself is not directly observable but its results are seen in later performance of some act. Recall and recognition are dependent upon the amount of retention that exists. We have a fairly large fund of information concerning the factors that affect retention but practically no information concerning the neural correlates. We know that some time after efforts to learn are stopped, additional time is required to fixate the learning. That is, some psychological processes continue, which, if interrupted, tend to break down retention. We know, in addition, that interpolation of other materials to be learned before this fixing process has been completed also tends to inhibit retention. Cameron (380) places great emphasis on the "continuation process" in the memory of senile patients. He found that senile patients could retain numbers just heard for a few minutes provided no other activity was engaged in. They were unable to recall the digit if memorizing was followed by a minute during which they were asked to spell a list of words backward. Any strong emotional situation or any injury interfering with cerebral circulation or neural metabolism produces an effect which inhibits fixation. We know, further, that materials tend to be forgotten, i.e. are not retained, in a definite order. More recently learned materials are forgotten first. This is true within limits, since certain acts or responses tied up with strong affects may not conform to this rule. Similarly, the extent of the learning may influence the sequence of loss.

Zubin and Barrera (381) taught mental patients paired word associations before they were given electric shock therapy. They tested memory by recall, recognition, and relearning methods after the electric shock therapy had been administered. They found that while learning ability was not impaired, recall and recognition were affected adversely. The material learned immediately before the shocks was affected more than the material learned earlier. This form of disorganization produces memory disturbances that are quite similar to those produced by other means. Duncan (382) demonstrated that well-established habit reversal patterns were destroyed by electric shock and that the

animals reverted to earlier forms of behavior. He argues that amnesia for the more recently established habits is induced. Sharp, Winder and Stone (383) have indicated that in addition to memory, reasoning (the ability to bring together spontaneously two elements of past experience without having them previously associated by contiguity) is impaired by electric shock convulsions. In humans, Brody (384) has demonstrated that memory defects for familiar material, names, places, and habits of work may be permanent in some patients treated with electro-therapy. More information on this topic will be presented later in the text. Sherman et al. (385) conclude from their study that chemical or electrical convulsions produce no significant effect on immediate or recent memory. The authors of this book are inclined to believe that the bulk of the evidence supports the former investigations.

We mentioned that some emotional situations and blows on the head may produce failure of memory. When this occurs, it is called amnesia. Under these circumstances, the length of the amnesia period is variable. It may extend for only a few minutes or it may extend to events covering many years. The amnesia may be complete for all events or it may be rather selective depending somewhat upon the various learning factors that have been pointed out.

In retrograde amnesia, the loss extends to events prior to the emotional shock or injury. Although the term retrograde amnesia may be applied to loss for any time period preceding a trauma or some episode, it should be restricted to a relatively brief period so that it can be distinguished from the more generalized amnesias. Janet felt that this distinction was necessary for a clear understanding of the problem. Retrograde amnesia is one of the symptoms of hysteria but may be symptomatic of a concussion. When found in cases with hysteria, it is said to be functional in origin; when accompanying concussion, it is organic. Cerebral concussion from air blast may or may not be accompanied by amnesia. Schwab (386) studied 350 such cases, of which only 40 per cent showed amnesia, but even cases having amnesia did not show retrograde symptoms. It was found that the reactions in 90 per cent of the cases were anxiety reactions which yielded readily to psychotherapy. Rudolph (387) has shown further that retrograde amnesia may occur with or without loss of consciousness at the time of the trauma. In those cases in which unconsciousness occurs the derivation of the retrograde amnesia is not related to the post-traumatic unconsciousness. The amnesia may result from repression caused by fear. Koff (388) found that the Rorschach differentiates cerebral con-

cussion from psychoneurosis fairly satisfactorily. Sixty-seven of 75 cases were correctly diagnosed as having organic impairment when the protein level of the spinal fluid was used as the index of organic involvement. Further, in 89 out of 100 cases with low spinal fluid protein, the Rorschach picture was one of psychoneurosis. A case of retrograde amnesia due to concussion is cited in the following paragraph.

A student at the university left the laboratory to do an errand several blocks away. En route, he stopped at a restaurant, bought a sandwich, and talked with several people. In crossing the street, he was struck by an automobile, became unconscious, and was removed to a hospital. He was unable to remember later where he was going, what he had done after leaving the university, or with whom he had talked.

Theoretically, amnesia due to concussion represents failure of retention. The disturbed circulation prevents retention. If such is actually true, then memory for the lost events cannot be reinstated. Syz (389) has demonstrated, however, that amnesic events due to organic disturbance can be reinstated sometimes. The severity of the organic disturbance is a determining factor. Shipley and Kant (390) in their review of treatments, including metrazol, for schizophrenia refer to reports of amnesia by various people. Retrograde amnesia is encountered for both the injection of the metrazol and preceding events. Difficulty is encountered in naming objects and parts of the body. After the convulsion, induced by the drug, functions return somewhat in the following order: esthesia, prosexia, gnosia, praxia, and mnesia. Reinstatement of functional losses is fairly easily accomplished under hypnosis, by association techniques, or during automatic writing.

Since synthesis of memory is possible in some cases conventionally designated as retrograde amnesia, it is probable that the phase of the memory process involved is not retention but recall or possibly recognition. This raises the old question that has received much attention in the literature as to whether anything once in memory is ever completely lost. This argument originated because under experimental conditions, materials apparently forgotten are relearned in less time than was required for the original learning.

Systematic and general amnesias are encountered in hysteria, fugues, multiple personality and hypnosis. In these disorders the amnesia may be complete for the entire past life, for a short period of time, for a particular person, for a given episode, or for some simple performance. These amnesias cannot be attributed to those phases of memory which

have been termed impression and retention, but to recall. In the majority of cases, recall is established spontaneously, with suggestion, or through associations. Definite relearning is not required. The causes of the amnesias in the mental disorders mentioned before, as well as their treatment, are brought out in later chapters.

The last phase of memory (recognition) is identified with a group of disorders that are called paramnesias. Recognition differs from recall in that identification of the object or thing remembered, occurs. If one is given a list of words, nonsense syllables or figures to memorize, and is asked to write down as many as possible after five repetitions, he is said to have recalled them. If the number of items is sufficiently great, there will be many that cannot be recalled. If, however, the subject is shown a list containing some of the words or numbers that he could not recall and some others that he had never seen before, he will be able to pick out from the list most of those to which he was originally exposed. This identification of materials that could not be spontaneously recalled is said to be recognition. Throughout life we are constantly recognizing things that have not been spontaneously recalled, and we are recalling things that are misidentified. Most people have had the experience of remembering a person's face and associating another name with it. This form of perversion of memory takes place almost daily.

The various forms of mistakes in recognition can be grouped with respect to (a) time; (b) place; and (c) persons or things. Time errors in recognition may involve simple disorientation of day, week or year. There may be a more generalized shifting of time in relation to the happening of a series of events similar to that which occurs in retro-antegrade amnesia. Under these circumstances, recent events are identified with the remote past and past events are identified as recent.

Places may be incorrectly identified so that the individual may not know familiar streets or buildings; or unfamiliar streets and cities may be recognized as familiar places by the individual. The latter phenomenon is called "the illusion of the *déjà vu*." There seems to be little advantage in distinguishing between the feelings of having seen before, having heard before, having touched before, under separate names. In normal people, there is usually a conflict between the feeling of familiarity and knowledge that the experience could not have occurred previously. Unless this conflict does occur, the experiences are accepted as real. In the psychotic patient the disparity between feeling and knowledge seems to be lacking. The normal individual checks on the disparity; the psychotic does not.

The following case presented by Woolley (391) illustrates the continuous feeling of familiarity.

A 26 year old woman for several years has suffered with symptoms of fear of blushing and fear of insanity. The family setting consists of father, mother, three older brothers, and one younger brother. Following a change of residence and taking up work as a housekeeper with a widower who had three children, (two boys and a girl) and a male employe residing in the home, she began to have a continuous feeling of familiarity with the whole setting. In many respects she was accepted as one of the family and ate with them at the table. She was carried to and from treatment in the family car and frequently was left alone with the man in the evenings, spending the time talking with him. This set of experiences of familiarity was brought up spontaneously by her and became associated with her own home setting wherein she was almost in direct competition with her mother for the management of the household (which fact had been admitted into consciousness in forms of a wish for the mother to be dead and herself to have charge of the house). It is interesting in this connection that she had refused several positions working for women employers, being finally attracted to the present one. She felt sorry for the man because he had a dead wife. He is the one who brings her back and forth in the car. She leaves the analytic hour to return home and spend the evening with him because she has no where else to go. She is much embarrassed at having accepted extra money from him because she needed it. She feels, when she eats with them at the table, that she knew them all before and associates this with an experience in which she had felt very much embarrassed at the supper table in her own home when she had clumsily revealed a secret of her brother's.

Many psychotics fail to recognize their friends and relatives, and may even deny the reality of themselves. Likewise, they confuse their nurses and doctors with other people. Specific cases of confusions due to faulty recognition would add little to the student's knowledge since they happen frequently to almost everyone. The student should bear in mind that these confusions are not indicative of incipient psychotic condition unless they are exaggerated. Here again, there is no line of demarcation that can be satisfactorily drawn.

Experimental work dealing with recall and recognition in various groups of psychopathic people shows that, similar to normal people, the loss in recall is greater than the loss in recognition. This seems to hold true for senile, parietic, manic-depressive, schizophrenic, epileptic and psychoneurotic cases. Not all patients in these classifications show amnesia, but when amnesia is present, it affects recall more severely than it does perceptual recognition. Arluck (392), in discussing the literature as well as his own work on memory in epileptics, reports that a number of investigations have shown memory deficiency. In his work, which was confined to non-deteriorated cases, he found no evidence of memory deficiency on the digits tests, reading test and designs test (1936 revision of Stanford-Binet Test).

The explanation of paramnesias depends upon both theories of memory and theories of many of the major mental disorders. It will be possible, therefore, to indicate in only a brief manner at this point the underlying nature of the disorders. Our explanation will in part overlap some of the previous discussion of the various phases of memory.

Janet considered one form of paramnesia, i.e. "the illusion of the *déjà vu*," as a disturbance of perception rather than memory. He maintained that it is a false appreciation of the character of the actual perception which takes on more or less the aspect of a phenomenon reproduced. In other words, Janet implies that the paramnesia is an illusion in which false perception occurs. In "the illusion of the *déjà vu*," however, the perception seems very vivid and clear, leaving little chance for the false appreciation of the character of the actual perception.

Organic impairment due to fatigue or other causes has been suggested. While it is true that paramnesia is encountered in such cases, the actual explanation is unsatisfactory because organic impairment is not always accompanied by paramnesia. Vivid emotional concomitants with previous experiences have been utilized as the basis for explaining certain characteristics of paramnesia. A specific feeling tone when aroused may reinstate previous experiences associated with that feeling tone, and hence the experiences become displaced in time. Many psychotic patients are completely out of touch with reality and hence the theory that they do not perceive any distortion of memory seems to be plausible. Explanation then has to be offered for their loss of reality before a satisfactory explanation can be given for the paramnesia.

Therapy for memory failure has been largely along physiological lines. Vitamin B complex, reduced oxygen tension, circulatory insufficiency, benzedrine, caffeine, aminophyllin, epinephrine, nicotinic acid, and pantothenic acids have been examined as agents that may be related to retention. Most of these agents have proved to have some beneficial effects, but they do not adequately control memory failure. Glutamic acid has been investigated as a potential agent in improving learning and in so far as memory is involved in learning it throws some light on memory. Marx (400) and Hamilton and Maher (401) have demonstrated that glutamic acid in normal or supranormal levels does not alter the performance of rats in maze learning. Other authorities have reported some improvement. At present, the beneficial effects seem limited at least. The reader can obtain an extended account of the literature by reference to Muenzinger et al. (393), Bowman et al. (394),

McFarland (395), Bleuler (396), Forbes (397), Hollingworth (398), and Cameron (399).

Hypermnesia includes several different activities that are related to the various phases of memory. When we say that an individual has an unusual memory we usually imply that he has an exceptional ability for recall. Recall immediately after presentation of material to be remembered and recall after a delayed period of time may not depend upon the same factors. We tend to distinguish between the number of items that can be recalled successfully and the period of time during which a given number of items can be remembered. What really concerns us is the temporal aspect of memory and the numerical span of memory for items. We have already shown that these aspects of memory differ in cases of amnesia and it is therefore likely that similar differences occur in hypermnesia. We also differentiate between the ability to remember all things unusually well and the ability to remember only certain specific things. We know very little concerning the causes of general ability to remember and are accustomed to explain the ability in terms of neural organization, which is just another way of stating our lack of knowledge. Some authors state that individuals of high intelligence have good memories. All that such statements really mean is that in tests of intelligence, memory plays an important part. Memory seems to be tied up with imagination to a certain extent and some people who have auditory imagery well established are able to recall things that they have heard better than the things that they have touched or seen. In other cases, touch or vision is more important for establishing memory. Why this should be true is difficult to explain. Sensory deficiency will not explain the matter, and if the assumption is made that some sensory centers in the cortex are superior or inferior to others, we have done nothing more than make an assumption. We know that a strong emotion accompanying a definite response may tend to enhance memory for specific details or may tend to blot out such details. Which will obtain is hard to predict. Some theories of learning hold that pleasant emotions tend to fix the response, whereas unpleasant emotions tend to inhibit fixation. Both pleasantness and unpleasantness at times enhance recall of details of experiences. The state of integration existing at the moment of stimulation is probably the determining factor as to whether pleasantness or unpleasantness is the more potent in the fixation of events that are to be recalled. Shaw and Spooner (403) found that there is a form of selective memory which depends upon whether the subject is ego-involved. They had subjects

rate an individual on a number of characteristics. A week later these same subjects were read a "bogus" composite rating of the individual. A week later they were asked to recall the bogus ratings. Recall was better for those items which coincided with the individual's own rating.

General hypermnesia is never of any serious concern to the individual and has received only incidental consideration in abnormal psychology. The writer is inclined to the view that hypermnesia is almost always specific; i.e. refers to certain particular events or topics. Certain psychopathic individuals may remember all their sins; others who have transgressed just as frequently may not remember their sins but can recall in unusual detail all the experiences associated with the various illnesses in their lives. We might also point out people who do tricks in the theater and have the ability to remember lengthy codes or numbers. So-called lightning calculators probably possess unusual memory for mathematical concepts. Meumann (402) cites the cases of the Italian, Inaudi, and the Greek, Diamandi. The former had been reared as a shepherd and was illiterate until the age of fourteen. He multiplied mentally numbers up to 24 digits but had them always presented to him orally. He was able to recall the next day all of the mathematical operations used in an hour's performance.

The latter was well-educated, but in contrast with Inaudi, insisted that all of his numbers be written. He was able to memorize in a very brief time a large column of numbers and repeat them either forward or backward. Why these men have such ability and others do not have it or cannot cultivate it is one of the problems for further research.

Some of the problems on association and memory which have been treated inadequately in this chapter will receive further elaboration in the next chapter, in which the general theories related to the association mechanism will be discussed.

CHAPTER VI

THEORIES OF DISORDERS OF THE CENTRAL FUNCTIONS

In this chapter we shall present certain theories that have been advanced for explaining the disorders which are ascribed to central origin. While these disorders have been discussed in part in the chapter on Association and Memory, certain more generalized theories that are related to the origin of the functional psychoses need to be elaborated. The inclusion of certain of the theories does not mean that the theories are valid. The presentation of any theory implies only that the theory has been held to be valid by its proponents. Some of the theories may be useful at present only, as historical curiosities, but their inclusion is justified on the basis that the student should know about them so that theorizing along similar lines will not be accepted as uncritically in the future as in the past.

INTEGRATION

Practically all of the psychological theorists admit as the basis of normal association the neural arc; that is, afferent impulse, the central relay or connecting mechanism, and the efferent impulse. It is an accepted fact, moreover, that many afferent impulses reach the sensory cortex simultaneously. These manifold simultaneous afferent impulses are in some manner organized (integrated or unified) in the brain so that a single efferent or relatively few efferent impulses occur. A very good example of the function of the integrating mechanism is found when one listens to an orchestra playing jazz or classical music. The air or tune is perceived as a synthetic product and is not perceived as being made up of a series of tones and overtones generated by a piano, saxophone, traps, and so forth. Facts from every day experience indicate that these response patterns become linked with each other and are remembered. The problem of abnormal psychology is to explain just how certain associated experiences are lost and how wrong efferent pathways are activated in place of the efferent pathways that are usually activated.

Errors in typing such as "hte" and "upno" for "the" and "upon" represent some slight derangement of the integrating system. Likewise speech lapses in which syllables are mispronounced or misplaced may be

of the same origin. These examples occur almost daily, and little attention is paid to them, since they are only temporary and their importance is relatively slight. Examples of loss of events that have once been a part of our associated experience are also very numerous. The recall of a word, name, or date may be attended by difficulty. The word seems to be at the "tip of the tongue," yet it cannot be remembered. A few seconds or a few minutes later it is suddenly recalled. The processes of association have now functioned in their customary fashion.

Exaggerated failure of association and failure of integration take place among neurotic individuals. Systematic movements such as stamping the foot before beginning to walk, functional paralysis, amnesia, and other hysterical manifestations have been explained in this way.

The specific kinds of neuroses may be disregarded for the present, but it is necessary to delve into the psychological theories underlying their development. The various theories which will be discussed are:

1. Dissociation Theory.
2. Redintegration Theory.
3. Inattention Theory.
4. Conditioned Reflex Theory.
5. Psychoanalytic and Instinctive Theories.

Although these theories are similar in many respects, the chief difference lies in the emphasis placed upon the various factors controlling consciousness and motivation. The points of disagreement are of sufficient importance to warrant separate treatment.

DISSOCIATION THEORY

The dissociation theory has been identified with Janet and Prince. Janet in his two volumes, *The Mental State of Hystericals* and *The Major Symptoms of Hysteria* gives a lucid picture of hysteria and its symptoms. He also supplies the nucleus of the dissociation theory which has been elaborated by Prince, Sidis and others.

The system of psychology as set forth by Janet is not essentially different from the modern viewpoints of Dunlap, Hollingworth, Carr and others. The functional disorders, according to Janet, arise because of a constitutional weakness, predominantly of the encephalon. Cerebral exhaustion results from this weakness, and there is an inadequacy of synthesis or dissociation. Since, however, all of the functions are not equally exhausted, the functional disturbance involves those func-

tions that are weakest, and it is only when some stimulus from the environment calls into play these weakened functions that the disorder is exhibited. It appears that emotional states coupled with these environmental stimuli are highly important. There seems to be embodied in Janet's scheme an organic basis for functional disorders, i.e., neural exhaustion. He leads one to believe, on the contrary, that the disturbance is only psychological in origin. He includes in his concept of exhaustion a diminution of psychic energy, possibly similar to the James' idea of the waning of the stream of consciousness.

Prince (404) has gone still further in developing the dual concept of mental activity. He assumes that conscious activity is accompanied by definite neural conditions. All mental activity leaves its traces (brain records) in the neural system; these remnants are called neurograms. The memory for past events is embodied in the vestiges of these neural correlates. When these neurograms are again activated by a physiological process or by a psychological state (thought, imagination), conscious experience may or may not result. This leads to an investigation of Prince's idea of consciousness. It is necessary to refer to our earlier remarks in this chapter concerning the reaction process and the integrating action of the nervous system. For our future discussion of the concept of consciousness, Dunlap has given a simple and understandable statement. Consciousness or being conscious, is awareness or being aware. Obviously, this simple statement needs some elaboration. There must be some distinction between the process of being conscious, the content of consciousness, or that of which we are aware, and the thing that is aware. The first of these terms may be applied to the function of the total organism; the second, to the stimulus and the third, to the ego or the I.

Dunlap (405) states that consciousness or awareness varies in degree from the "focal" or highly "attentive" on the one hand to the "marginal" or "fringe" consciousness on the other. Difference in respect to degree (vividness) may exist between consciousness at one moment, and the consciousness at the next, and also in any given moment, between the consciousness of different details in the content. Whether the gradation in degree is of a continuous sort, or whether there are 3, 5 or more distinct "grades" between "focus" and "margin" need not enter the discussion. He further maintains that the occurrence of the marginal degree of consciousness, sometimes termed subconsciousness, is tacitly or explicitly admitted. That these forms of subconscious processes are important, not only as modifying the total conscious pattern of the

moment, but also as profoundly influencing succeeding processes, both conscious and non-conscious, is also generally admitted.

The adoption of his concept of subconscious processes does not necessitate the adoption of the various doctrines of the "unconscious mind" or of "co-consciousness" unless the obvious fallacy is committed that, since the names of the various concepts are confused, the concepts are the same. The differences in degree of vividness or awareness have been attributed by different authors to various psychical "entities" called the unconscious, the pre-conscious, and the co-conscious. It is preferable for the present to term all these different concepts of consciousness nothing more than degrees of consciousness. What Dunlap calls marginal consciousness has been termed subconscious processes by others. That subconscious processes or marginal consciousness influence focal consciousness can be readily demonstrated. While dancing, one may be carrying on a conversation about a beach party or changes in style of clothing; however, when the orchestra changes from one dance step to another, the steps or movements of the dancers are correspondingly changed, in spite of the fact that the tempo of the music has not been in focal consciousness. Similarly, if one is engrossed in reading, when the dinner hour approaches, he may stop reading, although hunger stimuli have not been dominant. Coover's (406) work on subliminal stimulation shows that an element in a stimulus pattern may be in consciousness, yet not be focal. Cards which contained in the center nonsense syllables (in foveal vision) and in one of the upper corners a number (in peripheral vision), were exposed to subjects. When these cards were exposed for such a brief period of time that only the nonsense syllables could be ascertained, it was found that the numbers on the cards (in peripheral vision and below the time threshold) could be guessed correctly more often than could be expected on a basis of chance. If these examples of non-focal or subconscious activities are compared with Prince's concept of the subconscious and co-conscious, certain differences will at once appear.

For example, in normal integration (fig. 31) stimulus patterns 1, 2, 3, 4, 5, 6, would produce their respective responses R^1 , R^2 , R^3 , R^4 , R^5 , and R^6 . Connections would be established in the central nervous system in such a manner that S.P. 1 may be linked with 2 and 3, and may also be linked with 4, 5, 6. In multiple personality, automatic writing, functional anesthesia, and somnambulism, Prince assumes that patterns 4, 5, 6 become isolated from patterns 1, 2, and 3. The vestiges of connections through pathways x, y, z remain, although these do not

function unless some unusual means is employed to reintegrate or establish the unity of the system. Not only do these independently integrated systems exist side by side, but they may function in conscious experience independently of each other. The organization of these independent conscious systems centers in an emotional element or sentiment. The neurograms which were described earlier as "brain records" are purely neurological and have no mental element. These dominant neural dispositions are what Prince terms the "unconscious." They are the basis for memory. In the following diagram, if stimulus pattern 2 produced response R¹ traversing pathway a, then it is assumed

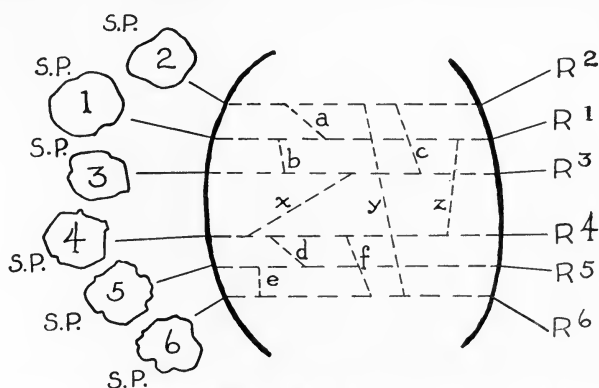


FIG. 31. Diagram showing the interconnections of stimulus patterns with the response patterns.

that that pathway is effected in some manner or becomes organized in some way so that it retains the possibility of action in the same way. Originally, the traversing of that neural pathway produced consciousness, and one might expect that later neural activity of that pathway would be accompanied by consciousness. According to the theory under discussion this does not always happen. The activity of the neurograms may revive all the conscious experiences that took place when the original impression was made, or there may be only reflex activity of the neurogram which influences consciousness at the moment but which is not in consciousness itself. For example, seeing an insect in the jam may lead to a dislike of jam. This reaction produces a neurogram relative to the reaction. At a later time, this neurogram may be activated so that seeing flies in the dining room leads to the inability to eat any food at that time. The original psychical experience of

seeing an insect in the jam is not necessarily reinstated, although it may be. A description of a case of somnambulism by Jastrow (407) brings out clearly the fact that neurograms may be active but not conscious. A young woman who was a confirmed somnambulist was in the habit of dressing and going from her bedroom to the parlor on the next floor. When observed, she struck a match on the under side of the mantel and lighted a gas light. She sat in a chair and gazed at a picture of her mother. Obstacles interfering with her vision were not noticed. Bread soaked in quinine and placed in her mouth produced no response. Pinching, tickling, and pulling her hair were equally ineffective in awakening her. When finally awakened, she had no recollection of her actions. In many neuroses, the difficulty lies in the fact that the neurogram influences conscious experience but does not revive the associated phenomena. The individual is unable to understand the genesis of his dislike for food under the specific circumstances. When this is explained by means of analysis of some kind, the dislike no longer prevails.

There is still another important aspect of consciousness inherent in Prince's system. To the usual concept of consciousness, he adds co-consciousness. Some conscious experiences are separated, because of inhibition or conflict, from the total system. Experiences integrated with this unit, which may be called "consciousness number 2," are not conscious in the sense in which the term "consciousness" is usually employed. This type of dissociation of consciousness is best exhibited in cases of multiple personality, hypnosis, and functional anesthesia. An hysterical subject will deny feeling pin pricks or a hot iron and will declare that a loud sound was not heard in spite of the fact that attention is centered on the anesthetic arm or on hearing. He will not only deny any awareness (consciousness) of these events but also will show no observable response to these stimuli. If, however, he is hypnotized and placed in another state of mind (consciousness), he will insist that sensations occurred at the time of the stimuli. In other words, there was a co-conscious perception even when there was no conscious perception. The veracity of co-conscious perceptions can be established. The patient can tell you the instrument used, the actual number of pricks or the number of sounds given, and the procedure used in giving them. It is assumed, of course, that the subject is blindfolded and that all of his cues are derived from sensations of the anesthetized area. Prince held that the motivating force is instinct and when an instinct is aroused the organism expends energy in three directions: an attempt is made to

satisfy the instinct; there is a production of visceral preparatory changes; and an inhibition of contrary instincts. Nicole (408) interprets this to mean that Prince recognized dynamisms of conflict and antagonism. He attributes a departure to Prince from Janet's theory of weakened synthesis of neurosis and contends that Prince's concept of dissociation is dynamic rather than biologically tinged.

In cases of multiple personality, one of the personalities may exhibit entirely different character traits from those shown at another time when the other personality dominates. Information which has been learned in state "A" cannot be utilized in state "B" and vice versa. In automatic writing the individual may reveal the answers to questions and solve arithmetical problems which have been asked, while deeply engrossed in some other task. The individual may not be conscious (Dunlap's use of the term is implied here) of either the questions asked or the answers given. These examples of simultaneous conscious activity seemed to Prince to add further evidence to his concept of co-consciousness. More detailed illustrations of this behavior will be presented in a later chapter. Although the concept of dissociation may be readily understood, the actual nature of the functional disorder or the loci of the dissociation are not at all clear.

One of the authors has attempted to secure some information concerning the loci of the dissociation in hypnotically induced states. In order to determine whether there was a blocking of the afferent pathway, anesthesia of the arm and anacusia were induced. Electrodes were applied to the subjects to secure changes in skin resistance and body potential. Since these electrical changes seem to depend upon sensory stimulation and motor activity of localized areas of the body, the intactness of neural pathways may be inferred on a basis of the occurrence or non-occurrence of the electrical changes; for example, if the free nerve endings for pain in the arm of a hypnotic subject are not functionally connected with the central nervous system, a psychogalvanic response (electrical phenomena described above) might not be expected. A similar condition might be obtained when hypnotized subjects are given suggestions that they are unable to hear anything, or when they are told that they cannot remember an event that has occurred in the normal waking state and to which an emotional response usually takes place. These subjects will, when awakened, deny that they have felt pin pricks, have heard a gong or pistol, or have remembered a salacious story. Nevertheless, a galvanometric response almost identical with the response of the normal waking state is obtained. Typical psychogal-

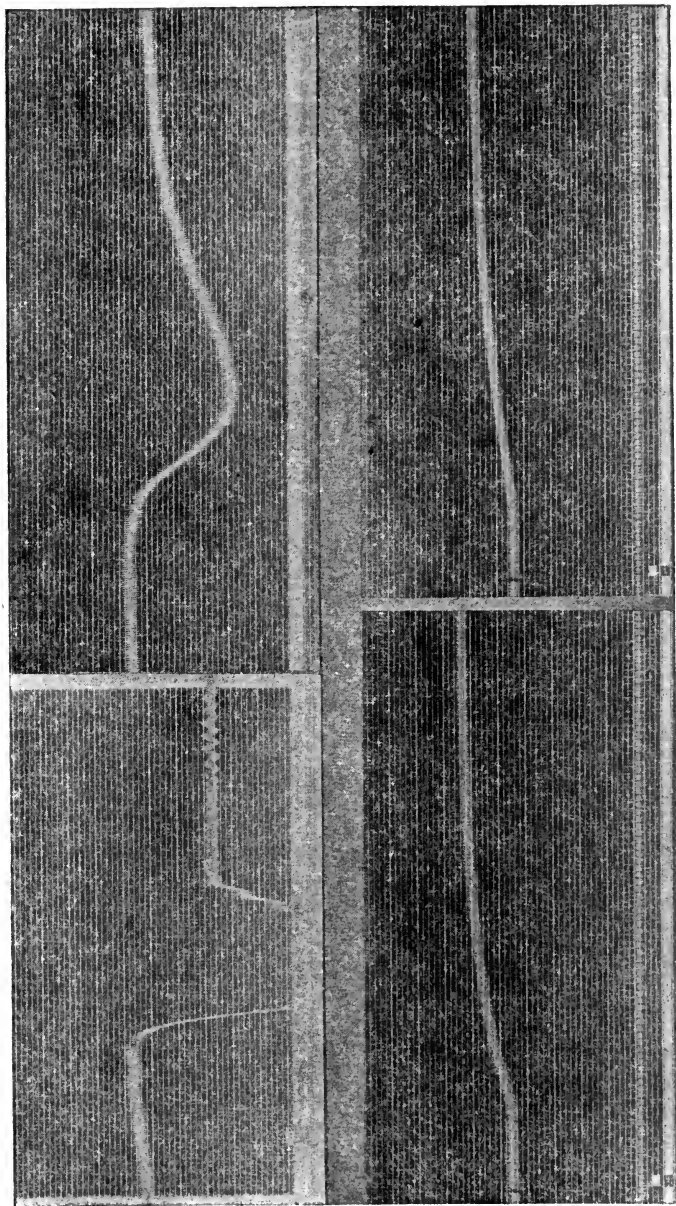


PLATE II

Upper curve left: Psychogalvanic response to gong after conditioning with shock. Both anesthesia of the arm and anaesthesia suggested under hypnosis.

Upper curve right: Same as the curve on left except that the subject was normal.

Lower curve left: Response to pistol shot. Anacusia suggested under hypnosis.

Lower curve right: Response to pistol shot of the normal subject.

vanic responses for the normal and so-called "dissociated" state are shown in plate II.

These experiments indicate that the afferent and efferent pathways are intact, since a paralysis of either the sensory or motor nerves by an anesthetic such as novocaine or by severing the nerves destroys the reaction. The psychogalvanic response has been experimentally inhibited in subjects with local anesthesia of the fingers. Although the experiments just set forth establish the fact that no neural blocking occurs at the reflex level, they do not demonstrate that a blocking does not take place at a higher level which would involve consciousness. In other experiments in which amnesia was suggested, and in which conditioning was tried, consciousness was involved, or at least the association processes were involved. Hypnotized subjects were told that they could neither hear a particular sound nor feel a feeble electric shock presented simultaneously. It was found that a psychogalvanic reaction was secured later when the sound alone was presented. The conclusion must be reached, then, that the neural pathways were functionally active at the higher levels; otherwise the response would not have been secured. Since these so-called dissociated states yield responses practically identical to normal responses, it appears that the term "functional dissociation" is simply descriptive and not explanatory.

REDINTEGRATION THEORY

The redintegration theory advanced by Hollingworth is carried over with some modifications from the psychology of Sir William Hamilton. In addition to offering the best explanation of many functional disorders, it is relatively free from the hypotheses, assumptions, and mystical concepts embodied in many of the other theories. Hollingworth presents a very good account of his theory in explaining a case of anorexia. The case may be summarized as follows: A widow whose husband had been dead for 3 months showed a loss of approximately 40 pounds in weight. The loss in weight was linked with the fact that she had no desire to eat; the small quantity of food which she took was chewed indefinitely because she felt a constriction in her throat and could not summon sufficient courage to swallow it.

Hollingworth (409) says:

It is enough to recognize that here is a situation (sitting at the table) which had previously been a part of a larger whole (the first occasion of trying to eat after her husband's death, with his empty place conspicuous, the odors of medicine, the presence of lamenting relatives, the business of the undertaker, the priest, the nurse). In this elaborate situation her pronounced emotional reaction prohibited eating, characterized as it was by emotional

sensations, constriction of the throat, feeling of weight in the stomach, lack of appetite, etc. Since then a part of the original situation, namely the act of sitting at the table to eat, reinstates the whole emotional reaction.

Any part of the original situation would probably be equally effective—but these parts do not recur. The relatives have departed and seldom visit her; the body is gone; the undertaker never returns; the house is no longer darkened in daylight. It is entirely unnecessary to assume with Déjérine and Glauckler (the case was originally presented by these authors¹) that the idea of her husband was present in imaginal form, or induced in any conscious form whatever. What is present is a fragment of the original stimulus, evoking the total reaction.

Attention must be called to the normal integrating action of the nervous system which was discussed earlier in the chapter. It was stated at that point that the organism is aroused to activity by stimulus patterns rather than by isolated stimuli. Hollingworth maintains that a single element from pattern A, incorporated into pattern B, is sufficient to call forth the identical response which was originally made to pattern A.

The explanation offered is only partially adequate. Difficulty is encountered, since Hollingworth fails to take into account the lack of rationalization on the part of the widow. Countless other women are faced with similar situations; yet they do not develop anorexia. It cannot be said that element "a" in pattern B does not recur to them in a manner analogous to its recurrence to the women who have developed a disorder. All that can be said is that element "a" in pattern B is integrated differently by most people. The causal explanation of differences in integration is ignored. The development of delusions proceeds along similar lines. The individual who develops ideas of persecution may have been slighted by some inadvertent action or have been offended by some unintentional remark on the part of another individual or other individuals. Later remarks are interpreted as being directed toward the individual who develops the delusion. The partial situation reinstates the feeling of being slighted. Just why the second and later situations are associated with the original situation has yet to be discovered.

In this connection the writer recalls an incident which took place some years ago. In carrying out some experiments, he hypnotized a subject by the usual method of having the gaze fixed on the experimenter while monotonous verbal stimuli were given. The verbal stimuli included repeating the numbers from 1 to 10. This same subject was engaged in this laboratory in another experiment which involved cross-

¹ Writer's insert. Case reprinted by permission from H. L. Hollingworth, *Abnormal Psychology*, 1930, The Ronald Press.

ing out single-place numbers. While performing this task he came across the number series from 1 to 10 and immediately fell into a hypnotic condition. The subject, when aroused, had no knowledge of the actual factor involved in his predicament. In fact, he inquired what had happened to him. The significant feature of the two situations was the number series. In both instances the reactions were the same; nevertheless, it is begging the explanation to say that this element reinstated the original reaction. The question which must ultimately be answered is: why did the individual not perceive that the task of crossing out numbers was different from the hypnotic situation? In explaining these questions which have been raised, Hollingworth offers an intellectualistic interpretation. He maintains that the neurotic individual is lacking in sagacity and hence is more prone toward redintegrative reactions. This notion was founded on the fact that many of the soldiers in the late war who exhibited neurotic tendencies were below normal in intelligence. He is partially correct in his contention; nevertheless, there are a great number of neurotic cases that show a relatively high order of intelligence.

INATTENTION THEORY

The theory of functional disorders proposed by Hurst (410) is worthy of comment although he did not attempt to apply his theory to any cases except those suffering from hysteria. He states that "hysteria is thus a condition in which symptoms are present which have resulted from suggestion and are curable by psychotherapy." His point of view is similar to that of Charcot, Babinski, and Rosanoff. The elaboration of his theories leads him to a rather simple explanation of functional disorders of the special senses. It is this aspect of his work that will be given our attention. Before discussing the theory in detail, it will be necessary to present some information concerning a few of his experiments. Hurst attempted to determine what factors were responsible for the production of hysterical anesthetics. He assumed that the majority of these cases arise because of the nature of the questions asked by physicians during their examinations. Then he selected 29 healthy and intelligent medical students who had had no clinical medicine and asked them to pretend that they had been in a railway accident and that they were trying to collect indemnity because of a paralysis of the right arm and leg. When these men were asked if they suffered from any other symptom, they uniformly denied other injuries, a procedure which corresponds to the behavior of patients with hysterical paralysis.

They were then asked, "Can you feel as well on your right side as on your left?" Twenty-two of the 27 complained of feeling less on the paralyzed side. When these men were tested, 6 had right hemi-anesthesia, 5 had complete right hemi-anesthesia except the face, twelve had anesthesia of the whole arm and whole leg, one had hyperesthesia of the whole arm and whole leg, and 4 had no anesthesia. It appears then that the mere asking of a leading question will influence the actual sensations of normal individuals.

According to Hurst there are three classes of anesthesia: (*a*) in which the anesthesia is produced by a suggestion of the physician, (*b*) in which the anesthesia is produced because of inattention to dermal sensations during some other profound disturbance, (*c*) in which the anesthesia arises because of an organic injury. The anesthesia is complete during the organic injury, but auto-suggestion is responsible for the lack of feeling after the recovery of the nerve.

Hurst and his co-workers have demonstrated that even in the cases of organic disturbances a leading question will produce symptoms analogous to those found in hysterical patients. Patients who have a deficiency in hearing due to organic causes, which is the same for both ears, will readily admit that the acuity is better in one ear if they are asked which ear is better. Functional loss of hearing, vision, touch, warmth, and cold may be explained on a basis of suggestion. The individual cannot feel, see, or hear because of inattention to peripheral stimulation. Inattention may be brought about through any one of the three methods listed above. For example, an individual may be unable to hear well when he has a head cold. Auto-suggestion leads the individual to cease paying attention to sound stimuli after recovery from the cold. Another individual may not hear when spoken to if he is suffering from some profound emotional shock. Attention is directed to his cogitations which involve the emotional experience. Sounds after the emotional crisis has disappeared are not heard because of auto-suggestion in connection with the emotional experience. Still another individual may be influenced by suggestions of the examiner in a way which has previously been described. Hyperesthesia is explained by a reverse mechanism. Attention becomes fixed or centered on certain peripheral stimuli by suggestion.

The difficulty with Hurst's theory is that he attributes some "voluntaristic" rôle to attention. In other words, he assumes that attention requires some voluntary neural "set." Individual variation has not been explained. Why certain individuals should be more suggestible

than other individuals remains to be explained. The only hint which he offers in answer to this question is that hysterical symptoms are more prevalent in the less intelligent and less critical individuals. This corresponds to Hollingworth's "intellectual concept."

CONDITIONED REFLEX THEORY

The conditioned reflex theory as applied to abnormal behavior has been set forth to a large extent in the works of Bechterev and Pavlov. Developing simultaneously and long somewhat similar lines have been the experiments and writings of the behavioristic school of psychology. The pronouncements of Watson, M. Meyer, Hunter, Lashley, and Weiss may be considered as representative of the tenets to which the behavioristic must subscribe.

A reflex, according to Pavlov (411), is based upon strictly neurological and physiological factors. The receptor or sense organ is a specialized type of cell or cell-group appropriate for responding to different kinds of stimuli. This is connected with the central nervous system in the usual way. The sensory nervous impulse is then directed towards the effectors so that a response occurs. Thus far, this conception of the reflex activity does not differ from the reaction arc hypothesis as stated by Dunlap. The subsequent explanation concerning the particular efferent pathway traversed gives rise to a divergence of the two theories. If we may naively assume for purpose of clarity that the individual is born before receiving any stimulation, then the first stimulus which he receives will produce a response. The nature of this first response will be determined by the development of his neural structure. The second response made by the organism may be initiated by the first response; the third response, by the second; and the later responses by those preceding them. Unfortunately, the stimulus-response situation soon becomes complicated, and the problem of explaining selectivity of response, linking of responses, and substituting responses must now be faced.

The unconditioned response made to a particular stimulus is determined by the structure of the neural system and other modifying physiological conditions. The only restriction placed upon simple reflex action in the normal individual is that the initial response is always appropriate or biologically useful for the animal. In the total structure of the nervous system there are innumerable innate reflex arcs which await the proper stimulus to set them into action. This innate disposition is in itself sufficient to account for the selectivity of response,

according to Pavlov. For example, he assumes that the reflex arcs involved in the withdrawal of the hand from a pain stimulus, or the contraction of the pupil when a light is flashed upon it, arise in the above manner. The aggregate of all these reflexes constitutes the foundation of the nervous activities of all the higher organisms. Linking of responses occurs in the manner which was described previously, i.e. the response of one reflex action serves as the stimulus for the next reflex action. A reflex in which the response has been attached to a substitute for the natural stimulus, Pavlov calls the conditioned reflex. For example, when a puff of air is directed on the eyelid, there is a closing of the eyelid, a natural reflex. If another stimulus such as a sound, which by itself has no effect on the lid reflex, is presented along with the puff of air, the sound after a few repetitions will have the same effect, namely, closing of the eyelid. This conditioning process does not occur except under the following circumstances.

1. The conditioned stimulus must overlap in time the action of the unconditioned stimulus.
2. The conditioned stimulus must begin to operate before the unconditioned stimulus comes into action.
3. Other distracting stimuli must be eliminated.

The opposite aspect of conditioning or the breaking down of the conditioned response Pavlov refers to as inhibition. Inhibition seems to be the tendency for conditioned responses to return to their unconditioned or primal state. In other words, a conditioned reflex will be weakened (inhibited) if the repeated application of the conditioned stimulus is not reinforced. If reference is again made to the conditioned lid reflex, the inhibitory effect can be made more explicit. The continued repetition of sound tends to lose its effectiveness, unless the original stimulus of a puff of air be interpolated. Another factor controlling inhibition is the intensity of the excitatory process. In general, the greater the intensity of the excitatory process, the more intense must be the inhibitory process to overcome it.

The application of the conditioned reflex theory to problems of abnormal psychology is linked up with Pavlov's explanation of sleep and hypnosis. Under normal stimulation, the cortical elements soon become exhausted with repeated stimuli, which results in a state of inhibition. The real cause of inhibition, then, is exhaustion rather than some specific property or function of the cells as was previously suggested. During inhibition the cells recover, since they are free from action. The

exhaustion may be localized initially but spreads rapidly to adjacent cortical areas. These adjacent areas are now in a state of inhibition as a result of irradiation. Sleep occurs when irradiation from inhibitory regions or pathways spreads over the entire cortex and lower portions of the brain. Pavlov further holds that even during the waking state, scattered sleep exists in the form of internal inhibition of separate cellular groups. The internal inhibition in the alert state is restricted, however, from spreading or becoming irradiated by the antagonistic nervous process of excitation.

Hypnosis is explained on a basis of cortical inhibition alone; inhibition is not as widespread as in sleep. In one of the experiments with dogs, it was noticed that the animal began to show signs of drowsiness, as a result of being left in the room without the application of conditioning stimuli. The monotonous stimuli of the surroundings led to inhibition which gradually spread to the whole brain until the inhibitory effect of the environment became so intense that the animal had to be aroused before the experiments could be started. When the conditioned stimuli were applied immediately, the normal conditioned reflex was present. If, however, the application of the stimulus was delayed for a few minutes, the conditioned secretory effect was present, and the salivary secretion was augmented with the presentation of food, although the animal would not voluntarily take the food. In some of the animals, the reflexes disappeared, the skeletal muscles relaxed and the animals snored; in other animals, behavior similar to hypnotic behavior in humans was observed. The animals would not respond to the conditioned stimuli; nevertheless, they preserved an alert posture; the eyes were wide open and immovable; the skeletal muscles were semi-rigid, and if one of the limbs was placed in a new position, this position was maintained. In hypnosis the cortical areas alone are inhibited, as contrasted with sleep in which both cortical and subcortical areas are affected. As the hypnotic condition increases, turning of the head, bending the neck and movements of the trunk disappear.

In still other experiments with dogs, conditions analogous to those found in psychopathic people have been found. The basis of the explanation of these abnormal behavior traits of dogs lies in the inherent neural structure of the animal. For the experiments, animals that exhibited either unusual amount of motor activity or very little spontaneous activity were selected. The former type of animals possesses a neural system that does not readily develop or pass into a state of inhibition; the latter type is prone to inhibition; that is the nervous

functions are in more or less of a state of inhibition all the time. Neurasthenia occurs when the animal passes into a chronic state of inhibition.

Neurasthenia, according to Pavlov, occurs in those persons in whom there is an exaggeration of the excitatory processes. This exaggeration leads to exhaustion, since inhibition does not take place quickly enough to prevent depletion of the excitatory processes. Hysteria arises in those cases in which the inhibitory processes predominate. In order to account for the violent attacks of excitation which are sometimes evident in hysteria, Pavlov maintains that they are due to a sudden change in the excitatory state which persists for a very brief period. Since there is a tendency for the nervous system in these patients to be weak, a quick reversal to inhibition takes place. This inherent weakness of the nervous system also accounts for the indirection and poor synthesis of the excitatory processes.

Reports of two other nervous disturbances of the experimental animals and their comparison with human disturbances are interesting. Pavlov cites an experiment performed by Rickman in which the dog could not stand any strong conditioned stimuli; the conditioned response could not be elicited except by very feeble conditioned stimuli. The use of strong stimuli caused the animal to pass immediately into a state of inhibition comparable to that of a patient reported by Janet. A young female patient showed no signs of activity during the day, lying motionless, refusing to eat, and failing to attend to excretory functions. During the night when the strong excitatory stimuli were absent, the patient was observed to eat and even write. This case shows extreme weakening of the cortex which led to development of almost complete inhibition under the influence of any strong stimulus.

The explanation of certain illusions in humans may be inferred by having recourse to one of the experiments performed by Erofiyeva (reported by Pavlov). A summary of Pavlov's account of the experiment follows:

A dog in which a part of the sensory cortex on the right side had been extirpated showed signs of misinterpreting stimuli falling on the retina of the left eye. When the experimenter or even food came within the field of vision of the left eye the animal would turn, run away and behave in a highly excited manner. The dog would sometimes glance to the left and run madly away. The animal's behavior was normal, however, when an object or a person came within the field of vision of the right eye. Pavlov interprets this behavior as due to the irritating effects of the scar tissue on the visual analyser on the one side. In other words,

since the external stimuli became distorted through the irritating effects of the scar, the animal behaved in a manner analogous to the behavior of a normal animal to any unusual visual stimulus

The objections to the conditioned reflex theory as a system for explaining normal behavior are expounded in many of the elementary text books on psychology. The criticisms that apply to the methods and technique of Behaviorists in formulating the general behavior of organisms need not be considered here; only those aspects directly related to the development of abnormal behavior are of any concern to us. The experiments which have been considered thus far have been done with dogs and perhaps with dogs that already had abnormal tendencies of behavior. Pavlov states in some of his experiments that the animals were selected because they showed either an excessive activity or a decrease in activity. From the fact that conditioning to isolated stimuli in a particular fashion occurred, it cannot be argued that complex stimulus patterns would produce like results. One of the essential requisites for conditioning is an absence of distracting stimuli; nevertheless, man is constantly being subjected to unfavorable stimulation. It seems a little far fetched to argue that since dogs under isolated experimental conditions behave in a particular way, that humans under still other circumstances will behave in a similar fashion. Even the basis of neurotic behavior in dogs is attributed to an innate neural disposition, the nature of which is a tendency to excitation or inhibition. These are assumptions upon which Pavlov's whole structure is founded. If his assumptions are correct then we may infer that neurotic humans are neurotic because they are born that way. There are certain other internal difficulties inherent in Pavlov's scheme, but they are not of especial significance for explaining abnormal phenomena.

The rather simple theories of Pavlov and his school, which served as the stimulus for this whole movement, have been greatly modified and no single, dominant and orthodox theory of the conditioned reflex obtains at present. Almost every writer has his own particular view of the matter and his own innovations to introduce.

Conditioned reflex theory must be differentiated from the conditioned reflex method. As a method it can be used to assay the behavior of many different animal forms, including the human, under conditions which are fairly rigidly controlled, without necessarily indicating the theoretical bent of the experimenter. Masserman (412), for example, has often used the method in his explorations of abnormal behavior in the cat, but he does not subscribe to any form of conditioned reflex theory, which he tends to describe in unfavorable terms.

A number of investigators have used the method in studying abnormal behavior. Welch and Kubis (413) studied normal college students and anxiety types of psychiatric patients in terms of the conditioned psychogalvanic response. They found characteristic differences in the rate of conditioning (the anxiety patients conditioning more rapidly) and in resistance to extinction (the anxiety patients showing a tendency for conditioned responses to persist longer than in normal subjects). These results might provide several hypotheses to guide future work. It may be that the neurotic and the psychotic individuals break down under usual traumatic experiences because of some fundamental difference between their nervous systems and the normal nervous system. The difference is manifested by indicators of autonomic activity, such as the PGR. It is conceivable that people endowed with such nervous systems (or such biochemical balances) might become conditioned more readily to emotional situations, and might be more resistant to extinction of emotional behavior. This would be in the line with Gantt's (414, 415) finding that the cardiac component of the conditioned response is more stable and more difficult to extinguish than the motor components. This, according to Gantt, is the basis for conflict: overt behavior is adaptive, the motor components of the total conditioned response being relatively easy to extinguish, but the cardiac components (and possible other autonomic responses) are not very adaptive, being resistant to extinction. The result of this divergence of functioning in the organism is conflict, since there may be good overt adjustment to a situation, but emotional responses persist from some previous conditioning.

Liddell and his coworkers (416) have studied for years the development of experimental neurosis in sheep, goats, and pigs, following Pavlov's description of the experimental neurosis in the dog. The assumption is that the breakdown which occurs in experimental neuroses in animals is in some way related to neurotic episodes in human behavior. Opinions differ as to whether the experimental neurosis is a "true neurosis" or a "preneurotic affective disturbance". The investigators who are working in this field believe that careful study of experimentally induced neurotic behavior will throw some light on the genesis of neuroses and on various factors which may influence their subsequent course. Obviously there will be no perfect parallel between animal neuroses and human neuroses because of the tremendous differences in the importance of, among other things, symbolic processes and social influences in the behavior of human and infrahuman forms. But the method seems to be a fruitful one, and can undoubtedly throw some

light upon problems of abnormal behavior if one maintains a reasonably cautious attitude toward the interpretation of animal syndromes.

Liddell (417, 418) has come to the conclusion that the classical conditioning procedure as developed by Pavlov is essentially a traumatizing procedure. He thinks that the central factor in the experimental neurosis is not so much a difficult or insoluble problem as the self-imposed restraint (due to training in the laboratory situation, where the animal ordinarily stands quietly in his harness) and suppression of spontaneous activity. He finds that sheep who are presented with maze problems much too difficult for them do not break down, but adjust by procrastinating or evading the situation calmly, whereas sheep in a conditioning situation will exhibit the usual experimental neurosis. One is tempted to see in this a parallel to the presumed effects of repression in human patients, but as we have pointed out above this type of theorizing is questionable. A second factor which Liddell deems important in the production of experimental neuroses is the monotonous repetition of inevitable but trivial reinforcement.

A number of patterns of neurotic behavior have been described, and they are cited here merely to indicate the diversity of "symptoms" possible in lower animals in limited situations. Liddell has found stiffening amounting to virtual immobility in the foreleg of the sheep, not too dissimilar to hysterical paralysis, and a concomitant hypersensitivity of the foreleg, again not too dissimilar to hysterical hyperesthesias. The rigidity may persist for years. Likewise, investigators have found tantrum behavior, somnolence, manic excitement, unwillingness to eat, and avoidance of the experimenters.

Gantt (419), who followed the course of behavior in an experimentally neurotic dog for 12 years, found that the symptoms changed over the course of years, and a large number of responses became involved in the neurotic complex, including urinary and sexual responses to the experimental situation and even the people associated with it.

Other experimenters have used the conditioned reflex method in studying various aspects of abnormal behavior, for example, Masserman and Jacques (420) have studied the effects of electro-shock on experimentally neurotic cats, and Masserman, Jacques and Nicolson (421) have studied the effect of alcohol on experimentally neurotic cats. Gellhorn (422) has investigated the effect of insulin hypoglycemia and electro-shock on the conditioned response in rats.

The method has proved productive of research on basic problems in abnormal psychology and has also suggested many working hypotheses

which may be tested. The conditioned reflex theory (or "response", as it is commonly referred to in contemporary psychology) is not as easy to present or to evaluate. As we have indicated, there is no unanimity of opinion as to what constitutes the orthodox theory. For Pavlov, conditioning was pure associative learning. Most contemporary investigators who consider themselves to be in the field of conditioning theory have given up this aspect of the theory.² Guthrie (424) is a notable exception in that he explains all learning in terms of strict association or contiguous conditioning. Other prominent theorists in the field have introduced motivational factors into the basic theory, [Hull (425), Spence (426), Mowrer and Lamoreaux (427)] which require that some drive reduction (primary or secondary) occur in order that certain responses acquire greater habit strength than others. There are at least three trends in current theorizing about conditioning. One group, [Hull, Spence, Mowrer, and others], holds that all learning is conditioning in a rather strict sense, and there is implied a corollary to the effect that all learning follows the same course and is subject to exactly the same laws. That is, all psychological functions change in identical fashion, and if the laws for one function or complex of functions and for one animal form can be worked out, any kind of learning can be predicted. This may or may not be true, but it is an interesting attempt at integration and is productive of much research. In particular, Mowrer's research (428) on avoidance conditioning, and his explanation of the efficacy of this procedure as a reduction of fear, have possibilities for the interpretation of neurotic behavior in human patients. According to this type of reasoning, neurotic behavior would be perpetuated long after the primary causes had ceased to operate since the symptoms (the conditioned responses) reduced the anxiety brought about by the conditioned stimulus, not because the original primary reinforcement ever recurred again. It is a very tempting theory because it explains so nicely the seemingly senseless persistence or repetition of symptoms, particularly compulsions.

A second group of theorists are attempting to show that conditioning and trial-and-error learning are not essentially different. The emphasis seems to be placed on the fact that conditioning is a sort of compressed trial-and-error learning.

² The Brogden, Lipman and Culler experiment (423) showed no conditioning in 500 trials when the conditioned stimulus was always followed by the unconditioned stimulus, but rapid conditioning was evidenced when the animal made the proper response to the conditioned stimulus and was able to avoid the unconditioned stimulus (shock).

A third point of view, held by Maier (429), is that conditioning and trial-and-error learning are different, and further, that learning new responses may require a very different technique than breaking old ones. In particular Maier feels that fixations are better altered by guidance and that trial-and-error is not a particularly effective technique. This might have implications for therapy in compulsive disorders. Mowrer's theory gives one possible explanation of why guidance would be more effective in such cases.

There is no one conditioning theory to accept or reject, unless one is committed to a theory which denies that any aspect of abnormal behavior is learned. If one follows a school which equates conditioning with learning, then conditioning will play an important part in the development of abnormal behavior, and a study of conditioning processes may eventually throw light on etiology. If one thinks that conditioning is different from some other types of learning, it may still be useful in interpreting certain data, as in Maier's experiment. There remains the further possibility that one may reject the whole concept that conditioning in any form ever occurs. Those authors who reject the whole concept are apparently reacting to what they consider to be an undue simplification and "mechanization" of a complex problem. It is possible that certain specific hypotheses arising from the investigations of conditioning theorists will be valuable in guiding future research in the etiology of abnormal behavior and in therapy.

PSYCHOANALYTIC AND INSTINCTIVE THEORIES

A system of psychology that has attracted much attention both favorable and unfavorable is that designated as psychoanalysis. Many of the orthodox psychologists have been unwilling to admit that it is a system of psychology but refer to it as a system of metapsychology. Before passing judgment on the validity of the theories held and assumptions which underly psychoanalysis, it is desirable to set forth the system.³ The first postulation which is made is that of some innate disposition, impulse, urge or striving toward a goal. Freud (430) assumes this impelling force or urge to be centered in the sex urge or sex instinct, which at one time he called the libido. In the later development of his ideas, the id becomes the great storehouse of the libido.

³ The student should consult the works of Healy, Bronner and Bowers: *The Structure and Meaning of Psychoanalysis*; Woodworth: *Contemporary Schools of Psychology*; Jastrow: *The House that Freud Built*; and Sears: *Survey of Objective Studies of Psychoanalytic Concepts*.

At some points in his discussion, it appears that he restricts the meaning of sex striving to the conventional meaning, i.e., sex desire of a highly specialized nature. At other points of his writing, the nature of the sex striving or sex expression includes not only the conventional sex desire, but a host of other feelings and sentiments connected with the pleasure principle of love. The ordinary physical sex drive is combined with a psychic life principle. All conduct for Freud is motivated by these wishes or urges, whether they are voluntary or involuntary. Slips of the tongue, inability to recall a name, dreams, thumbsucking, bodily functions including elimination of waste products of the body, walking up and down stairs, acting, studying medicine, etc., are all the results of the sex urge which has been altered by various other mechanisms that he has postulated. He did not stop, however, with the narrow concept of sex urge; he broadened it to include what is conventionally termed love, affection, all forms of pleasure and esthetic appreciation. The term libido was assigned to this more comprehensive concept. It must be remembered that the libido is dynamic in nature and that it normally tends to express itself in overt activity. Nevertheless, it is without power to direct the course of its expression.

Sears (431), in his excellent monograph, undertook to evaluate the known facts relative to this keystone of the Freudian system. He maintains that Freud's system depends upon the acceptance of some source of energy such as the libido, and to question this assumption would destroy the system. He prefers, therefore, to adopt this source of energy tentatively as the basic factor in personality dynamics. He examines the facts related to sexual behavior and attempts to ascertain whether the facts fit the assumption made by the analysts with reference to the way in which sex behavior develops.

According to Freud and some of his followers, the libido is first localized in erotogenic zones other than the genital zone. The child obtains gratification by oral and anal *erotism*. When these sources of gratification are interfered with or removed, substitute behavior of an anomalous kind arises. Sears has brought together relevant literature on this point. The work revolves about the occurrence of thumb sucking, nail biting, and oral gestures under conditions of deprivation or partial deprivation of oral gratification. In comparing finger suckers with non-finger suckers, he found that the former group had histories of greater deprivation of opportunity to suck during the feeding process. This does not imply a lack of nutriment but only a deprivation of the pleasure that was desired from sucking, since puppies fed with a large

nipple (hence less sucking for satiation) showed a much greater tendency to suck at each others' bodies between feeding than animals fed with a small nipple (same amount of food but longer sucking time). Sears concludes with respect to finger sucking that "nonnutritional sucking, either of the food source or of the fingers, seems to be motivated by some drive other than hunger.

Finger sucking is a preferred form of nonnutritional sucking because of its autoerotic quality; i.e., the fingers have taken on erotic properties as a consequence of chance encounters, and the child therefore gains double pleasure, part from fingers and part from mouth. Levy's finding that children who used their fingers did not use pacifiers is suggestive, but scarcely conclusive because of the nature of the methods by which his data were obtained. Continued work on the problem of whether the type of feeding and nursing has a significant influence on the oral drive and the development of substitute behavior has been reported by Simsarian (432) and Sears (433). Simsarian found that complete nursing satisfaction at the breast and self-regulation of feedings does not prevent the development of thumbsucking. Sears compared the effects of cup, bottle, and breast feeding during the first 10 days of life, on the development of the oral drive. He concluded that breast feeding resulted in the greatest increase in strength of sucking response. He theorizes that the oral component of the libido is in part the result of a nearly universal method of feeding. In nursing, the child must suck and be orally stimulated while securing primary satisfaction.

With regards to nail biting and oral gestures (touching or manipulating the mouth) the data do not seem to confirm the thesis that these habits are derived from any form of deprivation or that they afford the individual oral gratification. In fact Jones' (434) study shows that boys doing mental arithmetic resort to an increase in oral gestures. This observation suggests that oral movements are not uniquely related to oral *erotism*. According to Freud, anal sensations give rise to erotic feelings, and diarrhea or constipation may be a direct result of fixation on this method of erotism or its failure to develop. Koch (435) reported by Sears found that constipation was related to the frequency of oral gestures by children, and we might infer some support for Freud's idea. Koch, however, maintains that emotions of many kinds reduce gastrointestinal activity and also provoke nervous gestures.

As the child develops, other specialized instinctive tendencies arise. Some of these may be diametrically opposed. These special tendencies Freud has called the life instinct (*eros*) and the death instinct. The

eros is the race preservative instinct. It also comprises the uninhibited sexual gratifications and self preservative impulses. The "death" or "destructive instinct" is the tendency to reestablish a state of things which was disturbed by the emergence of life. It comprises the regressive tendencies, those impulses to reinstate an infantile or earlier level of personality, "self injuring and self destroying impulses."

The child is born not only with the instinctive tendencies toward the gratification of the sex urge, but also with another set of instinctive tendencies which act in opposition to and are a part of the libido. The early manifestations of activity of the child allow the libido relatively free expression. Pleasure of a purely sexual nature is derived from natural bodily functions such as nursing and possibly from viewing the body of the father and mother. Later in life the activities change, and the sex desire is directed toward some other person or objects in the environment. This change in the direction of the manifestation of the libido must be produced by something, hence the postulation of another tendency. This tendency or these tendencies were labelled the ego-instincts, or dynamic forces which prevent the organism from coming into too direct a conflict with the environment. The ego now becomes the repressing force of the libido tendency in spite of the fact that it comprises certain libidinous tendencies. Derived from the id by modifications imposed on the id by the external world, it is partly conscious and partly unconscious in contrast with the id which is entirely unconscious.

If we consider the psyche as embracing both the id and the ego, that portion of the psyche that comes into contact with the environment and mediates the strivings of the id is called the ego. The ego in the child is poorly developed; as the id comes more and more into conflict with the environment, the ego develops and in a way protects it. The ego plays the rôle of censor. In sleep its function is partially relaxed although it is never completely off guard. This accounts for the fact that dreams occur only in disguised forms. The latent content of dreams is unacceptable to the ego; and although the manifest content is representative of the hidden content, it is unobjectionable.

The third entity postulated is the super-ego and corresponds in ordinary terminology to conscience. It is a system of moral tenets. The super-ego develops from the ego, although it is to a large extent unconscious. Woodworth gives a good account of its development in his book entitled *Contemporary Schools of Psychology*. The super-ego is truly an entity. In its early life the child gains expression of its sex

urge through its own body. The child's early libido centers about oral and anal gratification. Nursing, excreting and stimulating the erogenous zones through movement fill the necessary requirements. Following this autosexual stage, the libido becomes directed toward some other object or some other person. The persons most accessible for this purpose are the parents. This infantile attachment of the boy for the mother and girl for the father gave rise to Freud's notion of the Oedipus and Electra complexes. The baby boy's libido is for a while encouraged by the natural processes involved in rearing the child. Ultimately conflict with the mother develops, since the youngster must be weaned and autoerotic and other habits corrected. These conflicts with the mother lead to an attachment to the father who becomes the boy's ideal. His attachment for his father, however, is not satisfactory since he finds certain prohibitions. His father is his rival for his mother. The solution to this problem lies in shattering his attitude toward the father and wishing him dead or removed. Since this goal cannot be obtained, he must repress. Percepts developed as a result of such repressions are the essential elements of the super-ego. Even if the child becomes conscious of the attractions for the parent and succeeds in repressing the libidinous urge or desire, the urge is still there tending to motivate the individual towards its goal. Since this cannot be accomplished in a direct way because of the interference of the ego and super-ego, the urge is manifested in an indirect, round about way which will be acceptable to these dynamic entities.

Data concerning some of the concepts under discussion are to be found in the various studies mentioned in the following section. That stimulation of the genitals occurs at an early age is confirmed by the studies of Blanton (436) and Halverson (437). Sears maintains, however, that the observations on tumescence and detumescence do not prove whether these activities afford sexual pleasure. Detumescence by inference seems to be related to pleasurable sensations of relaxation. Sears (438) states in his conclusion concerning erotogenesis that "the notion of erotogenesis boils down to little more than the presumption that several sources of pleasurable stimulation are somehow related to one another. In working out the details of this relation, Freud first applied the properties of adult genital sexuality to infantile activities centered around the oral and anal-urethral body zones and then assumed that there was a specific quantum of pleasure-seeking that could be channelized through the various zones, making one a substitute for another. The evidence cited here supports the general correctness of the first point, but throws less light on the latter."

Aside from the importance of these pregenital forms of stimulation, Freud attaches significance to premature genital sex experience in bringing about perversion, hypersexuality and neurosis. The literature that has a bearing on this problem has been assayed by Sears. He has examined the importance of such factors as early sex play, sex curiosity and overstimulation, and sexual aggressions. Work of Isaacs (439) and Hamilton (440) indicates that sex play is very common among normal children of preschool age and that shame and loathing play a part in giving up infantile sexual aims. Prepubertal sex play is reported by about 10 per cent of adults although this percentage is likely to be modified significantly by cultural conditions as has been observed by Malinowski (441).

In tying up anxiety and aversion with sexual curiosity, the work of Terman (442, 443), Landis (444), Conn and Kanner (445), and Conn (446) may be cited. All of these studies indicate that curiosity about the differences in the sexes, the origin of babies, and similar matters exists among a great many children at an early age. The reports do not, however, show how emotional reactions to this curiosity are tied up with perversions and hypersexuality. The problem of the effect of early sex aggression on subsequent adjustment has been studied at least indirectly by Terman, Hamilton, and Landis (reported by Sears). Inadequacy, or lack of orgasm, on the part of the female is considered a sexual abnormality brought about by inhibition. The results of these studies are, however, not in agreement. Terman and Landis feel that lack of orgasm and neuroticism occur about as frequently in people who had early shocking sexual experience as among people who did not have such experience. Sears (447) concludes that "several sources of evidence indicate, however, that Freud seriously overestimated the frequency of the castration complex and the importance of childhood sex aggressions. The castration complex, like theories of the origin of babies, is a function of the kinds of information children have. Freud's tendency to rely on cultural universals—which do not exist—has led him to postulate universal attitudes and complexes that can be demonstrated in but a part of the population.

"The influence of sex aggression is not universal, either; but the prevalence of perversions, neurosis and morbid prepossession with sexual matters that Freud attributed to such experiences can be accounted for differently. These experiences are outlawed in our own culture and the child who has them, either willingly or unwillingly, is made to feel guilty or ashamed; at the very least he knows he must not let his participation become public knowledge."

We shall examine the experimental literature dealing with one other phase of Freudian Theory, namely, the object of attachment of the sex drive. There are three primary sources of attachment, the self, the father and the mother. Primary sexual attachment to the self is exhibited by narcissism and masturbatory practices. That such early practices do occur is evident from many reports, but that they have any special significance in formulating the course of later sexual activities is highly dubious. Parent preference is indicated by the studies of Stagner and Drought (448), Terman, and Stott (449). All of them emphasize the fact that there is very little difference between the sexes in the attachment or preference for each parent. Bell (450) found, however, that love affairs of children were in some instances highly sexualized, but these were outside the family. The studies cast doubt on the universality of the Oedipus situation and show that forces other than the immediate family relations may serve as the basis of anxiety in future love relations.

The terms "unconscious," "preconscious" and "conscious" indicate another division of mental life according to Freud. These divisions do not represent any form of dynamic activity but represent the various levels at which the id, ego, and super-ego function.

Thus far, Freud has postulated: (1) The id which is a source of instinctive energy, is unconscious, amoral, illogical and centers in the sex instinct. (2) The ego, which has instinctive tendencies of its own. It is influenced by perception and plays the part of a censor to a certain extent. In addition, it is partly conscious and partly unconscious. (3) The super-ego which rules the ego. Its chief function is criticism, which creates in the ego an unconscious sense of guilt. It is partly instinctive and partly influenced by prohibitions through teaching.

It is unnecessary at this point to delve into the various methods applied in Freudian analysis. There are, however, several more concepts directly involved in analysis that should be introduced, namely, repression, sublimation and symbolization. These are only 3 of the 17 "mechanisms" which Freud proposes and which Healy calls "dynamisms." They may be viewed as "mechanisms" by which the organism in its strivings frees itself from annoying situations. These concepts of organized tendencies of reaction do not involve the assumption of some dynamic force, but are descriptive of the way in which the ego and super-ego operate in relation to the id. Repression consists of thwarting the normal mode of activity. This may be accomplished in at least two

different ways. The normal person directs, shunts, or inhibits the urge or striving which is incompatible to his ego or super-ego, into a mode of action that is compatible. The neurotic individual is not successful in redirecting this urge; he represses it. It is relegated to the unconscious or to the id, where it constantly struggles to appear in action. Since the ego tendencies have succeeded in repressing it, the urge cannot appear in consciousness except in some disguised form. The disguises of thwarted urges take the form of dreams and various forms of functional disorders. One important characteristic of the repressed desire or urge is that it is not consciously recognized or perceived as such.

Sublimation is the means by which the libido finds expression in every day life. Many of the strivings of the unconscious are not acceptable to the ego. There are many perverted sex urges; if these are repressed and no neurotic condition follows, a sublimation must take place. One of the classic examples of sublimation centers in the sadistic tendency of man. This is the tendency to inflict punishment or practice cruelty on the object which is loved. A surgeon may be manifesting the normal response to this thwarted tendency. That is, he cuts and hurts people, but in the reversal of the process he heals them rather than hurts them. A man whose impulses would indicate a long list of murders and other crimes, by sublimation turns out to be a writer of crime and detective stories. Actors and actresses may be supposed to have had a strong tendency towards exhibitionism or narcissism. Their sex urges are sublimated.

Symbolization can best be discussed in connection with dreams, although many other varieties of activity make use of the same concept. Earlier in this chapter latent dream content was said to be different from the manifest dream content. Freud views all dreams, with the possible exception of the recurring dreams of war neuroses, in which some incident or horrible situation was reproduced, as wish fulfillments of a sexual nature. During sleep the censor (one of the functions of the ego) takes an active part in shaping and distorting the latent dream material into acceptable manifest material. The censor is supposedly cognizant of the wishes or urges to be fulfilled. Since the latent content of the dream is unacceptable to the ego, it comes out in a disguised form. In other words, all objects and actions which are set forth in dreams are symbolic of or stand for some other object or action of a sexual nature. Dreams, according to Freud, may then be interpreted on a basis of symbolism. The system of symbolism is not a chance

arrangement but is inherited in some way by the unconscious mind. Because of this inheritance, it is difficult for individuals who are unversed in folk lore to find the sexual connection between the symbol and the object that it stands for. Symbolism is also used by the analysts in interpreting many inadvertent acts of every day life, such as mispronunciation of well known words, inability to remember a well known address or name and an unusual movement such as putting the wrong end of a cork tipped cigarette in the mouth. Although the doctrine of fixed symbolism is inherent in the Freudian scheme, the analyst theoretically makes use of the free association method in determining what the symbols represent. Fixed symbolism means, of course, that a particular word always stands for a particular object and no other object. This line of reasoning implies that all individuals have the same or nearly the same experiences and consequently have the same associations. Unquestionably there is a certain community of experience. One has only to ask different individuals what word they associate with grass, knife, table, black, et cetera to discover that many of the responses will be identical. Kent and Rosanoff have made use of this community of association in establishing an association test for detecting neurotic individuals. Freud's notion, however, does not conform to the usual ideas on association and symbolism. All of the words which he wishes to consider are symbolic of sex. It might be expected, then, that all objects resembling the sex organs in shape or in function stand for these objects. This is similar to the practice of magic among primitive people, who believe that injury of an enemy can be accomplished by transfixing with an arrow an image of the enemy. All elongated objects, trees, poles, sharp weapons, umbrellas signify the male element. Groves of trees, boxes, rooms, pockets, fish (because of their fecundity, odor, or shape of the mouth) and caskets signify the female element; climbing, mounting, going up and down stairs all symbolize the sexual act. The symbolization is too extensive to treat further in this text, but this brief explanation should tend to make clear to the reader the general nature of the scheme.

An example of a lapse and a dream will convey a somewhat better idea of the working of the system. An individual writes a letter which lies on his desk for several days; he finally picks it up, puts it in his pocket, and mails it two days later. It is returned for lack of postage. Freud maintains that this behavior is purposive and that it has some underlying unconscious motive. Likewise the pronunciation of Lohn Jandis for John Landis must be occasioned by some mechanism. Perhaps the

individual had some unpleasant association in which the word John figures. The groom who unintentionally fails to keep his wedding engagement may be influenced, unconsciously of course, by the fact that perhaps this is not the right girl or that he is not inclined toward matrimony.

The following dream set forth by Freud (451) brings out clearly how symbols may be applied.⁴

Then some one broke into her home and she called in fright for a watchman. But the latter had gone companionably into a church with two "beauties." A number of steps led up to the church. Behind the church was a hill, and on its crest, a thick forest. The watchman was fitted out with a helmet, gorget and a cloak. He had a full brown beard. The two were going along peacefully with the watchman, had sack like aprons bound around their hips. There was a path from the church to the hill. This was over-grown on both sides with grass and underbrush that kept getting thicker and that became a regular forest on the crest of the hill.

The symbols are clearly recognized. The trinity of persons is the male genitals; the chapel, hill, and forest, the female genitals. The steps signify the sexual act. A good example of the free association method as employed by the analysts occurs in the interpretation of a dream in which the number 2477 appears. This case was presented by Jung (452). In attempting to arrive at the significance of the number, the patient thought of the birthdays of himself, his wife, his mistress, his mother and his two children. He was born on the 26th day of February. February is the second month and occupies the units place. Therefore the number may be written 262.

He was born	26	2
His mistress was born	28	8
His wife was born	1	3
His mother was born	26	2
His children were born	29	4
	13	7

Unfortunately, when these numbers are totalled, they do not produce the desired result. In addition, the patient was 36 years old at the time of his analysis, and his mistress was 25. The addition of 61 still does not furnish the correct total; consequently by further associations the patient recalls that he was born in February 1875 and his mistress was born in August 1885. If these are converted into a number in a slightly different manner, the numbers 275 and 885 are secured. It

⁴ Reprinted by permission from S. Freud, *A General Introduction to Psychoanalysis*. Liveright Publishing Corp.

should be pointed out that the number representing the month now occupies the hundreds place, and the first two figures of the year are dropped. When all of the numbers thus obtained by these devious associations and manipulations are added, the sum is 2477. Jung, of course, assumes that these calculations and manipulations were made in the unconscious.

The authors recognize that many psychoanalysts would not subscribe to Jung's theoretical explanation of this dream. The choice of this illustration is perhaps unfair to the workers in the field, but it demonstrates rather clearly certain difficulties which are encountered in accepting such theories without critical evaluation.

The earlier psychological theories of Alfred Adler (453) are set forth in a volume entitled *Studie über die Minderwertigkeit von Organen*. This was translated later and appeared under the title of *Organ Inferiority and its Psychical Compensation*. In the course of his clinical experience, certain of his concepts were changed, and emphasis was placed upon different phases of his theories. The changes in his point of view are brought out in his books, *The Neurotic Constitution* and *Problems of Neurosis*. Although Adler was one of Freud's early disciples, he soon formed the opinion that Freud was placing too much emphasis on the strivings of the libido. He insisted that there were other fundamental facts, and one in particular that underlies all neurotic behavior as well as much normal behavior. This fundamental fact or feeling was that of inferiority. There is an attempt to overcome this feeling of inferiority by a fundamental urge towards dominance or superiority. The concepts which Adler recognizes, then, in his Individual Psychology are a feeling of inferiority and a universal will to power. These feelings may center in an actual "organic inferiority" such as poor vision, deprivation of a limb, poor development of the lungs, deficiencies of sexual development, and deficiencies of metabolism, abnormalities of the viscera or a host of other morphological inferiorities which cannot be detected readily. Adler noticed that psychical compensations occurred for these organic deficiencies, just as in organic functioning, compensation takes place. For example, the functions of a misplaced or undeveloped kidney are taken over to a large extent by the normal kidney. In renal disease, the heart may be called upon to perform extra duty because of the diseased member. This "will to overcome difficulty" or inferiority may result in different types of activity. On the one hand, an individual may compensate by directing his energies toward overcoming the specific difficulty such as a one armed man may do in becoming a good

tennis player. Another example of this type of compensation was exhibited by Demosthenes in overcoming an actual speech difficulty. On the other hand, the compensation may take place in exerting superiority along a different channel. Byron, who had a club foot, became a great poet. Likewise, the undersized individual may compensate by becoming an intellectual leader. In the case of neurotics, frustration of the normal cravings for superiority happens. They are unable to develop an adequate outlet. The phantasies of the individual are attempts to escape from the demands of the environment and arrive at a feeling of superiority. A man who is effeminate in stature and appearance may compensate for this lack of physical masculinity by developing a deep voice which is one of the attributes of a large man; hence he becomes superior by this means. The neurotic adopts various ways of compensating, but it must be kept in mind that these compensations are for self-enhancement. A very good account of the various ways of compensating is given by Fisher (454). The following list will furnish a fairly good idea of the varieties of compensation although it is by no means complete.

1. Over-evaluation of a physical or mental trait.
2. Vicarious compensation; identifying oneself with a superior person or organization.
3. Belittling others.
4. Blaming others for one's own failures.
5. Belittling oneself.
6. Religious compensation.
7. Day dreaming (autistic thinking)
8. Anti-social actions.
9. Becoming ill.

The work of Farnsworth was discussed previously. He found that organic deficiency (visual and auditory) did not result in overcompensation. The most extensive attack on Adler's theory is the work by Ackerson (455). He tried to show the relation between certain physiological conditions which might cause inferiority and the actual appearance of inferiority as designated in clinical case records of juvenile delinquents. Undernourishment or undersized condition, history of encephalitis, lues, convulsions, mental deficiency, speech defects other than stuttering yielded coefficients of correlation with the presence of clinically noted inferiority of very low order. Practically all of the coefficients were below .30. He also presents data that enable us to determine whether the clinically designated cases of inferiority tend to exhibit certain types of suggested compensatory behavior to a great extent. Behavior such

as stubbornness, lying, fighting, secretiveness, quarrelsomeness, boastfulness, bashfulness, and day dreaming was correlated with the clinical diagnosis of inferiority. On the whole these correlations were low, ranging from about .20 to .50. These data seem to indicate that social factors rather than physiological factors are predominant in the control of behavior patterns.

Thus far, Adler has postulated only a general striving to superiority. This striving does, however, call for the postulation of an unconscious mind. When these strivings are thwarted, the individual becomes self critical and consequently develops a feeling of inferiority. Adler (456) says in relation to this point:

Yet neither the inherited organism nor the environment is wholly responsible for the sense of impotence; nor is it cured by both together. The degree to which it is felt is due to both these factors plus the reaction of the child. As a conscious relation between its organism and environment, the child's psyche seems to have an indefinite causal power.

The standards of criticism are self estimate or estimates of others. Adler makes environmental influences especially potent in determining the directional trends of the superiority lure. These are organized early in the life of the child. The immediate family influences determine to a considerable extent what the child will expect in life and the form of compensation which will arise as a result of feeling inferior in one way or another. The order of birth in the family is, along with many other factors, influential in establishing trends. Whether a child happens to be the first born, one of a number, or the last born, is an important consideration. The way these children are treated and their subsequent reactions to life will be markedly different.

How does Adler dispose of the Oedipus complex? He does not deny that sex impulses are important, but he does maintain that the erotic life can be explained only when the directional trend of the individual's life is understood in relation to the environmental factors that have helped to shape it. The Oedipus complex is nothing more than the desire for power or superiority. The father is the head of the family, the ruler, the possessor of power. The son is under him; he would depose the father and possess the mother. The child is not seeking the mother in a sexual way but the power which the father possesses. Dreams are utilized in this system to indicate the directional trends of the individual and are not the fulfillment of wishes. They reveal the fundamental attitudes of the individual towards unsettled problems of life.

The other name usually identified with psychoanalysis is that of Jung, who is best known for the introduction of psychological types. Jung's (457) system is not essentially different from that of Freud. In fact, Freud seems to have modified his concepts to include certain factors which Jung insisted must exist. The emphasis placed on the sex urge by Freud is only one of many collateral urges according to Jung. The libido is now the source of all energy and not strictly sexual energy. It contains the primal urge to live, and as the sex urge develops, it is the source of its energy. The difference in the concepts is that Freud postulates primarily one urge, whereas Jung postulates several, arising from one great storehouse.

In regard to the unconscious, Freud and Jung are in agreement, except that Jung attributes more characteristics to it. The unconscious contains, in addition to repressed material (the personal unconscious), the residue of animal ancestry. The unconscious inherits, by means of structural disposition, racial and social habits. This system of inherited racial and social habits is designated the "collective unconscious." The dispositions and residual habits are "primordial ideas" or "archetypes." Jung offers, in proof of the inheritance of these tendencies, examples of myths and folk lore which universally arise. Numerous insane patients produce bizarre symbols and stories, which could not be produced unless there is some inherited mechanism for retaining them. Dreams are useful in Jung's scheme only in so far as they are directed toward solving some problem in the future. They are unconscious energy manifestations of the individual's attempt to solve a problem in the future, in contrast with the Freudian point of view that they are the urge of the libido to bring into expression the reaction to a situation in the past.

One factor which has not been discussed is that of psychological types. The course of the libido is further complicated by the inheritance of temperament types. In the beginning stages, the libido and other impulsive tendencies are capable of being modified by the temperament type. Jung recognized two major types, the introvert and extrovert. These major types resulted from his attempt to reconcile Freud's libido with the concepts of Adler. In this scheme Jung retained his own concept of a general energy, but said that in those individuals who were motivated by "will to power" and "feeling of inferiority," the libido must be directed inward toward themselves. The concept of the fixation of the libido on external love objects gave rise to the notion of movement outward or the movement away from the self, which is

typical of the extrovert. This is analogous to the stages of sex development in the child, who is first autosexual, and later homosexual or heterosexual. The terms introvert and extrovert have intrigued many psychologists but have very little psychological significance.

There are many variations of the three systems of psychoanalysis. The variations are not so important from a theory angle as they are from the approach to psychotherapy. It is impossible to discuss all of the variants and the student is referred to the work of Nicole (458), Alexander and French (459), Horney (460) (461), Fenichel (462), Reik (463, 464, 465, 466), Rank (467, 468, 469), Deutsch (470), and Rogers (471), for detailed elaboration of many of the systems. We shall present briefly the theories of Rank, Reik, and Horney.

Rank has espoused a diversified point of view with regard to his theoretical basis of psychoanalysis. In his early years he was a rather orthodox Freudian. Later he attached great significance to the birth trauma as the motivating influence in personality dynamics. He maintained that the physiological and psychic shock of birth produces a modification of the individual's characteristics. The individual reacts to life situations, especially those involving separation of any kind, in terms of the reaction to the original birth situation. The individual never overcomes his feeling of insecurity, helplessness, isolation, anxiety and pain. His future life is one of attempting to regain the prenatal bliss, security and protection which was experienced in the uterine situation. Life situations tend to furnish a unique set of experiences for each individual and the interplay of these with his reaction to the birth trauma mold the general characteristics of the individual. The attachment to the mother after birth affords a partial sense of security. This is later broken down through weaning, habit training, etc. Primal fear of facing life and separation is reestablished through each successive stage of attachment and the breaking of these attachments. Gaining of life goals, only to see them disrupted by circumstances and finally the loss of attainment through prospective death, maintain a continuous focus on the antagonistic elements of security and deprivation of security. The role of the individual changes after birth from that of being created, to that of creating. He begins to do for himself as well as to his environment. He develops the power and volition to in part determine his own fate. External forces of authority and morality are incorporated into his own personality and furnish additional impulses to his basic instinctive forces. Idealism is one of the outgrowths of these processes. Ideals developed are determined in a

large measure by the culture into which the individual is born, but the ideals are influenced in turn by the individual's needs and attitudes. It is the influence of the cultural system that has played a large role in the later thinking of the followers of the Rankian theories. Volition or will is perhaps the most vital force in integration and disintegration. There are three phases in the development of the will. In the first phase there is an incorporation of forces such as sex drives, assertive impulses, parental authority, and moral codes into the self. At this stage the individual recognizes that he is different but still derives some security through feeling of belonging or being like the group. In the second phase, the will is felt as counter-will. The outside forces are not incorporated and antagonism develops between the will and counter will. If the conflict is resolved in favor of the will, better integration and development occurs; if not, disintegration takes place. He develops guilt feelings and makes unhealthy attempts to rationalize and deny his will. In the third phase, he develops a "conscience" and a personality structure unique unto him. Personality then stems from his own creative experience and constructive and ethical considerations.

The ego for Rank is a combination of impulse, drives, emotions, and conscious components of will. The impulses are instinctive strivings which may very often be sexual. The super-ego is developed somewhat along the same plan as the Freudian super-ego. The id or libido is the basic drive which impels the individual to activity.

The dynamisms have been given somewhat different meaning from those of the Freudian system. When will is expressed as counter-will (undesirable) the individual develops guilt feelings and attempts to justify the counter-will. If the counter-will is expressed against the moral code as represented by the parents, we have either the Oedipus or Electra complex. Guilt, however, is aroused by the expression of the counter-will rather than through the prohibited incest relationship. Creative drive is not the Freudian libido but rather the regulating force of the libido by the will. Recognition of willfulness affords individuality which emphasizes feelings of inferiority and insecurity; this is avoided by repression. Repression may protect the individual against life, and hence facilitate the return to bliss and security. Regression comes about because willing and assertiveness are in themselves painful. In order to avoid such pain the individual thinks of the past which is less vivid and less fraught with insecurity. Identification is the attempt to attach the will to others, thus gaining commonality and security.

Reik's viewpoint is essentially Freudian although he broke with

Freud in a number of respects with regard to detail. He recognized the importance of instincts as determinants of behavior but felt that all of the biological needs of the organism were important in appraising the end result. He might be recognized as the precursor of some of the theorists in the field of extra-sensory perception. He held that the unconscious is capable of receiving stimuli from outside sources, and discusses the possibility that sense modalities may have been lost in the process of evolution. The archaic remnants of these senses may, however, be partially retained in the unconscious which accounts for impressions and hunches on which the individual may act. Similarly, he holds that ancestral experiences may be partly retained through inheritance in the unconscious. Unconsciously perceived stimuli produce effects in shaping personality and behavior. In one respect he seems to have followed an early lead of Freud. Freud, according to Fenichel, classified instincts into two major categories: "sexual instincts" and "ego instincts". The "sexual instincts" were essentially sexual wishes. Anxieties, guilt feelings, and ethical or esthetic ideals which fought the sexual wishes were called "ego instincts." Reik seems to subscribe in part to this formulation when he speaks of ego drives. He distinguishes between love and sex, calling sex a biological need like hunger and thirst. Love, on the contrary is not primarily biologically determined but psychically determined. The ego drives are those which protect and preserve existence. The sex drive and the ego drives become blended and one rarely sees the sex drive operating alone. The ego drives can cause disturbances if left unsatisfied in the same manner as the sex drive. Developing out of the ego drives and the environment, Reik set forth the ego-ideal. It is a replica of parents, teachers, and figures of authority. The ideal may be compared to the term "aspiration level". The individual never attains completely his ego-ideal and recognizes his deficiencies. This is similar in certain respects to the superiority-inferiority concept of Adler. The more nearly one reaches the ego-ideal, the less conflict and hence the better the adjustment. The major constructs of the Freudian system are accepted, i.e., the id, ego, and super-ego, although slightly different functions are assigned to each. He disagrees with Rank on the importance of the birth trauma. He parts from Freud in believing that the new born child is narcissistic. He believes that narcissism is a later and secondary development. Self love is learned through love of parents and other contacts and when deprived of love, narcissism becomes the desire to be loved. The Oedipus complex is only a stage of development and does not remain in the unconscious as a motivating force throughout adult life. Reik does not

regard sexual disturbances as the sole basis for neurosis. Neurosis results from the emotional disturbance produced by loss of self-trust and self-confidence, which in turn set up anxieties and inhibitions. These reflect failure to achieve two ego ideals, to love and to achieve.

The modern trends in psychoanalysis, as exemplified by the writings of French and Horney, seem to close the circle which Adolph Myer constructed. He maintained that the inherited structure and tendencies, the life experiences (developmental processes), and the stresses of the environment all had to be evaluated and studied if one expects to understand the genesis of a particular disorder. Various aspects of the parts of the circle have been emphasized by the analysts, particularly the instinctive tendencies and the developmental processes. Horney has, however, recently emphasized the environmental stresses and adjustment to them, thus giving chief weight to a sociological point of view. While recognizing the instinctual drives in shaping behavior, attention is given to environmental and interpersonal relations in shaping personality. Ways of adjustment to present difficulties are of greater importance than past traumatic experiences. In this respect certain of Rank's ideas seem to prevail and it is in part the point of view held by Rogers and his followers. Thorpe and Katz (472) have stated the point of view very succinctly and we present their interpretation in the following quotation⁵

"When the Freudian pleasure principle (of the libido) theory is forsaken, the individual's striving for various forms of security assumes more importance, and the role of anxiety in such striving appears in a new light. The principal factor in the development of a psychoneurosis is then neither the Oedipus complex nor any other kind of infantile pleasure-striving; it is rather those adverse influences which make the child feel rejected, defenseless, and afraid of the world. When dangers threaten the child, he develops certain 'neurotic trends' which enable him to cope with the environment in the light of his own needs. 'Narcissistic, masochistic, perfectionistic, trends seen in this light are not derivatives of instinctual forces, but represent primarily an individual's attempt to find paths through a wilderness full of unknown dangers.' The anxiety element in neurosis is then not the expression of the 'ego's' fear of being overwhelmed by instinctual drives or of being punished by a hypothetical 'super-ego', but is a result of the failure of certain safety devices (psychological mechanisms).

A psychoneurotic disorder may thus be defined as a particular kind

⁵ Thorpe and Katz. Reprinted by permission from *The Psychology of Abnormal Behavior*, Ronald Press Co., N. Y., 1948.

of struggle under difficult conditions (for the ego) of life. It is associated with disturbances in relations between the self and others and to conflicts arising from such maladjustments. This concept of the psychoneuroses changes the whole approach to psychoanalytical therapy. The therapist does not enable the patient to gain mastery over his instincts, but helps him to reduce his anxiety to such a degree that he can dispense with his neurotic symptoms because his possibilities for satisfaction are limited by them."

The psychoanalytic theories have been attacked by many writers. Among the antagonists may be listed Dunlap, Woodworth, Jastrow, Hollingworth, Wohlgenuth and Robinson.⁶ The various concepts which the analysts have erected have been subjected to criticism on a basis of the mystical assumptions underlying the concepts. The tripartite division of mental life or the psyche into conscious, pre-conscious, and unconscious cannot be sustained on any logical basis. The assumption that knowledge may be conscious and unconscious at the same time is untenable for any system of psychology, but even if this assumption were allowed, there seems to be no neural or physiological basis for understanding the interplay between these parts of the psyche. Moreover, there is so much inconsistency in the functions of these two aspects of mental life that it is impossible to be certain what is meant by the concepts.

The fundamental "urge" itself is not agreed upon by the various analysts. Freud started by postulating one urge which he called the libido. This concept had to be augmented by the postulation of the "eros" (life instinct) and the "death instinct." Adler maintained that there was one urge but described it as "striving forward" or "will to power." Jung postulates several collateral urges which are complicated by his inherited "temperament types." Since the dynamics of the id and its strivings are so fundamental to the whole system, it might reasonably be expected that there would be some agreement among the proponents of the system. What they seem to say is, that there is a tendency for the organism to be active, but why it is active and what directs its course of action is still enshrouded in mysticism.

On the one hand, the conscious, preconscious, and unconscious mental life of the individual seems to be inextricably tied up with physio-

⁶ Their respective objections have been amplified in the following books: Dunlap, *Mysticism, Freudianism and Scientific Psychology*; Woodworth, *Contemporary Schools of Psychology*; Hollingworth, *Abnormal Psychology*; Jastrow, *The House that Freud Built*; Wohlgenuth, *A Critical Examination of Psychoanalysis*; and Robinson, *Wish Hunting in the Unconscious*.

logical states; on the other hand, the postulation of a tripartite mind disembodied and conscious "stuff" seems to be the basis of all mental life. If the first point of view is accepted, then desires might reasonably be conceived as the motivating influence of the individual, but the analysts attribute to their "motives," capabilities and persistency of function far beyond any thing that can be proved by experimental psychology regarding desires. If the second point of view is examined, a greater conflict with psychological principles and even the tenets of ordinary common sense is apparent. No one seriously maintains that there is a mind without a body or that there are "images" that can be moved about and stored similar to boxes or objects in a warehouse.

Another inconsistency in the structure of Freudian psychology is related to the mechanism of repression. It was pointed out earlier that the term "censor" was applied to the force or dynamism by which undesirable unconscious strivings were repressed or were altered in accordance with the "wishes" of the ego and super-ego. The source of the censor's power and dominance seems to be one of considerable moment; nevertheless the authors of this theory ultimately fall back on some innate tendency. The organization of this innate tendency is very interesting since it seems to perform the dual function of preventing certain urges from coming into expression at one moment and then seems to about-face and abet these same urges by supplying them with disguises so that they can elude the censor. One may inquire why, if the censor supplies the disguises, as it seems to do in manifest dream content, it is unable to recognize them at another time. It appears to have the faculty of performing its duties (which are determined in accordance with environmental and innate influences) in more or less of a voluntary fashion. In spite of the fact that unconscious strivings are the most powerful motives in man's activities, the censor manages to suppress these when necessary or expedient. The source of the censor's more powerful tendencies is still obscure.

The remainder of the criticisms are directed at the procedure in analysis. The Freudians theoretically use the free association method in arriving at the source of a complex. Free association means, of course, association that is not directed or influenced by statements or preconceived ideas on the part of the patient that would direct his line of association. Most people already have a preconceived idea concerning psychoanalysis; whether their ideas are correct or incorrect matters little. If they have a notion that sex topics are of paramount interest to the analyst (and most people have this idea) their associations will be of a sexual nature. Even if they did not have the idea already firmly

fixed, the general nature of the instructions in the course of the analysis would inevitably lead them into sexual channels, since they must reveal any association, however trivial, embarrassing, or disgusting. In addition, the point at which the associations are terminated is not made clear. If reference be made to the significance of the case of Jung's in which the number 2477 was interpreted in light of the association method, several pertinent objections may arise. The associations were not stopped until the total of 2477 was obtained. The individual could have given other associations if asked for them. He could have thought of his father's birthday, his aunt's birthday, and even other birthdays but they would have been insignificant since they would have influenced the total adversely. The conclusion must be reached that the association is stopped in accordance with some preconceived notion of the analyst.

The use of the association method in the manner already described should be sufficient to cast grave doubts on the validity of the technique.

The logical fallacy which the psychoanalysts commit and which will be set forth is, however, perhaps the greater error. In practical analysis the analysts maintain that if an individual associates the items A, B, C, D, and E, in the order listed, E is responsible for the individual's thinking of A originally. A slip of the tongue which was recently heard may make the situation clearer. An elderly lady, in referring to her youngest son (one of four children), called him her last *sin*. Some one remarked that the slip could be interpreted in a very embarrassing way. The lady in question replied that she was quite willing to admit that the youngest child was unwanted and was conceived at an undesirable time. An analyst would say that the slip was caused by the unconscious wish not to have had the son or even by the unconscious wish to have had the son by another father. The interpretation is not pertinent for our discussion. The thought of the son as unwanted must, according to the analysts, be responsible for the pronunciation of son as *sin*.

The interpretation of symbols has been partially discussed earlier in this chapter. If the neurotic patient admits that an unusual figure such as \oplus , which he or she employs in writing, is a symbol of union of the two sexes, the admission must be made by any one that the interpretation is correct. On the contrary, if the same figure is employed by another individual, the assumption cannot be made that it is a symbol of sexual union unless the admission is made. It may be symbolic of some mathematical formula. Symbolization is an individual matter, except in so far as many people are subjected to the same environmental

influences and have almost the same experiences. The American flag is symbolic of the same things for many people of this country; yet even in this country the things for which it stands may be different for the prohibitionist and anti-prohibitionist. The American flag has an entirely different meaning for a Chinaman from its significance for a citizen of the United States. The fixed symbols of the Freudians have a still greater range of associations. A woods may be symbolic of fear for the youngster who has been lost at some time. For another child, the woods may be a pleasant place to spend an afternoon in play; yet the analysts do not hesitate to say that a wood in a dream stands for the pubic hair.

The authors were once present in a group of psychiatrists, several of whom were adherents of the psychoanalytic school. At this gathering a college student was hypnotized and told that while he was asleep he would have a dream. He related the following dream when awakened. "I was riding down a wide street on a bicycle, holding on to the back of a stone truck." The analysts attempted to learn the meaning of the dream by asking a variety of questions, including such questions as these: (1) Did you like your father or mother best? (2) Do you feel people are fair to you? (3) What does a truck signify to you? The student answered the questions as intelligently as possible, and although the dream was not interpreted, it might readily have been in accordance with Freudian principles. Another member of the group (non-analyst) asked a question which the student could answer and which to the writers was adequate for explaining the dream. The question asked was, "Can you remember anything that might have caused the dream?" The answer was illuminating. When about 8 years of age, the subject had ridden behind a stone truck on a bicycle, had been thrown off, and had had concussion of the brain. The dream appears to be a simple reproduction of an actual incident; however, if interpreted in terms of fixed symbolism, it would have an entirely different meaning.

Sears (473) discusses also many of the other psychoanalytic concepts and relates the known facts to the concepts. The material presented is sufficient for the purpose of this text. We should like to quote a paragraph from the conclusions drawn by him:

"The experiments and observations examined in this report stand testimony that few investigators feel free to accept Freud's statements at face value. The reason lies in the same factor that makes psychoanalysis a bad science—its method. Psychoanalysis relies upon techniques that do not admit of the repetition of observation, that

have no self-evident or denotative validity, and that are tintured to an unknown degree with the observer's own suggestions. These difficulties may not seriously interfere with therapy, but when the method is used for uncovering psychological facts that are required to have objective validity it simply fails."

In order to recapitulate some of the various theories and to show how the dynamics would be worked out, an actual case of psychoneurosis is presented for discussion, formulation and therapy from different orientations.⁷ To that end we wish to compare here the theories, possible formulations and attack on the same problem by the Adlerian and Jungian schools of psychology, the psychoanalytic approach of the Freudian school and finally the psychobiologic orientation originating with Adolph Mayer.

In a section necessarily as brief as this and covering, in a sense, the whole scope of all of these fields it is almost inevitable that, due to material condensation, repercussions might be heard from the adherents of these respective groups. Protest, argument and defense of their systems of thought and therapy will be raised. Though aware of the likelihood of protestations from various sources, it is felt that in general the approaches to be described are fairly representative of the schools.

CASE SUMMARY

The patient is a 39 year old, white, single male. He has been unable to work or to make an adjustment to life since his discharge from military service, after a year's service because of medical reason. He has been hospitalized for 18 months in two hospitals. The presenting symptoms some months ago on his present hospital admission were depression, suicidal thoughts, and numerous physical complaints.

Descriptively, Joseph is a large person well over 200 pounds, brawny and "rough looking". However, he gives the impression of being an overgrown boy, of putting on an air of bravado to hide inner panic. He was quite demanding of attention on admission, and very insistent on wanting to be helped. He would constantly ask the ward physician the meaning of innumerable phantasies and dreams. Joseph's ancestors are first generation from a small European country. He is Roman Catholic by religion. Joseph, the senior, now dead, was described as a huge hulk of a man, a hard worker and a hard drinker. Apparently the father was an adequate provider according to the standards of the family's environment, a seaport city of the West Coast. The father at one time was in charge of the hiring of stevedores and ruled with an iron hand. His first wife had six children before her death. The oldest was a boy, named after his father. Then in succession came five sisters. The patient's mother married in the face of the responsibility of six children and in turn began to bear children. There were five more children of whom Joseph was the

⁷ This section has been prepared by James M. Rankin, M. D., Chief, Continued Treatment Service, Neuropsychiatric Hospital, Veterans Administration Center, Los Angeles, California.

second in line, following a second boy 2 years older than he. After 2 more sisters, a younger brother was born. It appears that when father was sober he was a quiet considerate man who was kind to the children. A very vivid picture is given of father when drunk. He became noisy, nasty, aggressive and destructive. He would roar into the house and the children scattered like frightened quail. Joseph's place of security was under the sink. There appears to have been some real danger in confronting this drunken person. Mother would be sarcastic, hostile and belittling when father was sober and lead him to the Priest to take vows of abstinence, all to no avail. She seemed to be fascinated by death, attending wakes for miles around and forcing the children to accompany her. She is described as a hard, cold, rejecting person whose emotional life was transferred to the church. Early in life, constipation appeared in the patient, necessitating enemata by the mother, a procedure followed for years. Joseph's childhood was a rough and tumble existence with other children of the neighborhood. His education was a strict authoritative type in a parochial school. At an early age, there appeared to be developing a definite hostility toward his sisters and feelings of rivalry toward the next older brother. He was a good student and seemed to have ambitions toward a complete education. Unfortunately while the patient was in first year high school, the father made unwise investments and lost his savings. Thus Joseph resentfully found it necessary to go to work. The history indicates that he apparently had a stable work record, being with a large firm for about a dozen years. During his early twenties there was the not unusual behavior of drinking, parties and sexual adventure. The oldest of the siblings eventually died of tuberculosis and mental disease, a shock to Joseph. Ultimately, Joseph acquired gonorrhea; this was a tremendously fear-invoking and shameful event. Soon after, he acquired pneumonia necessitating a prolonged convalescence. Events show that he quit his job, drank excessively and depended on political patronage for work. Because of tension, shakiness and sensations of throat constriction, he was subjected to a thyroid operation with little subsequent relief. His work record increasingly deteriorated to the point of his being in a low economic scale. His physical and emotional complaints increased in frequency to the point that there was some question of accepting him into the service during the war. Actually he soon was hospitalized after induction but was returned to duty. Within a year however, it was necessary to discharge him for nervousness and he received a government pension. Since then he has been a restless wanderer from city to city trying unsuccessfully to hold a job. Increasingly he began to have headaches, noise sensitivity, constriction in throat and chest, weakness and shakiness. He became preoccupied with fears of disease especially tuberculosis and epilepsy. Religion preoccupied him with much ambivalence—from ecstasy in fantasies to intellectual defiance and hostility to the church. His depression and apathy were marked, but at variance with his aggressive demands of hospital personnel for psychiatric aid. This aggressive demanding increased with an exacerbation of all his fears and symptoms when his pension was cut off. Physical examinations were entirely negative, as were various laboratory examinations, such as the electroencephalogram, basal metabolism and blood tests. Because of his psychiatric picture containing many varied neurotic classifications, his diagnosis was made, i.e., psychoneurosis, mixed type. Of major import was his phobic reaction, fear of disease and death, death paradoxically at times thought of in suicidal terms. Because of his inability to get rid of these recurring bad thoughts, and of his preoccupation with geometric designs and repetitious fantasies and ambivalent attitudes, he reveals much of an obsessive compulsive nature. These things, plus frequent periods of marked anxiety and depressive reactions, all show the mixture of syndromes so often found in the severe psychoneurotic.

THE ADLERIAN APPROACH

To understand the approach of the Adlerian school it is advisable to review briefly some of their concepts. Their psychologic philosophy is based on the doctrine of "unity of the personality"; a preliminary to this is the secondary doctrine that states in substance that the social attitude and reaction of the child is indicative of preparation for subsequent efforts toward self-sufficiency and supremacy. Thus the conflict is between the strivings of the person, the organism, and society. In this there is the effort at preserving the unity of the organism in compromise with social demands. These doctrines are based on the earlier Adlerian concept of organ inferiority. He postulated that the child develops a conscious awareness of organ inferiority that to varying degree is carried into adult life. In addition he felt that the various body organs either through heredity, structural defect or disease made its inferiority consciously felt in the psyche. This conscious awareness of the organ inferiority stimulated in turn an impulse to compensate for the defect in various ways. Dr. Adler felt that this impulse to compensate stemmed from a "will to power". Generally stated, there are two main goals of the personality, one of social adaptation and service to society and the other to the attainment of power. This school feels, then, that the neuroses stem from a conflict over the feelings of inferiority and the urge to power. Secondly, the inability to meet normal social demands, stemming from consciousness of a lack of social equality and inability to adapt to change, leads to seeking justification in neurotic acts. These are defenses against consciousness of inferiority.

The Adlerian approach then in view of the orientation just outlined would be somewhat in this manner. In the conferences with the patient, an attempt would be made to determine what the "life pattern" of the neurotic is, what is his goal in life? An effort would be made to find what he is running away from and what he seeks in his neurotic pattern. With these things ascertained, an appeal to his enlightened intelligence would be made with the view of bringing about withdrawal of the "dishonest" pathologic methods of acquiring power.

In the case previously sketched the formulation might be somewhat as follows: We have a case in which Joseph's father had a central nervous system injured by alcohol. In Joseph there is the inherited alcoholic tainted, or inferior nervous system. This nervous system inter-connects the various organs and tends not only to transmit the awareness of inferiority from one to the other, but to accentuate the inferiorities. In the case of this patient, there were numerous illnesses. As a child, and persisting into adulthood, he was constipated, necessitating ene-

mata by mother. He almost died of pneumonia twice. He was rendered unconscious by a blow from a baseball bat as a boy. An older brother whom he looked up to and respected died in a mental hospital of tuberculosis. A younger brother had tuberculosis. Gonorrhea caused intense emotional upset and fear. A thyroidectomy caused more inferiority feelings. One sees then a combination and potentiation of organ inferiorities building up to a tremendous strength. The urge to power as a boy was blunted by a powerful fearsome father, numerous older siblings and maternal "masculine protest". As these series of inferiorities made themselves felt his psyche and urge to power were no match. The result was neurosis with its conviction of many physical ills, the phobias of disease and death and repetitious obsessive thoughts. From the social aspect we see a person whose father became a social outcast with his frequent alcoholic disturbances, arrests and failures in pledges of abstinence in church. His older brother died a broken man. He in turn developing social inferiority from his environment and secondarily from his organ inferiority, felt unable to adapt to society's precept. Alcohol became a socially neurotic pattern. The war with its greater stress and adaptive necessities was too much. A completely pathologic pathway for his urge to superiority was formed. After the war he ultimately sought refuge in a hospital for care. What then was his probable "life pattern", his ultimate goal? One speculates on whether it might not be knowledge, education and culture. Certainly early in life he was intensely interested in schooling and libraries which he haunted. The urge to power perhaps was to be physically dominant like the father. These are speculative. We do not know that the neurotic result was the demand for comfort, care and love. Possibly then we see the urge to power distorted into compelling society to take care of him by the very mechanism of his neurosis. He succeeded. However, this success was a Pyrrhic victory. Joseph is unhappy, extremely so. Therapy then would be to show him how this negative urge to power came about and to approach the ultimate goal of a compromise with society.

THE JUNGIAN APPROACH

Following Jung's break with Freud he began developing divergent theories on the framework of psychoanalysis. For example, the Jungian postulates an unconscious of two parts, the "personal" unconscious and the "collective unconscious", the description of the racial inheritance of the psyche. This racial reaction makes itself manifest in day by day life and in dreams. This concept of collective unconscious thought,

considered to be typically Jungian, was mentioned by Freud in his writing prior to the separation. The Jungian school does not follow the precept of development of infantile sexuality but rather puts more stress on the degree of "animus", "anima"; that is the degree of the masculine (animus) in woman and the degree of feminine (anima) in man. This is derived from the parental constellation in much the same manner as in the psychoanalytic theory of the oedipus situation. They feel that a neurosis is a conflict of the present and does not necessarily have its roots in infantile sexuality. Of divergence also is their concept that the unconscious is primary and that from it is derived inspiration. Here too is found the archetype of the deity, racial thought and folklore. Dreams are not wish fulfilling as Freud postulated, but represent through archetypes the plans of the patient and the upcoming of inspiration.

A possible Jungian formulation of the presented clinical case follows:

It would be felt by this school that the sequential order of the siblings and their names is of importance in determining the presence of parental substitutes. As we know, the first born was a male. The next five children in order were females. This sibling order, plus the description of the parents, leads one to the concept of a weak father and a strong mother. By deduction, it is felt that the father had a mother fixation just as the patient does. Joseph has then become the psychologic reproduction of his father—a femininely oriented figure. Socially he shows his unmasculine attitude in his work. He "cannot" work, i.e., his neurosis is symptomatic of the feminine in a male body. The dependence upon politics in earlier years for work is equivalent to depending on mother. The Jungian would feel that it is difficult if not impossible to make a dynamic construction from this summary because of the lack of dream material. In Jungian therapy, great stress is put on dreams and their interpretation. Free association and the patient's thoughts are not needed. The archetypal symbols are enough to determine what is behind the dream in the unconscious. In therapy there would be direction given to the patient through discussion of these archetypes and much consideration given to the "soul". The Jungian therapy is more a "psycho-synthesis" in that the therapist actively directs thinking, on a conscious basis, into new channels.

THE PSYCHO-ANALYTIC APPROACH

As in the discussion of the preceding schools of psychology, it will be necessary here to mention a few of the psychoanalytic precepts used

in the case formulation and treatment. It is obviously impossible to cover adequately all of the technical working theories of psychoanalysis. For this one must turn elsewhere. However, here as in all neurosis, there can be seen derivatives of various stages of the development of infantile sexuality. If one might loosely make the comparison, the development of the personality is akin to the Darwinian theory of evolution—that is, development from a primitive undifferentiated lower scale organism to the highly complicated organism of man. Primitive man then would be similar to the early stages of personality development. Psychoanalytically when a neurosis appears the conflict can be handled by the ego in many ways, by many mechanisms. One commonly seen mechanism, for example, is that of “regression”—of part of the total personality retreating to some earlier more primitive era in its life span. This “regression” is on a unconscious level, but produces as derivatives the many symptoms of neurosis. Analytically the Oedipus complex, although only a part of analytic thought, is felt to be critically determinative in neurosis. It is demonstrated in this case in only an obscure distorted manner. The dynamic formulation of this case might be somewhat as follows: Joseph was subject to an alternating changing father figure. Without question, the father became a terrorizing primitive figure. The mother was a cold gloomy woman. She was, with little doubt, a sadistic person basically. She could not possibly in reality give all the love and attention that the child demanded. Instead it got enemata. Analytically, Joseph had no one to “identify” with—no one to grow up to, to be like, to imitate. He was in fantasy a deserted person, alone, who could expect only punishment from the parents. His conscience, or “super ego” was a severe one, unconsciously, after the parental image of fantasy. Deeply buried in his personality as the result of his paternal fears was a passive feminine attitude. This was borne out by several actual episodes in his life, which it is not necessary to detail here. With little question his flight from a socially and economically adjusted life into neurotic regression began with his venereal disease. This, to him, was living proof of the punishment which his unconscious fantasies, still remaining from childhood, expressed in symptom. In appeasement of his unconscious, he began imitating father in his alcoholism and social degradation. In service these conflicts were magnified tremendously to the point of marked regression to infantile attitudes. Chief of these ultimately was his primitive oral attitude of demanding security, care, attention and affection. He got these things by being completely passive and helpless as manifest by

his many symptoms of illness, phobias, weakness and anxieties. His depression was from the turning in against himself, punishing himself, for hostile destructive unconscious wishes towards his parents. A demonstration of the etiology of his headaches, throat constrictions, and suicidal depressions was made apparent during an interruption in therapy. Due to his emotional attachment to the therapist he was apparently symptom-free. Immediately after the interruption, he began to have splitting headaches, sore throat and chest pain. He consulted many doctors, to no avail. On resumption of therapy, it could be shown him through his own associations that this sickness was his own self-punishment for the murderous unconscious protests at the doctor's deserting him. His symptoms then subsided. Throughout treatment he has repeatedly utilized intellectual defense, bizarre fantasies and obsessive ruminations as defenses against conscious awareness of his primitive oral sadistic strivings for attention at any price, and of the turning against himself and passive feminine attitudes. Work had always been associated, since the war, with frank panic reaction. Even in the early stages of treatment he was unable to do simple hospital detail work. Work is unconsciously and regressively associated with competition and therefore, a symbol of terrible fantasy punishments.

Therapy has been and will be long, difficult and uncertain. He is very ill, and has at times been very close to the unreality of psychoses. Treatment objectives have been the slow gradual process of making him aware of the implications of his unconscious hostility and death wishes. He gradually, through free association, dream interpretation and utilization of transference phenomena has been able to see the result of his hostility. An attempt is being made to uncover gradually these deeply unconscious early primitive fantasies and fears that prevent him from attaining a mature personality. As these drives are brought to light there is concurrent ego strengthening, a softening of the malignantly punishing super-ego, or conscience, and a diversion of the unconscious instinctual drives into socially accepted channels. This is the ideal aim. In this case, if Joseph can be made happier, his symptoms controlled, and if he can be gotten back to work, that is an adequate and ambitious goal.

THE PSYCHOBIOLOGIC SCHOOL

Strictly speaking, this should not be considered a school of thought or therapy. The adherents of the Meyer attitude toward psychiatry

do not wish to feel bound to any preconceived theoretic structure. Their attention is closely focused on the medical aspect of the individual. In relation to the psychologic a search for disease, disability or defect of the body-mind is attempted. The physical aspect then is closely watched. As a corollary there is no hesitancy in the use of drugs, stimulants, depressants, hypnotics and analgesics as needed in psychiatric treatment. The psychobiologist has the attitude of examining the mind with a body. Similarly, the psychobiologist examines the environment, its effect on the organism and the reaction of the personality to the environment and society. This is accomplished by a meticulous and painstaking life-span history with emphasis on heredity, the medical history and the time factor relationship. Essentially the endeavor is to look at the individual as a living integer reacting as a biologic entity.

In the case presented, the psychobiologic formulation would start with the relationship of the siblings. Here one finds a much older brother to whom the patient "looked up". Five sisters followed, some of whom acted as nursemaids. Joseph expressed resentment towards them, for what specific thing he cannot recall. Of the full brothers and sisters the next older was two years his senior. Rivalry is evident in the patient's attitude toward him. He consciously resented his mother's rejection of him. He felt his parents were unfair to him, even to having produced and reared him. The psychobiologist would be interested in the childhood constipation, his pneumonia, the later tuberculosis of his oldest half-brother, and his subsequent death. His deprivation of higher schooling and reaction to it would be significant of feelings of frustration socially. In his third decade of life the increasing alcoholism and poor work record would be considered as the beginning of his defective biologic reaction to society and life in general. Further traumatization by gonorrhoea and the tremendous physical upheaval of thyroid disease and operation set the stage for the final coup de grace during the social disturbances of the war. His behavior pattern since has been the chronic repetitious symptom complex of the sick biologic entity. In treatment it would be necessary to know whether his electroencephalogram was normal. Does he have epilepsy as he fears? Is his thyroid functioning adequately? Does his chest X-ray show tuberculosis? If all his physical tests are normal these are used to show Joseph consciously and rationally, that he is not physically ill. From another aspect, is he well-endowed mentally?

What is his intelligence quotient? Actually, we see it is quite high. He is very keen mentally. Perhaps with tests like the Murray Thematic Apperceptive, for instance, to show attitudes, then by conscious means the patient is gradually led to understand there is no physical basis to his symptoms and that he is and was resentful of his position in life as just one of a large brood of children and of unstable parents. Review of the cause and effect patterns of his life helps him to change his biologic behavior as a total personality into more realistic and economic patterns.

CHAPTER VII

DESIRES, FEELINGS AND EMOTIONS

RELATION OF THE TERMS URGE, DRIVE AND INSTINCTIVE TENDENCY TO THE TERM DESIRE

In the discussion of the psychoanalytic theories in the preceding chapter, the terms motive, urge, drive, instinctive tendency, and innate disposition were employed. Each of these terms has a specific meaning for various psychologists, although they are used interchangeably in much of the current psychological literature. Warren's *Dictionary of Psychological Terms* furnishes the definitions given below for certain of the terms. "Motive is a conscious experience or subconscious condition which serves as a factor in determining an individual's behavior or social conduct in a given situation." "A drive is any intra-organic activity or condition which supplies stimulation for a particular type of behavior. It covers both organic activating conditions, such as hunger and presumably cerebral conditions, such as mental set or such as desire for a particular object." "Urge is a strong tendency to perform a certain act." Another term which will be employed in the discussion, is desire. Desire may be defined temporarily from our point of view as anticipatory thinking in conjunction with either localized or non-localized bodily conditions. Unfortunately, all human action cannot be explained in terms of these relatively simple concepts. The problem becomes enormously complicated, since life is directed by thought which includes purpose and ideals. Feelings, sentiments, moods, and emotions, are other psychological concepts which must be fit into their respective places in the puzzle; these latter concepts and desires are not theoretical concepts but they are experiences or facts of every day life and play an important rôle in shaping and moulding the individual. Some of the concepts listed above are superfluous for our present discussion; some are relatively unimportant, and for some of them, other concepts may be substituted that are more adaptable to the scheme which will be set forth.

The desires are the most suitable concepts on which to build. Desires are not abstractions, they are the result of intra-organic conditions plus a certain type of thinking. The exact nature of the organic conditions

which arouse certain desires can be definitely traced; the origin of certain of the other desires cannot at present be accounted for in a specific way. Dunlap¹ has employed the term *appet* to describe the something which in conjunction with anticipatory thinking constitutes a desire. Desires are actual events, processes or occurrences; they have an organic basis; they are wants. This notion of futurity seems to indicate that desires are always positive or that any anticipatory thinking is a desire. The notion of futurity alone does not constitute a desire nor is want a satisfactory criterion. One may think about future events in one of three ways; they may be desirable, undesirable or neutral. Whether an *appet* in conjunction with anticipatory thinking will be desirable, undesirable, or neutral will depend upon past experience, and the thinking which has preceded the arousal of the desire.

The *appet* or organic condition for the desire to quench one's thirst is the dryness of the mucous membrane in the upper portion of the alimentary tract. The actual liquid desired for the satisfaction or relief of this organic condition will be determined by many other factors, including purpose and ideals. Under certain circumstances the desire, will be for water, even though the water may have a disagreeable flavor. The anticipatory thought of the particular water may be unpleasant, yet the desire prevails, since the organism rids itself of a more disagreeable or more unpleasant situation. Under other circumstances, the anticipatory thought may lead to a desire for alcohol; and under still other conditions, the desire may be for tomato or orange juice. The *appet* in these circumstances is fundamentally the same. The nature of the specific want or desire has been influenced by past experiences and anticipatory thinking. An individual with a strong prejudice against the consumption of intoxicating beverages may not have a desire for alcohol because of his ideals. If alcohol were prescribed as a stimulant for this same individual in order to overcome an organic difficulty, the desire for alcohol would arise. The original *appet* would be lacking, although another may be substituted. In spite of the fact that the essential characteristics of the original desire have been lost, purpose has been the deciding factor in action. Desires are without doubt purposive, but they are purposes of a definite sort. They are more than purposes, since they are influential in the determination of purposes which are not desires. How do the terms *appet* and desire compare

¹ The discussion of desires is based to a certain extent upon the chapter on *Desires* in the revised edition of *Social Psychology* by Knight Dunlap.

with the terms drive, urge, instinct and innate tendency? The appet may be compared with the drive in that both are organic conditions or actions that furnish stimulation which sets the organism into action, although the term drive is used in a vague way to apply to a more general organic or psychological condition. In the conventional interpretation of drive it is the agent which activates the animal toward a specific goal, getting food, mating, and activity itself. The theorists have been little concerned with the mechanisms involved in the process, being content with explaining drive, urge or tendency in terms of inherited or innate tendencies of reaction. The drive or urge is the force which impels an animal toward a particular goal, reward or incentive. Drive is somewhat similar to instinct, if the following definition is accepted for instinct. An instinct is an organized and relatively complex mode of response, characteristic of a given species, that has been phylogenetically adapted to a specific type of environmental situation. In other words, an instinct is an innate, unlearned, response. The manifestation of an instinct does not require any learning, but may require maturation. The desire, on the contrary, is linked with and dependent upon learning. The only essential feature of the desire that depends upon inheritance is that the neural pathways be developed sufficiently to transmit proprioceptive afferent impulses which initiate anticipatory thinking. All primary reaction tendencies in man and animals have been called instincts. Avoidance has been called the fear instinct; association with other humans, the herd instinct; mating, the parental or amatory instinct; eating and procuring food, the food or self-preservative instinct; combing the hair, sex or self assertive instinct, and so on ad infinitum.

MODIFICATION OF DESIRES

Abnormalities of desire may be produced in numerous ways:

- (1) The actual appet underlying the desire may be affected, i.e., it may be too feeble or too intense.
- (2) The intensity of the appet may not correspond quantitatively to the satiation of the desire.
- (3) The appet may be normal but the anticipatory thinking or derived desires may be abnormal.
- (4) There may be some abnormality in the frequency of occurrence of the desire

These underlying causes of an abnormality of desire cannot in most instances be attributed to only one of the specific factors listed above; more often the cause is the interrelation of the various factors mentioned.

The organic basis for certain of the desires is fairly well established, the appetits being identified with particular bodily tissues. For other desires, the basal tissue conditions can only be guessed. It is rather obvious then that our discussion of intensity or enfeeblement of appetits is founded on insufficient data. The relation of the tissue condition to the desire itself is of the utmost importance, although the actual satisfaction of the desire as well as the method of satisfaction may exert a tremendous influence upon the appetit. Desires may be either excessive or deficient. Some confusion exists in determining whether the desire is abnormal or whether the gratification of it is abnormal. Some individuals may show an excessive gratification of a normal desire; this excessive gratification may lead to either an increase in desire or decrease in desire. Non-satisfaction of the desire may result in (*a*) the abolition or the reduction of the desire or (*b*) increasing the desire.

Knowledge of how or when a desire is to be satisfied, if at all, will also affect the arousal of the desire. Fletcher, as reported by Masserman (474), showed that chimpanzees under the same degree of hunger motivation will work harder to obtain a large piece of food attached to a string than to obtain a small piece attached to the same string. The time between the appearance of the desire and its satisfaction will also be a potent factor in determining the subsequent characteristics of the desire. There is little uniformity of influence of these factors on the various desires. Expectation of food, water and rest within a specified time may effect these desires in entirely different ways. A desire for food may be enhanced or decreased by the knowledge that food will be served in a short time; it may be further complicated by knowledge that the food is bean soup or roast turkey. The knowledge that the food supply is exhausted and cannot be replenished may greatly increase the desire for food, and would also affect the desire for particular kinds of food. Lazarsfeld (475) in comparing the desires of children coming from an impoverished village in Austria with the desires of children coming from more favorable economic villages has shown that the total value of things desired at Christmas time was in a ratio two to three. The desire for preëminence, conformity, and the amatory desire are especially subject to foreknowledge and lack of it. The delay or non-satisfaction of a desire may result in organic changes so that the desire may be manifested in a totally different way or it may abolish the desire. In starvation, especially in the early stages, the desire for food increases; with further non-satisfaction the desire may be abated and finally disappear altogether. The excretory desires are subject to

temporary modification and may even result in faulty habits of excretion through the delay in satisfying them. Activity and rest are subject to similar effects. Fat may result from failure to satisfy the desire for activity, which is an indirect modification of tissue, that inhibits the desire for activity. A more complex set of factors operate in determining the intensity of the preservation and abolition of the amatory desire, than any of the others. The variability of the strength of desires is partially due to the inclusion under the term strength of a number of different characteristics. These different characteristics may be (a) the intensity of the desire at any given moment, (b) the frequency of occurrence of the desire, (c) circumstances under which the desire is aroused.

The intensity of a desire may actually be the intensity of the appet, but as has been pointed out earlier in the chapter, a proportional relationship does not necessarily exist. Attention is the predominating factor, since with dominance of attention there goes a dominance in perceptual patterns of objects and events which have a direct relation to the desired object. The frequency of the occurrence is often mistaken for intensity. If the desire for food having intensity A occurs ten times in one day, and occurs only four times at intensity A on another day, we are prone to say that the desires were stronger on the first day. Favorable or unfavorable circumstances existing at the time of the arousal of a desire may lead to the interpretation that the desire was stronger or weaker. A woman may be forbidden by her doctor to eat candy; under certain circumstances the desire is inhibited and under other circumstances it is satiated, although the intensity of the desire in both cases has been the same.

How perversions of the desires arise is one of the problems in abnormal psychology. Before undertaking an explanation of the perversion, we have to clarify what is meant by perversion. We may speak of gluttons, drunkards, lazy people, etc.; what we are doing is merely describing the ways in which people are satisfying their desires. These activities are not really perversions, except in so far as we may choose to classify them as such. In perversions, the desire is satisfied by some process or materials which are not satisfying to most people. There is no marked line of cleavage between a normal modification of a primary desire into a secondary desire or into a perversion. The man who plays golf is satisfying his desire for activity or preëminence; if he walks the floor all night he may be a manic; if he sits still all day he may be a catatonic; and if he walks the floor with the baby he is satisfying certain other desires. The perversions of the desires are practically determined

in the same manner as other abnormalities; i.e., if the activities engaged in for their satisfaction are harmful to the individual or society, they are perverted.

Perversions result from various causes. Failure of satisfaction of the desire in the normal way, over-indulgence of the desire, failure of adequate satisfaction of one desire and the resultant perversion of another, and learning under favorable circumstances are common causes of perversions. The formation of normal secondary desires, which are beneficial and non-injurious, is through a learning process. Where new desires can be formed without the repression of other desires, there is a tendency to form them. The difference between a normal modification and a perversion is that the perversion interferes with adequate satisfaction of one of the primary desires or reduces the normal desire in strength or frequency, whereas a normal modification has no adverse effect on any of the primary desires or their satisfaction. Desires may be modified by the regressive spread of desire, from that which is thought of as a means to the primary end, and is therefore desired. A student, who plays football does not desire primarily to get tired, to get hurt, and to be humiliated in defeat. He may desire activity and since these other activities are means to an end, he desires these means.

The desire to play football is not in all cases the primary desire; it is secondary, being the result of a spread from some more fundamental desire. It may be the desire of preëminence, the amatory desire, or even the alimentary desire if the student holds an athletic scholarship. The relation of the secondary desires to the primary desires cannot always be readily determined.

ALIMENTARY DESIRE

The tissue structures underlying hunger and thirst normally give rise to the alimentary desires, although ideational factors or secondary desires operate in determining the way in which the desires are satisfied. The frequency and strength of the alimentary desires will depend partially upon the rate at which food and liquids are utilized in metabolic processes, although not entirely so. The desire for water or liquid is influenced by the rate of salivation, the rate of evaporation through the body pores and excretion through the kidneys. In general, the desire for liquids will arise before there is any serious depreciation of the liquid content of the body. Mayer-Gross and Walker (476) found that preference for unknown liquids was partially determined by the blood sugar level. One hundred patients were tested for preference of solutions of

saccharine, saline 5 per cent, sucrose 30 per cent, and water. Blood sugar levels were determined at the time of testing. When the blood sugar was below 50 mg. per cent, the 30 per cent sucrose solution was preferred, and when the blood sugar was greater than the above figure solution was rejected. The work of Cannon (477) and Carlson (478) indicated that hunger is definitely linked with stomach contractions. Doubt concerning the function of such contractions in arousing hunger has arisen since it has been shown that some individuals who have rhythmical contractions of the stomach do not have hunger and others who do have hunger do not have the rhythmical contractions. If emptiness of the stomach and contractions were the stimuli, then any solid material taken into the stomach should abolish hunger. This is true to a certain extent but ultimately hunger will occur unless material that can be assimilated is taken into the stomach. Davis (479) studied the selection of a variety of foods served simultaneously, by a group of thirteen infants that had just been weaned. The continuation of the study for a period of months indicated rather clearly that the children were capable of selecting a balanced diet and furthermore that the diet was regulated somewhat in accordance with changes in temperature and humidity. In a subsequent study by the same author (480) it was found that newly weaned children who had no experience with adult foods when allowed to select their own diets were able to maintain normal physical growth. The children selected 3600 meals at the rate of 4 per day. Examination showed that growth, red cell count and bone calcification were equal to accepted American standards. Rats on the other hand do not seem to be as successful, according to Scott, Smith and Verney (481). Twenty-one day old rats when offered a choice of diets containing casein, sucrose, hydrogenated vegetable oil and salts, did not select sufficient casein for normal growth and life maintenance. Twenty-two of 31 studied, died by the age of 58 days. Six to 12 month old rats fared better, since 60 per cent of these animals selected sufficient casein to maintain growth. Pregnant animals were found to increase their salt intake. Dill (482) found that food preferences of combat fliers were influenced by emotional tension. Aroma, flavor, and acquired preference played an important part in selection. In neurotic males, food aversions were more numerous than in normal males (Wallen, 483). Neurotics were inclined to have more unpleasant and disgusting associations with disliked foods, and the author suggests that food aversions might be a useful indirect index of maladjustment. Work by Hausmann (484) shows that in the choice of sugar and saccharine (the former having

food value and the latter not having any food value) rats seem to be able to select sugar since this supplied a tissue need. The desire for a particular kind of food is controlled by quite a different mechanism from that of stomach contractions and it is highly probable that hunger is also controlled in a similar manner.

The excesses and deficiencies of the alimentary desire are clearly recognized; perversions are not as readily distinguishable since the perversion of one desire may depend to a considerable extent upon the interaction of the other desires. Deficiency in the alimentary desire ranges from weak appetites to total abstinence from food or liquid. This lack of the desire for food and liquid is technically designated as anorexia and adipisia respectively.

People who eat relatively little food or drink small quantities of liquid usually pass unnoticed unless some other abnormal condition develops as a result of these deficiencies. If the individual refuses to eat any food or drink any liquid, we may be dealing with either a psychopathic case or an organic disturbance unaccompanied by a mental aberration.

Excessive food desire is popularly called gluttony and is technically bulimia; excessive thirst is termed polydipsia. If the alimentary desire is directed toward a specific food or liquid, a technical name is applied to that condition; for example dipsomania is the uncontrollable desire for intoxicating beverages.

The physiological conditions underlying the appet have already been mentioned in a general way. Some derangement of the metabolic processes would be reflected in the lack of desire for food; stasis (popularly referred to as auto-intoxication) of the stomach or intestines may poison the end organs located in these regions so that no afferent impulses are set up; flatulence from poor digestion may lead to fatigue of the end organs or their terminals in the brain because of continual incoming stimulation or because the air chambers created may prevent the chemical stimulation derived from the food from affecting the end organs; tumors, and many other factors may account for the lack of the appet. Keys (485) work on human starvation points out clearly the psychological and physiological effects produced. In his experiment 32 males between the ages of 20 and 33 were kept on a 3150 caloric diet per day. This was continued for a 3 month period during which the subjects were tested. They were then placed on 1760 calories per day with 49 grams of protein added for 6 months. They were again tested. There was evidence of severe weakness, depression, fatigue, anemia, brachycardia, edema, 24 per cent loss in weight and a small loss of plasma protein. There were

no adverse effects upon vision, hearing, and general intelligence, although initiative was impaired and small adverse effects were detected in coordination and speed. Full recovery from the adverse effects occurred in from 8 to 12 months when the subjects were returned to an adequate diet.

Physiological factors for explaining an increase in the intensity of the appet are more difficult to localize. The vast amount of experimental work on this topic is gradually yielding a better understanding of the whole problem. Not only is information being obtained about the appet for a specific food or chemical but also concerning the general hunger appet. Young (486) and Richter (487) have carried out a variety of experimental investigations and have collected much of the experimental literature on this topic. Operative procedures which alter the basic needs of rats show that adrenalectomy results in the consumption of large amounts of sodium; parathyroidectomy increases the intake of calcium; pancreatectomized rats ingest large amounts of fats and casein and but little sucrose; however, rachitic rats do not choose an optimal diet for overcoming the condition. Clark and Clausen (488) support the notion that adrenalectomy results in increased salt intake and found further that injections of adrenal cortical hormones tended to return the salt intake to a normal level. Warkentin et al. (489) have demonstrated the influence of metabolic rate on total food intake in rats. Thyroidectomized rats showed a marked decrease in intake, and hyperthyroid rats ate much more food than normal animals. In their selection of specific foods it appears that the choices are altered so that they obtain a high caloric intake. Donhoffer and Vonotsky (490) injected .02 to .04 mgms. of thyroxine daily into white mice, which produced within 3 to 6 days a rise in oxygen consumption and food intake. The additional food intake was largely carbohydrates. Brooks, Lockwood and Wiggins (491) found that hypothalamic lesions in rats increased the amount of food eaten at a meal.

Growth in fatty and muscular tissue may explain an increase in appet if the theory is accepted that there is an underlying tissue need responsible. This theory receives additional support from the observations on patients with diabetes mellitus. Untreated cases show voracious appetites and intense thirst; since these patients void large quantities of urine containing sugar, it might be inferred that the polydipsia is a result of high blood sugar concentrations and withdrawal of fluid from the intestines, hence the appet for water. Partial contraction of the muscles of the stomach and intestines may set up

continual afferent impulses which are not strong enough to fatigue the central or peripheral neural tissue and so cause an increase in intensity due to greater frequency of stimulation.

If the theory that contractions of the stomach are essential for the arousal of the appetite is true, then it must be assumed that the hunger contractions are abnormally strong or that the nerve endings are hyperexcitable. Some idiots and insane people show bulimia but the information which is available is too scanty to be of much use in determining the actual mechanisms involved. It is probable that a lesion or defect is present in the higher regions of the brain and endocrine system since accidental lesions will in some instances produce an analogous condition.

Reiss (492) in a careful study of a case of anorexia nervosa set forth the difficulties of distinguishing between the organic and the ideational bases of the disorder. The photographs in plate III show very clearly the changes manifested. The patient was disappointed in a love affair and subsequently lost the desire for food. With the introduction of rationing she excused herself from eating thereby leaving more for other people. There was no evidence of a major psychosis. During a twelve-months period in which diet changes and psychotherapy were instituted, the changes shown in the top and bottom photographs occurred. It might be concluded that the causal factors were entirely psychological. However, it has been found that other cases do not respond unless adjunct therapy with hormones, particularly those of the pituitary gland, is instituted.

The ideational element connected with the alimentary desire is especially important. In spite of the fact that the physiological and neurological factors underlying the appet are normal, anorexia and bulimia occur in some cases. A case of anorexia from Hollingworth was cited in a previous chapter. The ideational elements in the situations were alone responsible for the lack of the desire for food. The normal individual who sees dirt in food or a fly in the jam may lose the desire for that kind of food in the future. Many disturbances of the desire for specific kinds of food in "so-called" normal people can be definitely traced to anticipatory thinking colored by previous experience or by hearing the experiences of others. The notion that various food combinations cannot be eaten at the same meal, or that particular foods cannot be eaten with impunity occurs because of a lack of knowledge of physiology. The bugaboo of sea food and ice cream, certain kinds of fruit and milk products, acidosis and other common gastric ailments need not give the average person any difficulty provided they reorganize their ideas concerning the harmfulness of these foods.

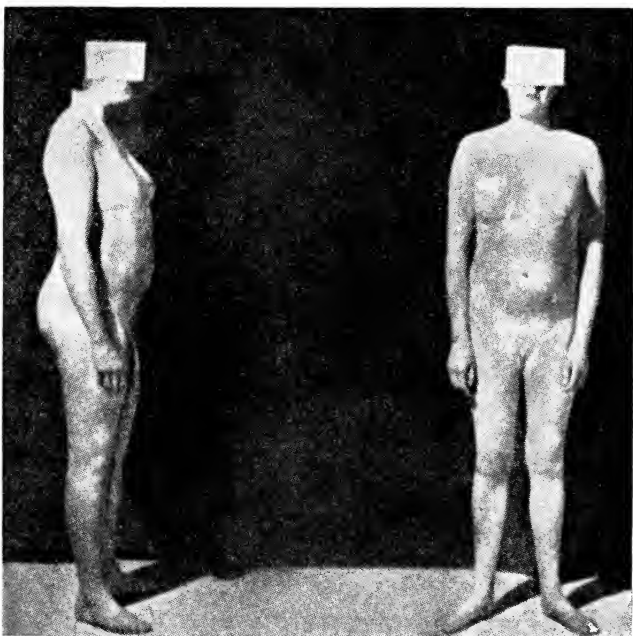
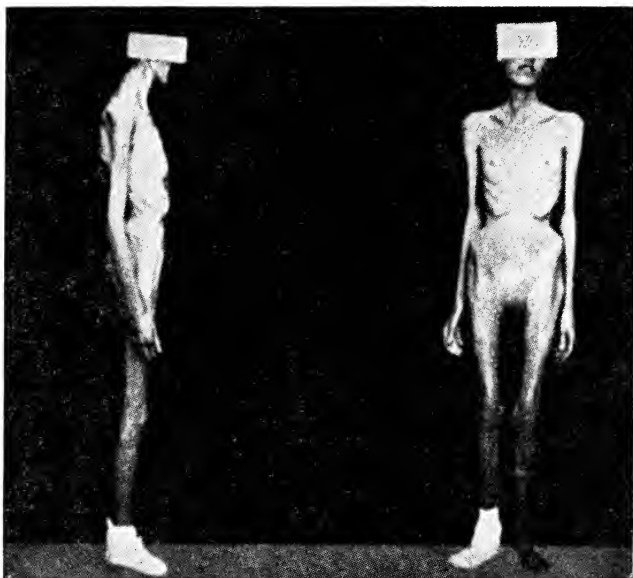


PLATE III

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The abnormal individual under appropriate ideational conditions would probably lose the desire for all kinds of food. This seems to be true in many cases of hysteria and depressive states in which phobias play a dominant rôle.

Fenichel (493) of the psychoanalytical school contends that if oral impulses are subjected to repression, inhibition of food intake, unconsciously reminiscent of the objects desired by the repressed oral-erotic strivings, occurs. These oral inhibitions may be displaced onto other activities with a hidden oral meaning, such as drinking, smoking, social activities or reading. His position is made clear in the following quotation:²

“Orality, as the oldest field of instinctual conflicts, can be used later on to express any other instinctual conflicts, especially if experiences in infancy have left an oral fixation that facilitates a displacement from subsequent frustrations (primal scenes, birth of siblings) to oral conflicts. Any conflict between activity and receptivity may result in eating disturbances. Since parents who have had difficulties in helping their children to make an adequate adjustment on an oral level usually have difficulties again in training their children for cleanliness, and since, among the anal frustrations, the prohibition of taking feces into the mouth is especially stressed, it is understandable that anal conflicts, too, may be expressed by children through oral inhibitions, through inhibitions in eating, as well as through inhibitions in speech. If a refusal to eat has an especially stubborn character, expressing primarily the attitude ‘I will not let myself be controlled; I eat when and what I like’, then anal components are mainly involved.

In the genital sphere, eating usually has the unconscious significance of ‘becoming pregnant,’ and this equation, too, may cause various inhibitions in eating. Since a high percentage of all oral pregnancy theories are based on the belief that the woman eats the man’s penis, revenge types of feminine castration complexes, if inhibited may also result in eating inhibitions.

Specifically disliked kinds of food unconsciously symbolize milk, breast, penis, or feces. However, a refusal of food does not necessarily represent a repression of eating cravings. A specific food may be rejected obstinately because it is not the desired one: ‘I do not want this food but that’; or ‘I do not want food but love (or penis, or a child).’ In this instance, it is not a drive that is refused but the acceptance of a substitute.

Specific eating taboos may secondarily become rationalized or idealized. It is cruel to eat animals, or dirty or unhygienic to eat this or that. Rationalizations of this kind are often suggested by modern food theories which tend to prohibit naive sexual pleasure in food and to connect eating with the superego sphere. You are not supposed to eat what is good but rather ‘what is good for you.’

If an eating taboo in later life is neither rationalized nor fixated in ego-dystonic conversions like vomiting or spasms of the jaws but becomes the core of a more or less ego-syntonic pathological behavior, this is called anorexia nervosa. Anorexia regularly can be traced back to eating disturbances in childhood which under certain libido-economic

² Fenichel, O. Reprinted by permission from *The Psychoanalytic Theory of Neurosis*. W. W. Norton Co., 1945.

circumstances are subsequently taken up again. Like the disturbances in childhood, later anorexias, too, may have a very different dynamic significance. It may be a simple hysterical symptom expressing the fear of an orally perceived pregnancy or of unconscious sadistic wishes. It may be a part of an ascetic reaction formation in a compulsion neurosis. It may be an affect equivalent in a depression, in which the symptom of refusal of food makes its appearance before other signs of the depression are developed. It may be a sign of the refusal of any contact with the objective world in an incipient schizophrenia."

The varieties of ideation that affect the desire for food adversely are too numerous to treat further. These forms of lack of desire for food may be overcome by a systematization of the ideational processes and by substitution of the secondary desires to strengthen the food purposes.

The ideational factors which operate in building up excesses in the desire for food are really factors which influence predominantly the way in which normal desires are satisfied.

Habits are influential in determining modes of satisfaction. We eat many times when we are not hungry, the purpose being reenforced by such desires as conformity, activity and the amatory desire. Habits once established through any one of the secondary desires may arouse indirectly the primary desire of food. Katz (494) has shown that environmental influences are very potent in the satiation of a desire for food. A hen under the same condition of hunger will eat less from a large pile of food than from a small pile and after apparent satisfaction of hunger will eat again if other hens begin eating. Likewise if offered another kind of food the hen will begin eating again and may repeat the process for as many as five or six varieties. She will also eat more of mixed than unmixed food. These facts are in agreement with those observed in humans. Morse and Chittenden (495) have found that children eat more efficiently when served a medium helping rather than a small or large helping. It is obvious then that the alimentary desire can be partially regulated through habits established and through the control of the secondary desires. The perversions of the alimentary desires are not numerous although the desire for a specific kind of food or liquid varies widely for different individuals. Parorexia is the most usual perversion of the desire for food. This is usually ascribed to the ideational factors accompanying the hunger appet, although the condition may be referred to the actual tissue needs. Rats' tendency to eat lead under certain conditions, the eating of bones by cattle whose diet is poor in phosphorous and eating of wool by sheep indicate that these perversions are due to chemical needs. The consumption of clay, glass, stones and other non-nutritious materials in time of famine by

humans can be attributed to the thwarting of the normal desire for food. Perversion arises in some humans in spite of the fact that all chemical needs of the organism are available. These perversions can be explained only by ideational factors. It is possible that the collecting mania with greed and avarice are perversions of the alimentary desires. The lack of satisfaction of the alimentary desires among misers is well known.

Psychoanalysts hold that greed of any kind is directly traceable to oral eroticism. Oral eroticism is first concerned with the pleasurable feelings engendered by autoerotic stimulation of the lips, tongue, etc. This is shifted later to the incorporation of objects into the body. By incorporation into the body, union of the objects takes place, or the individuals obtain primary identification with the object. Thus, with individuals fixated at the oral level, many kinds of collecting activities are ascribed to this principle. There are cases in which the individuals pursue similar behavior, although the behavior itself is now dependent upon anal factors. These anal characteristics grow out of conflict over cleanliness and such matters as toilet training. The child possesses the power to postpone or gains mastery over both his instinctual drives (anal gratification) or the omnipotent adult (environment). Frugality is a continuation of anal habit of retention. Obstnacy is a striving for a feeling of mastery over environment and restriction of self esteem, and may be centered in the habit of fecal retention. Money like feces represents mastery over environment in that the individual can retain both money and feces until disposed to get rid of them. Money then becomes an object of pleasure.

Animals tend to hoard food under appropriate internal stress and environmental conditions. Hunt (496) separated litter mate rats about four weeks old into two groups. One group was allowed unlimited food, and the food of the other group was restricted. After about five months of unlimited food for both groups, it was found that the group in which food was restricted in early life hoarded about two and one half times as many food pellets as the unrestricted group. Stellar (497) has carried this form of investigation into the physiological factors that may be in operation. Since the amount of hoarding was related to food deprivation, he assumed that the activity may be related to tissue concentration of carbohydrates. He therefore argued that glucose and epinephrine may decrease hoarding by raising the carbohydrate concentration in the blood, muscles, and liver; that insulin, which has an opposite effect, may increase hoarding. Groups of rats

injected with these drugs partially substantiated his hypothesis. Epinephrine increased hoarding, but insulin and glucose had little effect.

Hunt, Schlosberg, Solomon and Stellar (498) in extending earlier experimentation demonstrated that satiated adult animals showed little hoarding even though they experienced frustration; they did, however, eat more during the adult feeding frustration trials. This suggested to the authors that eating and hoarding could be regarded as alternate expressions of infantile feeding frustrations. Bindra (499) also concluded that hoarding of preferred foods is more prevalent. This partially substantiates the previous workers' conclusion that hoarding and appetite are alternate forms of behavior, but he concluded that a physiological basis was not necessary for hoarding behavior.

The rôle played by the alimentary desires in feelings of various kinds will be considered later in this chapter.

EXCRETORY DESIRE

The excretory activities are not restricted to a single process of the bladder and rectum. The arousal of these activities are dependent upon a complex of activities associated with pressure upon the nerve endings in these organs. Normally, defecation and urination occur upon stimulation. Many physiological factors control the rate of excretion of urine which in turn influences the pressure resulting in the bladder. The size of the bladder and the strength of the muscles of the bladder walls and of the sphincter will also partially determine the frequency. Although the urinary and defecatory functions may proceed under physiological stimulation alone, if the ideational factors are allowed to disintegrate, these functions tend to become disordered. The importance of the ideational element is demonstrated clearly by the inability to urinate under unusual circumstances. The use of running water by physicians when collecting specimens is nothing more than the reestablishing of the ideational or associated factors with the physiological process. The most frequent disorders of the urinary functions are retention of urine (anuresis) and the incontinence of urine (enuresis). Retention of urine occurs with many febrile diseases. Ideational factors will not ordinarily cause retention for long periods of time since the discomfort occasioned by bladder distention becomes very acute.

Some principles of a similar nature to those mentioned in connection with the retention of feces could be applied to the retention of urine. These will not be elaborated further.

Enuresis, on the contrary, seems to be decidedly influenced by idea-

tional factors. The involuntary voiding of urine may occur at any time during the day or night, and the methods of dealing with these two varieties of enuresis must be appropriately met. Enuresis is always encountered in infants. With proper training both the nocturnal and diurnal types are usually overcome before the end of the third year; in some cases the diurnal enuresis may be voluntarily controlled as early as the tenth month. Maturation of the higher centers of the brain is required before the reflex action of the bladder is brought under control. Lack of maturation or development which is found in idiots and imbeciles prevents these individuals from ever gaining voluntary control of the functions. The instability and the inhibition of the higher centers is related to the lumbar centers in such a way that any imbalance between them may result in incontinence. Hyper-acidity of the urine combined with weak cerebral inhibition may readily result in enuresis. In the majority of cases of enuresis, the underlying physiological cause cannot be determined. Stuttering enuresis belongs to this category; it is so named since it compares with the act of stuttering and many other tics. There is incoördination of neural innervation of the sphincter muscles and the muscles of the bladder.

Thorne (500) studied the incidence of nocturnal enuresis after age 5 in 1000 consecutive army selectees and found that 16 per cent reported the condition after this age. Two and five tenths per cent did not gain bladder control until after 18 years. There was evidence of associated neurosis or mental disturbance in 63 per cent of these cases. Among inmates of a school for mental defectives 83.8 per cent of idiots were troubled with nocturnal enuresis.

Mowrer and Mowrer (501) and Smith (502) have summarized the theories of and treatment for enuresis.

The general theories are as follows:

1. Enuresis is a neurotic symptom whereby the child gains sexual satisfaction.
2. Enuresis is a form of conversion hysteria in which deep-seated anxiety is converted into a physical dysfunction.
3. Enuresis is a habit engaged in whereby the child gains the right of self-assertion or retaliation; i.e. it is a form of compensation.
4. Enuresis is due to inadequate training.

The first of these theories assumes that urination is a pleasurable biological function. Observations that a full bladder may produce an erection during sleep and that male infants have tumescence even during the waking hours when urination takes place have been used in the arguments that urination is definitely symptomatic of or a substitute

for sexual expression. Another symptom used as evidence in connection with the theory is the convenience dream. A quotation from Mowrer and Mowrer will make this point clear: "enuretic children very often have the most vivid 'dreams of convenience' just before or during the act of urinating in bed. Under these circumstances, the sleeping child, instead of awakening to the stimulation produced by a distended bladder, fancies himself in a toilet, swimming in a pool, at the beach, alone in the forest or in some other secluded place where urination, which he now indulges in, would be allowable; in this way the child dismisses the otherwise disturbing fact that he is in bed and avoids the discomfort of awakening and really going to the toilet."

That there is anything sexual in these dreams is improbable. The dreams can be explained on a basis of nervous excitation originating in the bladder which arouses ideational processes in the cerebral hemispheres, but which is not of sufficient intensity to set off the urinary reflex.

The essential points of the second, third, and fourth theories are embodied in the subsequent quotations from the source previously given. In regard to the second theory they state: "Fearfulness has often been assumed to be a primary cause of enuresis, and it may indeed be in some cases; but what would seem to be more frequently true is that the enuresis is the primary condition and fearfulness a *consequence*, arising from the threats and punishments which are often resorted to by adults in attempting to eliminate this condition. Many children have been so harshly dealt with in connection with toilet training that they live in real terror of nocturnal lapses; and once the disgracefulness of bed-wetting, as reflected by the attitudes of adults, is accepted by the child and "internalized," a kind of vicious circle is often set up, the enuresis creating greater shame and apprehensiveness, which in turn may further aggravate the enuresis. In such cases it seems reasonable to infer that the enuresis can be eliminated or at least materially helped by relieving the child of his old anxieties; but this is usually a long tedious process."

The third theory, similar to the first and second, is formed on the fact that enuresis is a symptom of some personality disorder. This theory has been summarized by Mowrer and Mowrer in the following manner: "Slowness in the acquisition of socially approved habits of elimination and periodic lapses in the exercise of these habits seem to be a form of self-assertion and retaliation by the infantile personality. The child who has discovered how effectively he can outrage the surrogates of the culture who are assigned to him in the form of his father and mother by the act of nocturnal enuresis, an act which is committed

while he is asleep and therefore one for which he is usually not held fully accountable, has at his disposal a peculiarly effective outlet for his resentments: in this act he achieves real retaliation and at the same time tends to avoid the consequences which would follow if he committed an equally annoying act during his waking hours."

The fourth theory seems the most plausible. The child who has not learned bladder control has as yet not been able to respond selectively to the impulses set up by a relatively slightly distended bladder and the numerous other proprioceptive and exteroceptive stimuli that occur during sleep. This same situation may hold true for diurnal enuresis. If enuresis is to be overcome, some special training or some cues must be given that will enable the child to learn to respond selectively to the bladder clues.

A wide variety of curative measures have been attempted. The measures include drugs, hormones, diets, operations, irrigations, suggestion, analysis and habit training. Kugelmass' experiment (503) on the use of androgen therapy is typical of these studies. Seventy-five cases with or without emotional difficulty which failed to respond to other forms of therapy were administered either methyl testosterone or testosterone propionate. Fifty-nine were cured; 10 were improved; and 6 failed to benefit. If these results can be duplicated, this approach seems to be the best form of therapy available and casts doubt upon much of the psychoanalytical and psychological theorizing. All of the methods have been attended by some success according to their proponents. Which method of treatment should be used will depend somewhat upon the theory that one is defending.

For diurnal enuresis, Hermann (504) recommends that the individual practice urinating a small quantity, stopping at this point and repeating the process. In this way the patient trains himself in the voluntary execution of the act. Dunlap (505) has amplified this theory placing emphasis on the ideational processes in conjunction with the practice. Since emotion such as fear seems to be the cause in some cases, it is desirable to approach the problem from the point of view of kindly cooperation, rather than by prohibition and punishment.

Recently, the use of mechanical devices to indicate the moment when nocturnal urination commences have been introduced. These devices employ pads that will convey current when wet but will serve as non-conductors when dry. When the circuit is closed through moisture, a bell rings or a light flashes. The theory and practical application of these instruments in cases of enuresis is given in the Mowrer survey.

In general practice, in attempting to train bladder control, the child is awakened just before it would normally have to evacuate the bladder. In time, this awakening is associated with a particular bladder tension. With the new mechanical device, the maximal tension of the bladder rather than a somewhat lesser tension becomes associated with awakening and enuresis is overcome.

Restriction or limitation of liquids before bedtime may also be of practical advantage in nocturnal urination, as reported by Beyme (506).

Increased frequency of urination is found in old age; with prostate disease; with cystitis; and in nervous disorders. The quantity of urine voided may be small but due to increased irritability of the nervous system, the desire to urinate occurs more frequently.

AMOROUS AND REPRODUCTIVE DESIRES

The sex desire may be broken up into two more fundamental desires; namely, the desire for reproduction and the amorous desire.

The amatory desire is the desire for stimulation by a person of the opposite sex. This stimulation may involve any one of the special senses and does not necessarily give rise to a specific desire of coitus or even a general desire of coitus. The reproductive desire should be applied to sexual union for the specific purposes of procreation. The manner in which the amorous and reproductive desires are interwoven is determined to a certain extent by the processes that are common to both. There are at least three kinds of processes related to the arousal of these desires: (a) reproductive processes, (b) the genital processes and (c) amatory processes. These processes correspond closely to physiological conditions of the organism and the appet for the arousal of the desire may be localized in some aspect of one of the processes.

The reproductive processes include the implantation of the spermatozoa, fertilization, gestation and parturition. Although the amatory processes may share a part in the reproduction process, they are not strictly amatory if engaged in for the purpose of reproduction. In fact, the amatory processes cannot be identified in most cases as reproductive since coitus in general does not take place for the specific purpose of reproduction. No physiological processes occur in the implantation of the spermatozoa for fertilization beyond those that occur in the normal gratification of the amatory desire. This is probably true for both sexes since it is extremely doubtful whether ideational factors in any way influence the probability of fertilization unless coitus is voluntarily terminated by the male or unless contraceptive measures are undertaken. Some people

may argue that the reproductive desire would not arise without the inclusion of the amatory processes. This is, of course, a fallacious notion. Some humans with strong religious convictions indulge in coitus only for the specific purpose of reproduction. Stone (507) has demonstrated the initial copulatory response in rats even after the afferent impulses have been cut off from the skin of the anterior belly wall, the inguinal region, the ventral and lateral portions of the scrotum, the vibrissae, the visual, olfactory, and gustatory receptors. The destruction of the olfactory bulbs, the cortex of the frontal, parietal, and occipital regions of the cerebrum in rabbits does not inhibit the reproductive response. Beach (508) has found similar results with rats, although he believes that the cortex is essential in the female's tendency to solicit sexual attentions of the male. He states, in addition, that the neopallium is responsible for active exploration and pursuit of the sexual object by the animal playing the male rôle. These examples show the possibility of the activity of the reproductive processes even in the absence of what may be termed the amatory processes in animals.

The genital processes are those directly related to the genitalia. The stimulation and response of these organs are necessarily involved in *reproduction* and in *some* cases in the *amorous processes*. The *amorous processes* may be aroused in some instances without the genital processes. Normal genital stimulation is contact, pressure, friction, and possibly warmth. The response of the genitalia to stimulation is of a specific nature and differs qualitatively from the sensation derived from contact and pressure with other parts of the body. The receptors of the genitals produce sensations of an exciting nature, which differ in this respect from the sensations derived from the ordinary receptors for pressure and touch. The increase in or lack of sensitivity of the genitalia is highly important in explaining many anomalies of sex behavior. The actual sensitivity of the sex organs seems to be modified by the absence or presence of the amatory processes.

The effects of genital stimulation may be both local and general. The immediate local effects are those produced on the sex organs; the general effects are much more far reaching. It is possible that the general effects may be produced without the local effects and vice versa. The genital responses both localized and general include activities of all varieties of effectors, glandular, vascular, and muscular. Changes in respiration, the heart rate, secretion of the sweat glands and various glands of internal type, changes in circulation, and rhythmical muscular contractions are to be classed among the general effects. The more localized

effects are to be found in the sex organs and their accessory mechanisms. Many of these responses can be observed when the organism is stimulated through other sensory channels; hence it is obvious that all disorders arising in these response mechanisms cannot be attributed to the "sex" as the Freudians maintain.

The amatory processes are not as uniform in pattern as those of the reproductive and genital processes. The behavior characteristic of the amatory process is varied; it may or may not have as one of its chief components sex union. Certainly much of our amatory behavior is not directed toward this goal. Amatory behavior includes a rather complex group of social activities, such as dancing, going to the theatre, playing games, and conversation. One might list also more direct amatory behavior, such as kissing, fondling, caressing, primping and coquetting. Any activity of a heterosexual nature may be a part of the process. The variability of the process prevents further description and will be elaborated upon in discussing the amatory desire.

The physiological processes underlying these fundamental desires are difficult to analyze. Various physiological conditions have been held responsible, among which may be listed in the male, turgescence of the glans penis, general circulatory changes, secretions of the testes, possibly the secretion of the prostate and the fullness of the vas deferens. In the female, functions similar to those in the male may apply. The cyclic variation of the female, and the corresponding waxing and waning of the amorous desire have been observed from historical times. The physiological factors which produce menstruation have been carefully worked out and have been suggested as possible causes. One point, however, is still obscure. We cannot say with certainty whether the rise and fall of the amorous desire is due entirely to the physiological factors or whether it is due partially to anticipatory thinking in connection with moral precepts of uncleanness during the menstrual flow. The result is due in all probability to both factors. Eagleson (509) and Johnson (510) have demonstrated that there is a general lowering of efficiency both physiologically and psychologically shortly preceding and during the menstrual discharge and a marked increase immediately following which would probably influence both the amatory and reproductive desires.

The reproductive and amatory desires are so closely allied that any abnormality of the amatory desire may affect the reproductive desire and vice versa. Of course, the relation of the strength of the desire to the method of satisfaction does not necessarily develop with correspond-

ing steps. The ideational factors are of too great moment. If we assume that the amatory desire is normal and that the physiological and anatomical mechanisms are normal, unusual manifestations of the reproductive desire will be found. In a primitive system of civilization and among animals, the normal reproductive desire leads to as many offspring as possible. Since we are not living under such a system another criterion of normality of the reproductive desire must be employed. The average number of children of the American family is about 3.8. It is not fair to assume, however, that in families smaller or larger in size, the reproductive desire is weaker or stronger. What is probably the case is that the other desires are more or less gratified or are less intense or more intense.

The possibility of gratification of the desires for rest, activity and preëminence, will certainly modify the attitude toward reproduction. The poorer classes of our population have large families partially as a result of the lack of satisfaction of their other desires. Since reproduction occurs in many cases because of the intensity of the amatory desire even with a strong aversion toward reproduction, knowledge of contraception is probably even more important.

Deficiencies of the amatory desire may occur in both sexes although the female is more subject than the male. The deficiency is usually restricted to some particular pattern of the process or behavior. The term impotence is usually applied to male hyposexuality, while frigidity is applied to female deficiency. Frigidity sometimes referred to as *anesthesia sexualis* may be total or partial, congenital or acquired. The physiological development of the sexual organs and the muscle reflexes are essential for the development of the amorous desire and in spite of a normal development of these, there are cases of failure of the amatory desire. Frigidity may be expected in some cases of old age, before puberty and even for a period in some girls after marriage. Its disappearance in these latter cases may be expected with adequate development of the sex relations. Various factors may operate in causing acquired frigidity. Improper stimulation of the female genitalia, dyspareunia, painful stimulation due to laceration, and incomplete satisfaction due to withdrawal of the male sex organ may all produce frigidity. Fear of venereal disease, fear of pregnancy, and masturbation may be powerful factors in the development of the condition.

The Freudian school of analysts explains frigidity on one of several postulates: Anxiety about danger which is unconsciously associated with the sexual aim gives rise to the failure to achieve interest in general

sexual affairs or in experiencing the orgasm. One of the unconscious aims involves the Oedipus complex. The sexual partner may be compared with the father. Another fear is loss of control at time of climax, which may be unconsciously thought of as loss of control of the sphincters of the bladder and anus. A third area of difficulty stems out of the arrested development of the erogenous zones at the level of the clitoris, whereas development should normally proceed to the vagina. Since the former may be associated with practices of masturbation, guilt associated with these practices may inhibit sexual satisfaction.

Impotence, according to the Freudian analysts, is due to a physical condition arising from dangers to the ego. The ego derives sexual pleasure if such pleasure is not connected with danger. In the child, uncontrolled sexual aims are always subjected to threat from the environment, therefore sexual expression must be curtailed in many ways. The Oedipus complex again intrudes into the picture. The male becomes impotent because of a sensual attachment for the mother and prohibition of sensual interest in the mother is very intense. Feminine partners may not arouse interest either because they are inferior to the mother or because they represent the mother. Males with passive homosexual trends cannot achieve heterosexual relations because of the identification of themselves with women. Other analysts hold that impotence is engendered by organic deficiency which gives rise to a feeling of inferiority. Crider (511) claims that impotence is somewhat of a conditioned reaction in which the male has some anxiety about his sexual powers. In order to prove his virility he attempts intercourse with great apprehension, which tends to produce failure. The failure enhances the anxiety which simply increases the inability.

Wolbarst (512) in studying male potency felt that impotence in the husband was often influenced by the change in the physical appearance of the wife with age. If one accepts the Freudian viewpoint of mother identification, his contentions might have some import, since the wife may tend to become more similar to the mother as she grows older.

The strength of the amatory desire cannot be rated on any known scale. Davis (513), Huhner (514), and Terman (515) have attempted to determine norms for one aspect of the amatory desire. The measure which they have used is the number of times coitus is indulged in per week or month. Terman compared frequency of coitus and desired frequency of coitus for a "passionate" group of wives with a "non-passionate" group of wives. The frequency of coitus of the former group averaged 12.6 per month while the latter group averaged 3.6 per month.

The desire in the former group averaged 14.2 times per month and in the latter group 1.8 times per month. The data are unsatisfactory since most people reporting were those who had only one mate. It is almost certain that different stimulation may have resulted in quite a different quantitative expression of the amatory desire. Huhner, admitting that his data are open to criticism, finds that the sexual passion of sterile women is reduced in 40 per cent of the cases. Kinsey, Pomeroy, and Martin (516) give comparable data on the frequency of sexual outlets among males. They find the range from 0 per week to 29 per week, the mean 3.27 for males under 30 and the mean 2.34 for the total population of males. Some types of frigidity due to physiological or psychological causes can be corrected. Anesthesia sexualis due to excessive modesty may be alleviated to a certain extent by drugs which act on the higher neural centers or by erotic associations. The other extreme of the amatory desire is called satyriasis in the male and nymphomania in the female. These terms, however, imply pathological conditions and hence should not apply to those cases in which the amatory desire is very strong. In satyriasis and nymphomania the amatory desire is so powerful that it dominates the entire activity of the individuals. The actual causes may be local, cerebral, or psychological. Irritation of the sex organs may be the basic factor, or a lesion of the brain may set up reflex activity. On the other hand, constant reading of salacious literature or erotic day dreaming may be sufficient causes to bring it about.

The Freudians hold that hypersexuality is brought about by the lack of real satisfaction of the sex impulses. Deprived of real satisfaction the individual attempts again and again to obtain satisfaction but never succeeds in obtaining relaxation and relief of tensions. These individuals' sexual activities are primarily designed to overcome inner feelings of inferiority by proof of erotic success. Kinsey et al (517) call attention to mistaken notions of frequency of both hypo- and hypersexual outlets and stress, on the physiological side, such factors as age, metabolic level, nutrition, vitamins, and endocrine levels. Psychologically they stress the fact that frequency is controlled by conditioning through early experience, the nature of outlets, mores, occupation, education, and many other factors. In general, the picture is very complicated and the simple "analytic" explanations seem farfetched.

The other perversions of the amatory desire which will be discussed are (a) auto-erotism, (b) homosexuality, (c) fetichism, (d) sadism, (e) masochism, (f) zoöerasty, (g) pedophilia erotica, and (h) inspectionism.

Auto-erotism is self-stimulation of the sex processes. Although there are several forms of this behavior, our discussion will be confined to masturbation. The analysts have looked upon this practice as one stage of normal sexual development, and this assumption can be partially justified in view of the large number of both boys and girls who engage in the practice sporadically at some period in their lives. (Estimates range from 85 per cent to 96 per cent in males). Masturbation usually results from the deprivation of other outlets of the amatory desire. Some cases are caused by irritation of the prepuce, the urethra and possibly the prostate which stimulates the nerve centers connected with these regions. The sporadic practice cannot be held in abhorrence although it is not to be encouraged. No serious mental or physical damage has even been demonstrated except in habitual and confirmed cases. Habitual performance of the act continued into adult life may lead to difficult adjustment of married relations. Some authorities claim that masturbation may continue along with normal heterosexual relations; but this notion, along with the other notion that it produces debility, and insanity cannot be held too seriously. Berne (518) holds that masturbation is no more common among psychiatric cases than among the normal population. When it occurs, he believes that the therapist should adopt a reassuring attitude, since the problem is usually solved by eventual heterosexual relations. Continuation of the practice is a symptom of marital maladjustment rather than a cause. The cure of this habit is one that cannot be undertaken by the lay person, and should not be attempted.³

Homosexuality is the amorous desire for a person of the same sex and the amorous stimulation of a person of the same sex. The analysts hold that this is the second stage of normal sexual development. This is a fallacious notion since we have no proof that the majority of individuals pass through this period. Where the analysts tend to confuse the average reader is in the loose usage of the term homosexual. They apply it to any type of interest manifested by individuals of the same sex toward each other. Theoretically, then, any boy or girl who has any affection for a man or a woman is manifesting a homosexual tendency. All of us are homosexual according to this theory since we have group activities involving members of the same sex, such as clubs, schools, etc. It is ridiculous to call this behavior homosexual since no element of the amatory or reproductive desire is present. If these relations are to be

³ The readers are referred to *Habits: Their Making and Unmaking*, by Knight Dunlap, for a more detailed account of the habit.

considered as homosexual, then they are highly commendable and another term should be substituted which does not have such an undesirable connotation.

The term homosexual should be applied strictly to those practices in which the sex processes are definitely stimulated. These activities, while undesirable and harmful in many cases, cannot be said to be abnormal when engaged in sporadically. Kinsey (519) reported that 37 per cent of males have had some kind of homosexual experience and that the incidence is higher among males unmarried until the age of 35. Wheeler (520) found that among 100 patients of an outpatient psychiatric clinic (age range about 18-35) that homosexuality occurred as part of the problem in at least 50 per cent of the cases. The figures of Kinsey, Wheeler and Gardner agree fairly closely and seem in part to substantiate the Freudian viewpoint that homosexuality may be one of the stages of sex development. Kinsey stresses, however, the environmental and cultural factors in determining homosexual trends. The habit is quickly established when once initiated, and the means of its spread is through teaching. Its prevalence in the army, in schools, and other social and business organizations is usually the result of instruction from other individuals. It arises also because of the paucity of other means of outlet of the amatory desires. When once established, it results in the inability to adjust successfully in normal heterosexual relations.

The best preventive is to avoid contacts that are likely to lead to the habit. Beware of the older individual of the same sex who exhibits behavior toward you which you would likely exhibit to a member of the opposite sex. Avoidance of sleeping in contact with members of the same sex is also desirable since this may unintentionally lead to this practice. Acting rôles of members of the opposite sex leads, through ideational processes, to the practice in a few cases and should be indulged in only with extreme caution.

Intimate association with members of the same sex is *necessary* since many of our most valuable character attributes are formed in this manner. Beware, however, of the individual who is too solicitous, who displays jealousy of you or who attempts to make you obligated to him or her.

Other theories have been offered for explaining this abnormal form of behavior. The one mentioned earlier by the analysts holds that it is an arrested stage of development of the sex instinct. Gardner's study (521) on the relation between paranoia and homosexuality is quite

interesting in view of the Freudian contention that delusions of persecution in paranoia are due to unsuccessfully repressed homosexual tendencies. Gardner examined 120 consecutive admissions to a mental hospital all of whom were diagnosed as paranoid dementia praecox or as paranoid condition. He assumed the presence of homosexual drives if the patient had made homosexual attacks; if his delusions indicated that he was being attacked by others; or if his symbolisms showed unmistakable signs that his delusions had such a basis. It was found that in 45 per cent of the cases there were evidences that homosexual trends were in existence. Page and Warkentin (522) found that on the Terman-Miles Masculinity-Feminity Test paranoid men tend to respond like women and hence may be of the passive homosexual type. While these studies point to a relationship between the two conditions, they do not throw light on the mechanisms involved. Other theories hold that perverts of this type tend to have physical and mental characteristics of the opposite sex due to improper glandular development. There may be some truth in this statement since the behavior of animals can be modified by injection of hormones of the opposite sex. This will not account, however, for many of the cases and especially those who are initiated into the habit. Unpopularity with the same sex may lead to the assumption of characteristics of the other sex and into homosexual tendencies.

Thorpe and Katz (523) have summarized the Freudian point of view in a very succinct manner and their summary is quoted in the following section:⁴

"The psychoanalytic explanation of homosexuality is based on several factors. In men, a major factor is considered to be the influence of an earlier strong castration complex. In this regard Fenichel suggests that the thought of being without a genital organ is so terrifying that it may cause the individual in question to avoid any sexual relationships with a member of the opposite sex. Another etiological factor is the Oedipus complex. His strong emotional attachment to his mother has brought the now mature man to behave like her. He thus chooses as love-objects men (like himself) and treats them with the same fondness with which he had been treated by his mother. In some instances a man who, as a child, had no mother (or had a cruel and severe mother) may become overly attached to his father and thus predisposed toward seeking persons who resemble his father; in still other instances a cruel and severe father may have caused the individual to feel hateful and resentful toward him. This hostility is repressed because of guilt feelings, and the boy thus tends to show love for persons like the father.

In women, the process of homosexual development is similar to that in men. According to Fenichel, 'The sight of a (male genital organ) may create a fear of impending

⁴Thorpe and Katz. Reprinted by permission from *The Psychology of Abnormal Behavior*, Ronald Press Co., 1948.

violation; more frequently it mobilizes thoughts and emotions about the difference in physical appearance. These fears, thoughts, and emotions may disturb the capacity for sexual enjoyment to such a degree that sexual pleasure is possible only when there is no confrontation with a (male genital organ).' In some instances girls who were overly attached to their mothers regress to this early childhood pattern after unpleasant or unfavorable experiences with men in adolescence or adult life. In cases where the mother was cruel or severe, the repressed hostility and ensuing guilt feelings can give rise, as in the case of men, to a 'love for persons like mother.'"

The cure of this disorder is impossible unless the individual definitely is desirous of being cured. In the first place, detection is difficult and secondly the tendency to relapse is too great. Various methods have been tried, such as advising heterosexual indulgence which results in only a still graver condition. Hypnosis will cure some cases, but not others. The method outlined by Dunlap for curing stuttering has been successfully applied in some instances.

Fetishism is accompanied by an abnormal interest in objects associated with a person of the opposite sex and the desire for stimulation by those objects. The range of fetishisms runs the gamut from repeated reading of letters to collecting pieces of clothing or other objects identified with the opposite sex. The term has been used to include a much wider range of associated materials by some writers. It has been used to include the worship of idols, rituals and various other types of worship impelled by fear. At the present its use will be restricted to association with the amatory desire. There is a certain amount of normal interest which must not be construed as abnormal. It is only when the fetish assumes the proportion that it inhibits the usual processes of the amatory desire that it belongs in the latter category.

The development of this condition comes about through strictly psychological processes, especially in those cases where the ideational factors are sufficiently strong to arouse the sexual processes. Fetishism is considered by some theorists to be a defense against fear of being rejected by a member of the opposite sex, hence the substitution of an object that cannot reject or a part of the body against which there is no prohibition.

Sadism is a term identified with the hurting of or injury of the person who is the object of the individual's amatory desire. Masochism is the desire to be hurt or made to suffer by the person who is the object of the amatory desire. The ramifications of these sexual perversions are to be found in religious sacrifices, persecutions, self-mutilation, penance, martyrdom, and meekness. Although these may be the result of other desires, these actions are sometimes included in this group. There is no

sharp line of demarcation between the normal tendencies and the abnormal tendencies, since in courting, sadistic tendencies show up from time to time. For example, the young woman may very much desire a date, but refuses it since she will thereby make her suitor suffer. In some pathological cases, the masochist must be insulted, whipped or injured in order that he or she may become sexually excited.

It was stated earlier that the pattern of the amatory processes is quite variable; it is highly probable that these attempts to injure and to cause suffering reproduce some parts of the pattern which are usually involved in the amatory processes of the individual but which are relatively unimportant for the average person.

Various theories have been formulated for explaining these aberrations. These are summarized briefly in the following section:

Sadism:

(1) Results from conflict over sex matters. Early condemnation, prohibition and shame surrounding anything sexual inculcates attitude of disgust and shame for heterosexual relations. This causes avoidance and fear of such relationships. This fear results in hostility and aggression and the individual inflicts pain and injury upon the object that creates fear, disgust and shame.

(2) Results from insecurity arising from parental rejection and loss of parental love. Love object is identified with parent or parent figure and hostility is vented on such figure as compensation for hostility toward early life situation.

(3) Results from castration complex. Fear of loss of genitals is overcome by inflicting pain on others. If individuals are powerful enough to inflict punishment on others they need not fear infliction of punishment on themselves.

Masochism:

(1) Results from conflict over sex matters. Early training arouses disgust and shame over sex matters. Since shameful and disgusting activities are punished, the individual resorts to self-punishment. Punishment allows the individual to gain self esteem since it proclaims his superiority.

(2) Results from feeling of inferiority. The individual gains superiority over sex partner by demonstrating his ability to take punishment.

(3) Results from attempt to gain affection and love. The individual will tolerate humiliation and punishment to gain love or please his sex partner.

Exhibitionism and voyeurism are forms of sexual behavior engaged in by most normal people to a limited degree. The first type of behavior refers to exhibiting the sexual organs and the second type refers to inspecting the sexual organs or the secondary sex characteristics of the opposite sex. When this behavior is indulged in for the purpose of attaining sexual gratification to the exclusion of the other usual components of gratification it may be considered abnormal. Both of these aberrations are considered by the psychoanalysts to be defenses against inability to handle a threatening ego situation. Exhibitionism may arise because of feelings of inadequacy in sexual power. The individual overcomes this inadequacy by exhibiting the sex organs, thus restoring his confidence in himself. Another approach along similar lines lies in the basic fear of castration. Such fear is overcome by reassurance obtained by looking at the sex organs, which gives confidence that they are still present. Voyeurism or inspectionism arises out of a somewhat similar situation. The individual feels a fear of failure in heterosexual relations and protects himself or herself against this fear by simply looking at the opposite sex. They gain mastery over the opposite sex by this method but do not subject themselves to possible failure. The Freudians assume that by the process of looking they incorporate the other individual, thus identifying themselves with the other person and thereby gaining mastery over them.

Inspectionism arises in children as a result of curiosity in attempting to discover the functions of various parts of the body and may continue well into adolescence. Sex excitement may be engendered normally by this activity and as such cannot be construed as abnormal.

Zoöerasty (bestiality), necrophilia (technically, love for dead bodies but by general usage sexual relations with dead bodies) and pederasty are perversions in which the object of the amatory desire is an animal, a cadaver, or a child respectively.

Part of the confusion in the use of these terms has arisen because they have been applied strictly to one phase of the amatory process in some instances and to the lay usage of the term "love" in other instances. Normal mental development is an important factor in many of these cases. The maladjusted individual cannot compete with other normal individuals because of his enfeeblement. In cases of normal mentality, the usual outlets for the amatory desires are markedly cramped and the amatory desire is directed to the object or objects that offer least resistance.

Kinsey and his co-authors (524) in their survey have found what has been generally suspected, that bestiality occurs most frequently in the

rural areas. There is a paucity of normal heterosexual outlets and an abundance of animal outlets. This practice is probably more prevalent among males than among females, although there are records of females engaging in sex relations with animals. Very little is known about the psychological factors in the three conditions mentioned above, but psychopathological conditions, such as mental deficiency, senile deterioration, psychopathic personality, are often encountered as concomitants. Popular superstitions among certain classes of the population concerning the effectiveness of these forms of sexual activities in curing venereal disease will also account for a certain number of cases.

THE PARENTAL DESIRE

The parental desire is the outgrowth of several of the other fundamental desires. It must not be confused with the reproductive and amatory desires since these may function entirely separately. The usual sequence of the desires mentioned arises in somewhat of a chronological order. The reproductive desire may arise through preëminence or conformity in that either of the two sexes may wish to demonstrate that they are capable of bearing offspring. The parental desires per se have nothing to do with the physiological processes involved but center in the desire to possess and care for children. This is clearly shown in the activities of young children, who play the rôle of parents before the amatory desire develops. Since the parental desire is so uniform throughout the species, it seems feasible to list it as one of the fundamental desires. This desire may be modified in numerous ways. It may normally result in the adoption of children other than one's own; or the object of the desire may take the form of animals, dolls, or other helpless creatures. Deficiencies of the desire result in destruction of the offspring in animals and sometimes in humans. It is usually assumed that the parental desire of the male is weaker than that of the female, since in many of the lower animals the male destroys the offspring. In other animals the offspring is fed and guarded by both sexes. In mammals, the female must play the dominant rôle, since the mother nurses the young for a period of time. However, in humans we have no data to show that the parental desire is stronger in one sex than in the other. One perversion of the parental desire is technically called zoöphilia. The difficulty in distinguishing between a normal interest in animals and an abnormal interest (zoöphilia) is quite obvious. Interest in animals may exist along with non-modified parental desire. For example, among certain Malay tribes, women nurse pet pigs when they are nursing their children. Likewise civilized humans may have a keen interest in animals along

with a strong parental desire. The chief danger lies in the fact that the interest in animals may influence the direct manifestation of the parental desire, in that the processes may be sufficiently activated by these means. Women or men who lavish excessive care and attention on cats, dogs, or other animals may be suspected of substituting these objects as a means of satisfaction for children.

THE PRÛMINENCE DESIRE

The general attempt on the part of man to excel or stand apart from his fellow man is noticeable in all races of men both in history and at the present time. The ways that are adopted for accomplishing this purpose are so numerous that only a few examples can be given. An individual may desire to be outstanding in religion, politics, education, medicine or in any profession. Other individuals may gain preëminence through athletic prowess, ability to drink, notoriety in the press, dressing in latest fashions, being hated or being humble. The appet underlying this desire is still unknown, and consequently there may be some question as to its authenticity as a primary desire. This desire has features that are in keeping with the postulates of Adler concerning the lure of superiority.

Perversions of the desires for preëminence are very numerous. Adler's notion of the influence of organ inferiority on the will to power or superiority can readily be ascribed to perversions of the preëminence desire. It is possible that the actual organic basis of this desire lies in morphological development as Adler suggests. A physical defect may determine the direction of the manifestation of the desire for preëminence. Speech difficulties, blindness, deafness, or deformity may lead individuals to quite diverse kinds of behavior. Mental status, social standing, and economic standing will also play an important rôle in the whole situation. The paranoid may have his desire so modified that it is satisfied by ignoring facts. He becomes in his own mind the wealthiest man in the world, a great scientist, an inventor or some great historical character such as Jesus, Napoleon, Queen Victoria, or Lincoln. This form of activity compares with the usual activity of normal adults who derive vicarious satisfaction of their desires by identifying themselves with superior people or belonging to organizations which they feel are prominent organizations. Similarly, children are wont to satisfy their desire for preëminence by praising their parents or possessions.

In other cases the desire may be modified in a different way. The individual achieves satisfaction by thinking that he is worthy of merit but

that it is withheld through lack of appreciation by the group or specific groups. This general notion gives rise to delusions of persecution coupled with paranoid tendencies. Such an individual believes that he has been singled out by the group, and as a result he is oppressed by spies of the church, government, lodge, or his family who constantly harass him. Counterparts of these individuals can be found almost daily among so called normal people. They constantly blame others for their failures, insist that their failures are due to bad luck or to the fates. Individuals who believe that they merit promotion but whose promotion is withheld for lack of merit and individuals who always insist that the appointment which they kept at the wrong time was the mistake of some one else, are exhibiting tendencies of this kind.

Some perversions arise because of disappointment in securing preëminence through useful activities. In spite of the fact that the individual may possess beauty, be intelligent, or have wealth, these do not suffice since many other people have the same things. Ordinarily we might expect cultivation of these traits, and in many cases only these forms of securing attention are employed. The woman with a good figure attempts to display it and lavishes care on it. She may give special attention to the selection of clothing to show it off. The individual who possesses wealth may buy expensive cars or jewelry, and still another individual may recount his exploits to demonstrate his superior intelligence. When these usual outlets do not secure the recognition desired, reversion to unusual forms of activity occurs. Hobbies such as collecting canes, pistols, stamps, cigar bands, steins, china, clocks, and similar objects are engaged in because they make a showing. These are normal modifications of the preëminence desire which may become exaggerated.

Sometimes the modification of the preëminence desire takes the form of motor conspicuousness which is objectionable or annoying. This form of perversion includes exhibitionism, display of vanity, bizarreness in dress, loud speech in groups, stunts in public, and even unusual forms of murder. Exposure of anatomy on the stage, at the seashore and to a certain extent on the street for the general purpose of arousing the amatory processes of the opposite sex is not usually called exhibitionism. Exhibitionism is deriving satisfaction through exhibiting the sex organs. This form of behavior is more prevalent among men than women. It is part of the amatory process and is instigated to call attention to anatomical features usually concealed. Vanity is displayed by primping, by strutting in lobbies or before mirrors. Similarly, bizarreness in dress, boisterous or loud speech, and attracting attention in public by

any unusual activity are encountered on occasion in non-psychotic individuals, but in general, they are indicative of slight mental aberration. The so-called scientific murders, the planning of super crimes and their execution, especially when money is no consideration, are of the same type.

Becoming ill is a form of behavior that frequently goes over into an abnormal variety. Every one is familiar with the youngster who does not feel well as soon as he is not the focus of attention. The woman who likes to tell of her numerous ailments and the individual who speaks about his affliction that baffles all the physicians are trying to secure attention. In some cases, these individuals become wards of psychopathic hospitals and are called psychoneurotics. Habit has undoubtedly played a large rôle in the etiology of their difficulties.

DESIRE FOR CONFORMITY

This is the desire to belong to a group and to share in the group consciousness and group feelings. It is fundamental for social psychology although its ramifications are more difficult to trace in individual behavior. The appet of this desire cannot be localized with our present knowledge. Examples of the normal operation of the desire are shown by all social groups. Modifications exist to a certain extent in hermits, tramps, and in individuals who isolate themselves in so far as possible.

DESIRE FOR ACTIVITY

The desire for activity and the desire for rest may be viewed reasonably as two phases of a single desire for which no adequate name is available. Practically, a state of equilibrium is never reached between these two desires, since the physiological state of the muscles is constantly changing. In one state of the muscles, the desire for rest occurs. The appet for these desires may be localized tentatively in the muscles. Activity or rest may proceed upon initiation without the ideational processes although rest is more likely to take place under these circumstances than is activity.

The activity desire is less influenced by other desires in children since food, shelter, and the sex desires are satiated with little effort or else have not assumed a prominent position in the galaxy of desires. The activity desire itself needs further discussion and can be treated independently of the desire for rest. It has been stated previously that activity may be initiated and may occur under the influence of the appet alone. The question, then, that has to be answered is what is the general condition

of the organism? Various theories have been advanced to explain this. They have been developed primarily upon the basis of what happens to a muscle or the nerve innervating it after it has been active. Increase in available glycogen, increase in the blood sugar level or a chemical change in the neural structure have all been assigned as possible interoceptive or proprioceptive stimuli. The actual condition may be localized in a specific muscle group or non-localized, resulting in general feeling of well being and possibly euphoria. Richter (525) and Smith (526) in their work on monkeys and guinea pigs have shown that the frontal lobes function in the mediation of activity. Removal of the frontal areas of the cortex results in a significant increase in activity. Although the appet contributes to the desire, the more important aspect of the desire remains to be explained.

The type of activity engaged in for the satisfaction of the desire will be controlled to a large extent by ideational factors and the relative intensity of other desires. In fact, the activity desire may arise in adults by way of the desire for food, protection, etc. It is difficult to think of any type of activity of adults that cannot possibly be explained on a basis of satisfying one of the other primary desires. Playing golf, gymnastics and walking may be attributed to the desire for preëminence or to the amatory desire. By these methods, the individual wishes to excel in physical fitness. If babies or animals are observed, however, it can be seen readily that they engage in activity. Babies constantly make many random as well as semi-coördinated movements. Rats will exercise voluntarily in revolving cages even though they are bountifully supplied with food and water; likewise they will exercise either in isolation or when maintained in groups. The factors influencing activity have been most carefully studied with rats. Diet, water, atmospheric condition, age, sex and the estrus rhythm play important rôles in the amount of activity taken. Casual observations on humans tend to substantiate the inferences that may be drawn from animal experimentation. Modification of the desire for activity results in increased activity, decreased activity and inimical forms of activity. The difficulty of determining whether the modified activity is a direct result of the desire for activity or whether the activity results from some abnormality of another desire is tremendous. The marathon runner is certainly not manifesting an abnormality of the desire for preëminence. It is probable that some manics have an excessive desire for activity. Whether the nature of the excess is ideational or due to the appet is not known at present. In Graves' disease (exophthalmic goiter) excess activity may be shown.

The symptoms of this disease are characterized by nervousness, tachycardia, tremor, and sometimes emotional disturbances. These symptoms seem to stimulate further glandular activity which in turn aggravates the symptoms so that a vicious circle is established. Fortunately, this disease can be adequately controlled by proper medical treatment. In some of these cases, at least, the appet seems to be weak since medical treatment will partially alleviate the condition. The administration of carbon dioxide and the use of colloids produce at least temporary improvement in some psychopathic patients. Similarly some obese individuals show a lack of the desire for activity. The appet may be affected since the muscles may be weakened by the increased demands to supply the fatty tissue. On the contrary, ideational factors may inhibit the desire since these individuals are not usually graceful in their muscular coördination.

THE DESIRE FOR REST

The appet for rest is undoubtedly a condition of the muscles. Where the initial action occurs is still conjectural. Some authorities ascribe fatigue to using up the available glycogen in the muscles, others to the freeing of lactic acid and still others to various toxins manufactured during the process of muscular activity. Theories have been based on the circulation of toxins in the blood stream which in turn change the resistance at the synapses or produce some change in the nerve cell itself. Evidence can be furnished in support of all these theories. In spite of the divergence of views held concerning the actual causal factor, all of the theorists agree that the causal agents are removed by rest or quiescence and during sleep. Physical rest and so called mental rest are desired quite independently of each other which complicates the analysis of the appet for the desire. If the view is taken that motor responses are always involved in thinking or ideation, then the postulation that different sets of muscles are involved will have to be made. If mental fatigue involves only fatigue of neurons, then the innervation of muscles cannot be explained, or the assumption must be made that the neural pathways involved in thinking differ from those employed in physical exercise. The evidence on this point is clear cut since mental fatigue seems to be dissipated through physical activity. Experiments by Gray (527) on animals bear out the contention. He exhausted rats by forcing them to run in cylindrical cages until they could scarcely stand and then tested them on maze learning. These animals showed a slight superiority to non-fatigued animals. Nicholson's (528) work

with hypnotized subjects indicates that different central neural pathways may be involved in innervating the same muscular response since fatigue produced under hypnosis was only partially carried over into the normal state and vice-versa. Ideation and the spread of the other desires markedly influence the rate of fatigue and the desire for rest. Experiments have shown that factory workers tire at about the same time of day, regardless of the number of hours that have elapsed since beginning work. Rats show similar tendencies in the time at which they are most active. Everyone is familiar with the fact that one's desire for sleep conforms to well-established habits. These habits of feeling tired or desire for rest can be altered with slight motivation. Monetary compensation for long work, or fear of punishment will readily overcome the usual onset of fatigue. The explanation offered is that reserve energy which is not usually utilized is expended.

Recovery from fatigue normally is brought about through metabolic processes which are capable of meeting the requirements of activity. In some instances, however, the rate of recovery is slower than the rate of fatigue and a chronic condition ensues or exhaustion sets in. Under these circumstances, undue pressure may be put on various vital parts of the organism and result in a general breakdown. Fortunately, the desire for rest intervenes in most instances before any serious damage is done, and the organism is restored. There is such a wide variety of diseases which affect the appet, i.e., increase the desire for rest or induce unusual fatigue that it is impossible to go into these in detail. Malnutrition due to faulty metabolism, febrile diseases, local inflammatory conditions and dysfunctioning of the special senses are sufficient causes to produce the effects previously described. Endocrine dysfunction plays a prominent rôle in the desire for rest. The injection of adrenalin, ephedrine and extract of adrenal cortex act as partial antidotes to fatigue, and the inference might be made that lack of products similar to these may favor the onset of fatigue. The hormones of the sex glands have been shown to be influential. Castrated male rats and ovariectomized female rats decrease their voluntary activity. Huhner (529) has emphasized the importance of prostatic irritation and disorders of the sexual function in some neurasthenic and psychasthenic patients. He attributes the sexual disorders related to these mental diseases as being due to exhaustion of the neural centers.

The action of benzedrine, amphetamine, pervirtin on overcoming the effects of fatigue have been studied. Alwall (530) (531) showed that soldiers fatigued by three nights of prolonged marching with little

intervening sleep during the day did not have the subjective symptoms of fatigue when given 20 to 30 mgm. of benzedrine or 18 mgm. of pervirtin. Rudolph (532) administered amphetamine to fatigued and depressed individuals and found that the substance tends to remove fatigue and the less severe depressions. There was an increase in self confidence and hope, although there was some tiredness following the amphetamine periods. The duration of the beneficial effects varied for individuals. Pemphigus produces a depressive influence on maze behavior, rope walking, and climbing in rats, according to Macht and Insley (533). Pemphigus serum injected into rats seems to cause an invasion of the central nervous system and this disease should be viewed as having a more extended effect than the mild dermatitis exhibited.

The ideational factors which tend to bring about abnormalities of the desire for rest are usually centered in vague fears and anxiety. The anticipatory thinking may have in some instances a factual basis, that is some organic difficulty may have existed. In some cases, after the organic difficulty has been removed, the individual persists in resting in spite of the fact that rest is not needed. Invalidism has been explained by many authorities as the individual's failure to adjust to environmental factors, such as marriage, home and working conditions, as well as to other desires. Menninger (534) contends that rest is much abused in psychiatric situations. Complaints of overexertion are symptomatic of illness, rather than the cause.

Hollingsworth's redintegration theory, and Hurst's inattention theory present the theoretical bases necessary to explain such behavior. Neurasthenia, anxiety neurosis and psychasthenia are recognized clinical disorders, the etiology of which may be attributed to disorders of the desire for rest. The clinical symptoms presented by patients of these types resemble actual fatigue or exhaustion states. The organic conditions which accompany true fatigue are lacking however. Memory of previous fatigue may be the cause since in most of these patients a history of physical illness may be found. Sherry's (535) work shows that these patients when properly motivated are capable of doing tasks requiring sustained efforts. Their work curves in gripping a dynamometer and tapping are comparable to those of normal individuals. The outstanding feature of these clinical types is the marked difference between the appet and their anticipatory thinking. Some of the patients think that the slightest activity will exhaust them, while the facts show that they are quite capable of indulging in normal physical and mental activity. Even normal people show a wide discrepancy between their

subjective fatigue estimates and the actual amount of work done. We have very poor tests for measuring the extent of fatigue or recovery from it. Brozek and Keys (536) have attempted to use flicker-fusion frequency as a sensitive measure for fatigue. They found, however, that such frequency is at best only a very gross measure. Further discussion of these cases will be presented in a later chapter.

FEELINGS AND EMOTIONS

Feelings and emotions are experiential facts. They are comparable to sensations in that they are initiated by stimulation of receptors and terminate in response. Feelings are usually distinguished from emotions in that they are more complex particularly with reference to the content of the conscious experience. A few examples may enable the reader to comprehend the relation between sensation, feeling and emotion. If sugar is placed in the mouth, the sensation of sweet may occur as well as a feeling of pleasantness. If music is heard, the sensations are of tonal qualities and the feeling aroused may be unpleasantness. The student who asks the instructor for his grade at the end of the term and is told that he has been loafing and shows little promise as a student and in addition has failed, will have the auditory sensations of the words spoken, a probable feeling of depression and possibly an emotion of anger. The essential characteristics of feeling are its vagueness and lack of localization. It lasts for a considerable period of time after the disappearance of the stimulus; and it is not localizable in space nor can it be referred to body surface as in the case of sensations. The receptors are usually said to be free nerve endings in the viscera and soma. The viscera are probably the most important source of feeling, and consequently the afferent autonomic system is the vehicle for the sensory system. Included in the afferent system are nerve terminals in the skin, striped muscles, the mesenteries, peritoneum, the connective tissue of the heart and blood vessels, esophagus, stomach, intestines, kidneys, bladder, and generative organs. The afferent current derived from these sources must go somewhere and must produce important effects. The effects produced may be activity of the striped muscles, particularly if perceptual and thought reactions are involved, or they may be glandular or of the smooth muscle variety. If these latter responses predominate, the efferent part of the autonomic system is involved.

The method of connecting afferent impulses with efferent impulses has been the source of much controversy. The view generally held at the present time is that the appropriate cortical sensory area

must be intact. In addition, a portion of the thalamus must be intact; otherwise there is a loss of affective experience or incoördination between the affective experience and the response. The importance of the thalamus has been emphasized by the work of Bechterev, Goltz, Déjérine and Roussy, Head, Cushing, Cannon and others.⁵ Bechterev (537) showed that transection of the region of the thalamus results in almost complete abolition of the characteristic emotional response in dogs, whereas deprivation of the cerebral hemispheres left these responses intact. Under the latter condition, painful stimulation in the region of the face evoked snarling and retraction of the corners of the mouth. Stroking of the back produced the usual pleasant responses including, in some instances, tail wagging. Goltz (538) removed both hemispheres of a dog and observed his behavior for a period of approximately eighteen months after the operation. A wide variety of stimuli, including both those that would invariably arouse anger or rage and those that would not, produced excessive overt behavior characteristically associated with excitement or anger and rage. Handling by the experimenter or running against an object were adequate for invoking the response. Goltz felt that the tendency toward activity or excitement was much stronger than the tendency to exhibit peaceful behavior characteristic of quiet or pleasant feelings. Cannon and Britten (539), and Bard (540) have noted the behavior of cats following cortical ablation. These animals retained the motor activities usually exhibited when defending themselves or when they are restrained by mechanical means. Erection of the hair on the tail, extension of the claws, lashing of the tail and disturbance of respiration and breathing were observed. Harlow and Stagner (541) give accounts of cases by Marchand and Chatagan and by Roussy and Lhermette. The former report a case in which phobias, anxiety and depression occurred with an involvement of the hypothalamus. The latter report the case of a girl who, prior to the onset of the neural involvement of the tuberian region, had been active and gay but who became suicidal, withdrawn and taciturn. Feuchtwanger, (542) in his extensive study of frontal lobe injuries, indicated that changes in feeling and emotions are likely to occur unless the connections between the thalamus and cortex are intact. Head and Holmes, (543) in comparing patients with optic thalamus lesions, observed that cortical lesions produced inability to make two point discrimination, thermal discrimina-

⁵ For a more extended treatment of feelings and emotions, the following books are suggested. James and Lange: *Emotions. Psychology Classics*, 1922; Wittenburg Symposium: *Feelings and Emotions*, 1928; Beebe-Center: *Pleasantness and Unpleasantness*, 1932.

tion and partially destroyed kinesthetic sensations. Pain and touch sensibility were left intact or reduced only slightly. Thalamus lesions produced, on the contrary, practically no disturbances of sensation. There was an excessive response to affective stimuli. Any sensory impulse strong enough to arouse consciousness would produce over loading of affective response. Those patients in whom the lesion affected only one half of the body gave a greater response on the side affected by the lesion in spite of the gross loss of sensation. There was marked discrepancy between the manifestation of both pleasant and unpleasant feelings and the sensations derived from the stimuli. For example, if one half of the face was involved, a pin prick on that half gave rise to behavior characteristic of extreme unpleasantness, whereas on the uninvolved side no observable behavior could be detected which would be indicative of unpleasantness. The application of warm objects to the affected areas produced feelings of pleasantness which were observable by the behavior of the individual. These same stimuli produced a marked response on the unaffected area. In general, it may be said that loss of the cerebral hemispheres does not deprive the animal of ability to show expressive behavior of feelings, while loss of the thalamus deprives the animal of expressive behavior characteristic of pleasantness and unpleasantness. That the cortical areas exert a mediating influence on the activities of the thalamus can be readily ascertained from the studies of Moniz (544). Freeman and Watts (545), and Rees (546) have performed prefrontal leucotomy (division of fibers connecting the frontal lobe with the thalamus) as a means of relieving psychotic symptoms. In patients suffering from anxiety due to mental conflict, groundless fears, suicidal tendencies, self-mutilation, destructiveness and violence, severance of fibers connecting the prefrontal lobe from the thalamus may entirely relieve many of these symptoms. Those cases in whom delusions are well organized may be relieved of their worries and tensions associated with the delusions even though the delusions remain. The prefrontal lobes then may be regarded as playing an important rôle in emotions. The neural bases of emotional response cannot be said to be of more significance than the psychological functions involved. The question that needs consideration is whether emotional responses are native, that is instinctive, or are they learned and do they become habitual? For example, do cats arch their backs, spit and lash their tails when confronted by a dog, without learning? Does the human weep and feel sorrowful at the death of a relative except through a long process of experience?

Watson's (547) early experiments with infants led him to conclude

that there were three innate patterns of emotional response present at birth; (a) love, which included behavior such as gurgling and cooing, (b) fear, characterized by catching the breath, grasping and crying and (c) rage, manifested by movements to free the organism and movements somewhat similar to those in fear. The validity of these patterns as indicative of emotional response has been attacked by the work of Sherman (548) who found that competent judges could not agree on the nature of the emotion portrayed nor the stimuli which probably produced the responses. The work of Pratt, Nelson, and Sun (549) and of Bryan (550) indicates that these so-called emotional responses are parts of the complete repertoire of the infant and that there is a high probability that the responses are common to many other varieties of stimuli which do not involve the emotions set forth by Watson. Characteristic patterns of response are probably built upon experience but, even in adults it is hazardous to guess the specific type of emotion exhibited. Many experimenters have attempted to analyze the emotions from facial expression. In general the ability to judge portrayed emotion is fairly accurate although most of the early experiments were made with simulated emotions. Ruckmick (551) and Dunlap (552) have offered evidence that the lower part of the face is more important in portraying emotions than the upper part. The work of Brunswick (553), Totten (554), Landis (555) and Duffy (556) indicates that changes in metabolism, smooth muscle tonus, striped muscular tension, blood pressure, and skin resistance are not adequate criteria for differentiating the emotional response pattern. Almost all of these functions tend to be involved in a wide variety of responses, and all of the emotions have in common a wide variety of such responses. The details of the pattern for the particular emotion have through experience become identified specifically, but even then the interpretation may be erroneous.

The inference may be made from a study of feeble-mindedness by Morrison (557) that emotional development is a complex process not definitely linked with physical or physiological maturity. He recorded the behavior of various grades of feeble-mindedness and felt that there was a positive correlation between the appearance of anger and affection, and intelligence. Fear, on the contrary, gave no significant correlation. He surmised that this was due to the protected life in the institution. Similarly, the appearance of emotions showed no correlation with chronological age. Maturation, alone, then is insufficient to account for the complex emotional responses.

Stratton (558) and Landis, Ferrall and Page (559) have shown that the expression of fear and anger is in part determined by general physio-

logical condition. Individuals who have histories of numerous diseases (other than endocrine) are likely to have a greater number of fears and to become angry in more situations than people relatively free from history of disease. These studies indicate that many diseases influence endocrine balance which in turn influences the expression of emotion. Rowe and Pollock (560) and Hoskins and Sleeper (561) have studied indirectly the influence of endocrine dysfunction on emotion. They have found the incidence of endocrine dysfunction much higher among groups of psychotics and psychoneurotics than among normal people. Since emotional disorders are prevalent in many of the psychotics, we can safely say that endocrine dysfunction is a potent factor. It is, of course, unwise to conclude that the individual will develop an emotional disorder simply because an endocrine dysfunction is present. Psychological factors, in addition to the hypo- or hyper- secretions of glandular products, are necessary for establishing the emotional disorder. The evidence on this point can be obtained from the work of Maranon (562) and Landis and Hunt (563). These investigators have demonstrated that the injection of epinephrine into human subjects was insufficient by itself to produce a true emotional experience.

There is one other aspect of feeling and emotion that should be considered at this point. Since the analysts have placed such great emphasis on unpleasant feelings and emotions as motivating factors in neurotic patients, the available data related to this notion should be presented. Many educational psychologists have also formulated their theories of learning in terms of the relative satisfaction or pleasantness of the organism's reaction. Here are two divergent views advanced to explain behavior and habit formation. Which is the more probably correct or is neither correct? The oblivescence of the disagreeable is a well known dictum. Yet it has been the source of much controversy. In some of the studies on the recall of pleasant and unpleasant events or happenings there has been a tendency for pleasant events to be remembered more often than unpleasant events (Gordon (564, 565), Cason (566)). This statement appears to support the analysts' contention that disagreeable feelings or emotions are relegated to the unconscious and cannot be remembered. Experiments, however, by other investigators, Henderson (567), Tait (568) show that the usual ratio of pleasant feelings to unpleasant feelings is approximately two to one; hence in normal recall and memory the expectancy of recall would be of the same order. Lanier (569) found that there was very little difference in memory value for words having pleasant, unpleasant, indifferent or mixed affective values. The words in the various categories of affective

values do not produce a marked difference in the psychogalvanic response, except for those in the mixed category. Sharp's (570) and Flanagan's (571) studies present a somewhat novel approach to the problem of repression. A list of paired associates containing syllables that were meaningless when presented apart from each other but suggested profane or sexual meanings (dah-mit) when presented together was prepared. Then there was prepared a similar list of paired syllables (res-ler) that aroused only neutral associations. There was better recall for the control lists than for the experimental lists after twenty-four hours. On the whole, there seems to be little evidence for the notion that recall is seriously impaired by repression of the disagreeable. The clinical aspects of feeling and emotion will be considered in a later chapter and the relation of emotions to somatic changes will be presented in the chapter on Psychosomatic Disorders.

CHAPTER VIII

PSYCHOSOMATIC DISORDERS

The disorders subsumed under the term psychosomatic disorders have been recognized in the field of psychiatry for many years. It is only within recent years that the term has become popular. It has been an accepted fact that emotions tend to distort behavior and may even produce degenerative organic changes in various organs of the body. Many of these disorders have been mentioned already in the text and others will be discussed in later sections of the book. In order that the student may obtain an overall picture, we shall present a resumé of the topics covered in the conventional texts on psychosomatic medicine, e.g., Alexander and French, *Studies in Psychosomatic Medicine* (572), Dunbar, *Synopsis of Psychosomatic Diagnosis and Treatment* (573), and Weiss and English, *Psychosomatic Medicine* (574). The topics covered vary somewhat with these authors. On the whole the psychosomatic problems most representative are those associated with autonomic and somatic nervous system functioning. Disorders of the alimentary tract, nervosa anorexia, peptic ulcers, mucosa colitis and fecal elimination; disorders of respiration, including bronchial asthma; disorders of secretion and elimination of urine; disorders of cardio-vascular function including hypertension; disorders of sexual and reproductive functions; disorders of glandular secretion; disorders involving skin reactions; disorders associated with arthritis and rheumatism; and many striated muscle reactions such as tics and compulsions, are the main topics covered. Work on frustration indicated clearly that emotional tension is built up when the frustration is persistent. It is not surprising then that those functions under autonomic control are greatly affected since even a show of emotion and usually striped muscle response must be inhibited and often suppressed. Neither of these reactions is completely obliterated and there results a continuous tension effect which may produce such things as headache from the tension generated in the muscles of the neck and scalp, or headache from vascular spasms of the arterioles of the brain which interfere with circulation. Frustration may produce a stomach ache from continued contraction of the stomach muscles or from flatulence arising through over-secretion or under-secre-

tion of the duct glands supplying the juices necessary for proper digestion. Many of the explanations that have been offered for psychosomatic disorders are similar to those advanced for explaining the functional disorders of psychoneurotics. Grinker and Spiegel (575) maintain that there is a distinct difference in the purpose of the symptoms, stating that psychoneurotics utilize their symptoms as a means of resolving conflicts while individuals with psychosomatic ailments cannot or do not utilize their disorders in the same manner. They maintain that the former seem relatively free from distress about their symptoms while the latter may manifest great distress over their symptoms. There seems to be, however, no real need for the distinction as far as etiology and therapy are concerned. Alexander (576) cautions against the assumption that conversion symptoms in the vegetative system follow rules similar to those which apply for the voluntary and sensory systems. In the vegetative system there is likely to be an intermediate chain of physiological processes. Since we are dealing with functions under the control of the autonomic and somatic nervous systems, a brief statement of the role of the hypothalamus should be presented. According to Grinker (577) the hypothalamus integrates all visceral and autonomic activity and balances the activity of the parasympathetic and orthosympathetic divisions. The parasympathetic acts as an inhibitor on activities, conserves resources, and builds up tensions. The orthosympathetic system enhances the functions of sensorimotor equipment and serves to discharge internal tensions. The hypothalamus "effects a rise in blood pressure, control of the arterioles, dilatation of the pupils, elevation of hairs, increase in blood sugar and adrenalin, increase in heart rate, contraction of bladder, uterus and gastro-intestinal tract, secretion of tears and saliva, regulation of body temperature and sleep regulation." The hypothalamus not only influences cortical activity but is influenced in turn by cortical activity. There is abundant evidence which points to the importance of the hypothalamus in syndromes encountered in mental disorder. It is not surprising that in psychosomatic disorders the role of the psychogenic factors is considered important when the intimate relationship between the soma and the cortex is so clearly established.

The psychoanalyst's approach to the problem of why a particular organic manifestation results from psychic conflict is somewhat vague. Some analysts have followed the general Freudian principle of the death wish or self-destruction instinct. The manifestation is only partial, however, and the affected organ is symbolic of the repressed idea.

Organ neurosis is the abnormal use or innervation of an organ, which occurs because of a repressed tendency. Some theorists rely upon regressive trends and infantile modes of expression of emotions to explain the selective process. They hold that the various autonomic functions in relation to emotional development have gone through a particular course of evolution and the regressive level of the individual accounts for the involvement of a particular type of functional disturbance. Saul (578) states that some organic symptoms such as trembling and blushing are the direct result of emotional expression, while other symptoms may be indirect. Symptomatology may occur because some response (not directly emotional) was involved in the emotion, i.e., soreness of the arms may be due to tensions set up during the process of dreaming about a conflict situation. Peptic ulcers may be caused by restricted circulation in the stomach coats, although the stomach and its activities are not directly involved in the conflict. Alexander (579) believes that it would be a mistake to interpret psychologically a duodenal ulcer which arises from changes in motor or secretory functions due to emotions. The ulcer is the end result and has no psychological significance; only the change in motor activity or secretion is the direct result of emotions.

GASTRO-INTESTINAL DISORDERS

Anorexia nervosa may manifest itself in the lack of desire for food or the inability to retain digested food. If continued for a long period of time, emaciation and inanition ensue. These symptoms will be accompanied by changes in skin tissues, poor circulation and even temperature decreases. We have discussed in a previous chapter some ways in which this disorder may arise. Psychoanalysts hold that parental rejection may be responsible. The child in particular gains attention by refusing to eat. Hunger in the child was associated with pleasure and sexual fantasies. In the adult, the denial of food is the denial of unconscious sexual longings. Bulimia (particularly in the grief laden situation) which may be considered a somewhat similar disorder is presumed to arise in the psychoanalyst's opinion over a conflict situation in which the individual unconsciously wishes to eat the dead person (incorporate or identify with), and the rejection of food which represents the rejection of the idea. Vomiting which may accompany anorexia nervosa may be resistance to pregnancy wishes and incorporation or identification fantasies.

Duodenal ulcers or peptic ulcers are associated, by some psycho-

analysts, with ambition, excessive drive and a tendency to overcome obstacles at any cost. This aggressive behavior results from a feeling of inferiority and a resultant overcompensation to avoid unconscious passive receptive feminine tendencies. Other psychoanalysts stress the relationship between stomach functions and the care, support, dependence and love heaped upon the child by the mother in early stages of life. To escape this dependence, the adult becomes assertive and aggressive. In the scheme of Adler, the drive in these cases is the attempt to avoid dependence and to obtain superiority by achieving independence. It is stated that in those races or classes in which ambition is lacking, ulcers are rarely encountered. Alexander (580) holds that the infantile wish to be loved, to be taken care of and to be dependent upon is rejected by the adult ego. Since these wishes cannot be obtained in normal life situations there is a regression to the wish to be fed, which activates and mobilizes continuously the stomach activities. We have thus a chronic innervation of the stomach. This chronic irritation and secretion results in the distress and ultimate ulceration.

Mucous colitis or spastic colitis patients often exhibit alternate periods of constipation and diarrhea. Saul (581) states: "Psychoanalytic studies of diarrhea and colitis cases show that the symptoms are stimulated chiefly by impulses to make restitution to others for grasping, demanding, receptive attitudes toward them, and also by impulses of hostility, depreciation, and soiling. The peptic ulcer patient usually compensates for his wish to be passive and dependent by real work, activity, exertion, accomplishment, and independence—often exaggerated in order to deny the opposite. But the diarrhea patient only makes the gestures. The schema in these cases is that these urges are not acted out in life, but stimulate the autonomic nervous system, causing increased peristaltic activity of the bowels instead. This becomes a substitute activity—a symbolic substitute for genuine accomplishment and giving."

Alexander (582) follows somewhat the same line of interpretation. He postulates three major types in gastro-intestinal disorders: (a) gastric type (b) diarrhea type, and (c) constipation type. The first of these groups has intense receptive and acquisitive wishes against which the individual rebels because of feelings of guilt. The expression then takes the form of refusing to take or receive. The dynamics for group (b) proceed along these lines: The individual has a right to receive or take since he always gives. He has no need to feel guilty since he gives in return for what he gets. The dynamics for individuals in group (c) are

stated in this manner: I do not have to give because I neither take nor receive.

Ruesch et al (583) present data that are difficult to interpret in a psychoanalytic vein. They quote various sources to show that war experiences tend to increase the rate of incidence in ulcers and that the sex ratio has shifted over the course of years from a higher incidence in females to a higher incidence in males. The first of these factors could still be incorporated into the psychoanalytic scheme but the latter is difficult to tie in with the theories. At least, the assumptions would have to be made: (a) that the mother principle and loss of approval have in some manner changed in the two sexes, and (b) the amount of jealousy and aggression have been at the same time modified. Similarly the experimental production of ulcers in animals by the injection of physostigmine and pilocarpine do not tend to favor the psychoanalytic theories. Ruesch, in the study referred to above, found that the sociological factors in the life of an ulcer patient do not differ greatly from those of the population at large. The ulcer patients respond on the Minnesota Multiphasic Scale in a manner similar to hysterical and hypochondriacal patients. Ruesch et al imply that there is a capacity for disassociation of both organic and psychological functions. They also indicate that the ego organization is simple and primitive-like. This point seems to be at variance with writers who claim primitives and those from low social structures tend to have infrequent ulcers.

The personality characteristics of the ulcer patients are described as dependence, psychological obtuseness, and lack of adaptability in social techniques. This description is borne out by the interpretation of the Rorschach responses. Seward, Fest and Morrison (584) studied 21 male spastic colitis cases. These were relatively homogeneous as to age, socio-economic level and education and were diagnosed as of psychogenic origin. Personality profiles were obtained from the Rorschach, T A T, Rosenzweig Picture-Frustration test, and personal interview. They concluded:

“The findings of the present study suggest a unique personality pattern for the spastic colitis subjects in this series. We have noted the absence of specific psychopathology. The schizoid features suggested by emotional evasiveness and difficulty in relating to people are counteracted by the strong trend toward social conformity. Moreover, neither neurotic anxiety nor ego defenses against it were found in our data. The interpretation that best fits our present findings is that the spastic colitis patient represents a form of character defect, which is especially indicated by his weak and inadequately defended ego, coupled with an inability to tolerate tension. Unlike the antisocial psychopath, however, the colitis patient is eager for social approval and is strongly motivated to con-

form. Emotional situations evoking either dependency or hostility are felt as threatening by him. Since he lacks adequate social techniques for handling them adultly, he seeks to evade them. Instead of 'acting out' the surplus tension at the expense of others he 'acts it in' at the expense of his somatic health."

RESPIRATORY DISORDERS

Respiratory disorders, including asthma, have been partially discussed in an earlier chapter but we should like to present briefly here the point of view held by many of the psychosomaticists. Most of the theorists agree that the general picture of the asthmatic patient is one in which a dependent type manifests a strong emotional attachment to the mother. This dependency in dreams and fantasies takes on the form of need for security and protection, as is manifested by dreams in which it is claimed that intra-uterine fluids play a dominant role. These patients differ in their dependency on the mother from the ulcer cases, whose dependency takes on the role of need for food and nourishment. Any attack that would disrupt this dependency brings about a spasm. If the individual has sexual temptation, aggression, or any impulse that would displease the mother or mother figure, the asthmatic attack serves as a defense against carrying it out, thus the dependency situation is maintained.

CARDIOVASCULAR DISORDERS

The impetus to the psychosomatic study of cardiovascular disorders arises largely from the report of Dunbar (585). After a survey of 1300 patients, the conclusion was reached that patients who were hospitalized with different syndromes exhibited a definite personality picture. The 7 syndromes included in the study were: fractures, hypertensive cardiovascular disease, coronary occlusion, anginal syndrome, rheumatic heart disease, cardiac arrhythmias, and diabetes. Methods of evaluating personality consisted mainly of analyses of medical, social and psychiatric histories. Her conclusions as to the personality make-up of each of these groups is representative of the point of view generally held by the psychoanalysts. Hypertensives show intense chronic, hostile impulses which seem to stem from a rebellion against attachment to the mother. These patients exhibit external friendliness and self control, but beneath this lie a strong aggression and hostility. Dunbar found that brutality on the part of one parent was often reported in the history of these patients. There seemed to be a strong attachment for the mother with intense fear of the father. Patients with coronary disease and pseudo angina, according to Dunbar, manifest a prominent sense of guilt and tendency to self punishment. Part of the self punish-

ment takes the form of accident proneness. Alexander (586), in an analysis of patients with palpitation and extrasystoles, came to the conclusion that there was essentially a strong competitive attitude toward parents of the same sex. These parents represent an overwhelming adversary with whom the patients have been in competition unconsciously. The struggle is a losing one because the parent is also a loved one whose love must not be lost. Since palpitation is a manifestation of fear and danger, any situation which necessitates action but in which action must be inhibited produces the heart irregularity.

There are relatively few objective personality studies on this type of patient, hence we are not able to verify the observations which have been made. Storment (587) has attempted to verify the personality pattern of patients with certain types of cardiac disorders. She employed the Guilford and Guilford-Martin Personality Inventories that presumably tap a number of the personality factors observed by Dunbar. These were administered to hospitalized patients and the scores obtained compared with the postulation of Dunbar. Storment's groups consisted of hypertensive, rheumatic heart disease, coronary occlusion, arteriosclerotic, and control cases. She concluded that while her study did not necessarily disprove some of Dunbar's contentions, the results do throw considerable doubt on the personalization of disease entities. This conclusion was arrived at because of inability to separate the various groups from each other and from the control groups.

All of the observations on cardiovascular disorders are extremely interesting and may be valuable. However, until an objective study is made, in which the personality patterns are clearly determined before the disease entities are ascertained, too much significance cannot be attached to the studies.

SKIN DISORDERS

There is relatively little data of a psychosomatic nature available on skin disorders. However, the theorists all refer to a strong voyeuristic and exhibitionistic trend in the dream content of these patients. Skin lesions seem to be self induced upon occasion because of strong sadistic tendencies toward the opposite sex and self mutilation represents an atonement for this guilt feeling. Conflict over exhibiting one's body and guilt and shame associated with such exhibitionism may give rise to dermatoses. Sweating, blushing and blanching are normal activities associated with emotions. In addition, endocrine disturbances are related to skin conditions. Changes in skin tissue are encountered in hypothyroidism and changes in sex gland output.

DISORDERS ASSOCIATED WITH ARTHRITIS AND RHEUMATISM

Certain of the psychological relationships are discussed in the chapter on cutaneous disorders. Johnson, Shapiro and Alexander (588) have presented a summary of the literature in this field and have worked out the dynamics they believe to be functioning. Their observations were made on 33 cases of rheumatoid arthritis, most of whom were females. The overt personality features described by them are as follows: in their early life the female patients were inclined to outdoor activities and sports, being in addition somewhat tomboyish. In later life there was a very strong tendency to control their emotional expression and the need to be of service to others. They are dependent upon others but mask their dependence by service to others. There is evidence of a rejection of their feminine role and they assume masculine roles and cannot yield satisfactorily in sexual matters. They state more specifically that all the female cases are classic examples of masculine protest, i.e., rejection of the feminine role. They tend to identify themselves with the male role, assuming many of the normal activities of the male. The actual arthritic effects may be produced by emotional states which bring about changes in temperature, circulation and endocrine functions.

The following topics have been dealt with adequately in other parts of the text and will not be discussed in this chapter:

- (a) Disorders of secretion and elimination of urine
- (b) Disorders of sexual and reproductive functions
- (c) Disorders of glandular secretion
- (d) Disorders of striped muscle reactions

While the authors subscribe to the fact that psychogenic factors produce many disturbances of functions under control of the autonomic and sympathetic nervous systems, they believe that many of the criticisms leveled against psychoanalysis must be kept in mind when appraising the dynamics of psychosomatic disorders. This is especially true since many of the postulated dynamics have been devised almost entirely from psychoanalytic theories. In addition, many experiments with animals show that the psychosomatic changes encountered in humans can be induced and cured by procedures in which emotional factors play little or no part. We must again caution against accepting too readily psychosomatic explanations for many of the disorders discussed. Favorable therapeutic results have been and still are being accomplished by workers in internal medicine and in endocrinology.

CHAPTER IX

SLEEP, DREAMS AND HYPNOSIS

The three phenomena, sleep, dreams and hypnosis, cannot be viewed as abnormal in accordance with the definitions set forth at the beginning of the book. If perceiving, thinking and feeling are the usual characteristics of the organism, then sleep, dreams and hypnosis represent certain modifications of these processes. Three different stages of disintegration may be involved. In dreamless sleep, the maximal loss of these functions exists; dreaming may represent an intermediate stage in which not only the reflexes are active but also sensory stimulation plays a prominent part (this stage corresponds closely to some conditions of intoxication from alcohol and drugs in which the inhibitory influences of certain cortical centers are lost); hypnosis may tentatively be classed as the condition most closely approximating normal activity. The reflexes are intact; selective stimulation is effective; inhibition to a certain extent is operative; and volitional control may or may not be lost. Aside from the fact that sleep, dreams and hypnosis are marked by unusual conditions of perceiving, thinking, and feeling, sleep shows variations of its own, and these variations must be explained as abnormal behavior.

THEORIES OF SLEEP

The classical theories of sleep have been critically evaluated by Haberman (589), Coriat (590) and Davison and Demuth (591). The latter authors give an excellent survey of the recent neurological and biochemical literature relating to disorders of the sleep mechanism. These theories fall into several categories which are: (a) chemical theories, (b) physiological theories, (c) neurological and histological theories, (d) psychological theories and (e) biological theories. The first three of these theories have some common features. The main differentiation lies in the emphasis placed upon the exact nature of the factor producing sleep.

CHEMICAL THEORIES

The chemical theory supposes that toxins created by muscular and neural activity accumulate during wakefulness and upon reaching a

certain level produce sleep. In order to account for the desire for sleep following physical and mental activity, two different points of view have been taken. One theory assumes that the fatigue following muscular activity sets free some toxic agent such as "kenotoxin" or lactic acid in the blood stream which finally reaches the nerve cells in the brain and that mental fatigue is the result of auto-intoxication of the nerve cells. The other theory assumes that the drowsiness following muscular activity is due to the exhaustion of the nerve innervating the muscle and that mental fatigue is due to the exhaustion of the muscles which function in imagining and thinking.

PHYSIOLOGICAL THEORIES

The physiological theories have been founded upon physiological changes following activity or loss of sleep. Perhaps the physiological theories which are discussed here are not theories at all but only a description of some physiological changes that occur during sleep. Almost every physiological function has at some time been used as a basis for the construction of a theory. It would be outside the scope of this text to examine them all and only the more general ones will be mentioned. The circulatory theory had its origin in the observation that humans assumed a prone position when going to sleep. The numerous species of animals that do not assume this position were overlooked. Following the observation just mentioned, delicate balancing boards were constructed to show that the blood retreated from the head toward the stomach and extremities. The outcome of these experiments was, of course, nil. The notion of a change in circulation persisted since many people noticed the tendency to become drowsy after a heavy meal. Fainting spells following hemorrhages, the sleepiness of anemia patients and of the obese furnished contributory data to circulatory changes. The proneness of the body which the observers believed favored an increased blood supply to the brain did not conform to the other evidence. As a result, two diametrically opposed theories were proposed. The first of these is referred to as the "anemia theory." The general assumption is that the lessened flow of blood to the brain results in a temporary undernourishment of the nervous tissue. Sleep, then, is not a period of recovery or anabolic activity, but one of breakdown or catabolic activity.

BIOLOGICAL THEORIES

Some theories to which the name biological has been attached should be designated as mystical. Theories of this type have been advanced by Claparède, Sidis and Coriat. Claparède (592) suggests that sleep

is instinctive and that we sleep to prevent fatigue rather than as a result of fatigue. It has become habitual or acquired since only those organisms that conserve their energy by sleeping or by becoming immobile can manifest the necessary increased energy required to protect themselves from their enemies. These instinctive sleep responses can be conditioned in the same way that other instinctive responses are conditioned. Thus, for the stimuli which originally produced sleep are substituted the conventional postural changes, closing of the eyes and all the other physiological concomitants.

The theory of Sidis (593) is similar to that advanced by Claparède. His assumptions are partly neurological, partly psychological and partly mystical. The neurological aspect of his theory involves the change in threshold level of the cell energy. The psychological assumption is that cells become de-energized by repeated monotonous stimulation so that afferent impulses are not effective in stimulating the organism. These stimuli are replaced by other modal stimuli until the gamut is completed. When all possible avenues are de-energized, the organism falls asleep. The mystical part of Sidis' theory is his assumption that sleep is instinctively developed out of the hypnoidal state (a condition intermediate between sleep and hypnosis) which in the evolutionary scheme is far older than either. Pavlov's (594) inhibition theory of sleep is not unlike that advanced by Sidis. Inhibition is produced by monotonous stimulation or absence of stimulation which gradually results in inhibition of the whole cortex.

PSYCHOLOGICAL THEORIES

The notion of reduction of peripheral stimulation embodied in the theories of Sidis and Coriat resembles very closely the theories of Mauthner and Trömner advanced several years earlier. Sleep, according to Mauthner (595) and Trömner, (596) is attained by blocking off all the cortex from incoming peripheral stimuli. Haberman (597) has presented pertinent evidence for and against cortical blocking. A quantitative, if not qualitative, reduction is found in the conditions which favor sleep. Darkness, quiet, and relaxation reduce three modes of peripheral stimulation. Monotonous stimulation such as a flashing light, roll of the waves, the rhythmical sounds of car wheels tend to limit the variety of stimuli since they become foci of attention.

NEUROLOGICAL AND HISTOLOGICAL THEORIES

A histological theory of sleep is based upon the supposed amoeboid-like movements of the dendrites of the nerve cells. These dendrites are

the means by which nerve currents are transmitted from one part of the body to the other. When anything causes the dendrites to retract or produces a change in resistance, sleep ensues. The dendrites unfortunately may or may not have this ability; and if the ability is postulated, either a voluntaristic rôle must be assigned them or the change is brought about through constant usage. This latter view is simply a variation of the fatigue or metabolic theory.

SLEEP NORMS AND CRITERIA OF SLEEP

The theories which account for sleep do not throw any light on norms of sleep, i.e., the length of time required, the so-called "depth of sleep," and the actual amount of coördinated activity permissible that may still be described as sleep. Individual differences in sleep requirements are quite marked. Most textbooks state that the average individual requires about 8 or 9 hours sleep out of 24, taken at one time. The variations from this schedule are pronounced in infants and elderly people. They do not sleep as long at a time but require frequent periods of sleep of shorter duration. The necessity of this is usually explained on a basis of fatiguability. Many adults do not feel any ill effects on as little as 5 or 6 hours sleep while others feel drowsy and tired unless they take from 10 to 12 hours sleep per night. Habits play a dominant rôle in sleep needs and when once established are difficult to break. A safe guide as to the amount of sleep that should be taken can be established by taking that length of sleep that leaves one feeling rested and refreshed in the morning.

Most studies on the depth of sleep have been highly unsatisfactory. The data, with but few exceptions, have been obtained from few cases or the criteria under investigation have been considered to the exclusion of other pertinent criteria. Various methods have been employed. The psychological methods have centered in the strength of stimuli required to awaken a sleeper after a lapse of a period of time. Sound stimuli (employed by Michelson and Kohlschütter) such as the noise made by dropping a steel ball from varying heights or the noise of a buzzer, varying intensities of electric shock, tactile stimuli (employed by De Sanctis and Neyroz) applied by varying lengths of bristles, and activity measurements (employed by Johnson and Weigand, and Karger) have been tried. The method of measuring activity used by Johnson and Weigand consisted of mounting beds so that major movements and the time of their occurrence could be automatically recorded. There may

be some question as to the validity of movements as a criterion of the depth of sleep. This objection is of course pertinent since some movements unquestionably take place without awakening; however, there is probably a direct relationship between the number of movements and the state of integration. On a basis of experiments similar to those described, conflicting results have been found. The first two methods yield results which according to the experimenter's contentions, showed that the greatest depth of sleep occurred in the second hour with gradual diminution until awakening. Not only have the methods used been subject to criticism but also the interpretation of the data has been questioned. Johnson and certain of the other investigators have felt that the depth of sleep is a highly irregular process. Some individuals tend to rest more in the early part of the night; others in the latter part of the night. This varies for individuals as well as from night to night for the same individual.

Some of the physiological indices of sleep have already been discussed. There are two others that should be mentioned since they may have some bearing on the qualitative aspect of sleep. Richter (598) has noted marked differences in temporal variation of skin resistance of subjects during sleep. Skin resistance during sleep was found to increase maximally in a ratio of 16:1, when the electrodes were applied to the skin of the hands. Such large changes were not found when the electrodes were applied to other parts of the body not abounding in sweat glands. He attributes this change in resistance to decreased activity of the sweat glands. Work of a similar nature by another investigator has not substantiated Richter's results although the methods used were not identical. The observations of Karger (599) tend to disprove Richter's contention. Karger found that the rate of perspiration in children increased greatly about 2 hours after sleep. This is usually thought to be the period of deepest sleep. Miles (600) also disagrees with Richter's findings. He states as a result of observations on himself, on loss in body weight during sleep that "In the longer normal sleep the latter portion approaches more to the waking condition and has a higher rate of loss." Thus, if the loss is greater as one approaches a waking state, the skin resistance should be lower since skin resistance is dependent upon rate of perspiration. Liberson (601) found that the EEG during sleep changes with the depth of sleep, but there is a wide variety of "sleep patterns." These seem to be individual in nature. He reports further that there are some characteristic patterns with mental disorder syndromes.

ABNORMALITIES OF SLEEP

Abnormalities of sleep follow a graded scale from almost complete insomnia to prolonged sleep or coma. Insomnia is the inability to sleep in spite of the need for and intense desire of sleep. Clinical studies have been made of insomnia produced by various physiological conditions. These have been elaborated under the theories of sleep, but we may mention again the rôle of stimulants such as caffeine and strychnine, unusual fatigue, pain, and brain tumors in hindering sleep. Unusual stimuli arising as a result of a change in the pattern surrounding sleep conditions and emotional disturbances tend to produce similar results. The city dweller may be unable to sleep in the country and vice versa. Absence of familiar stimuli certainly is important. One who is accustomed to sleeping in a particular position may be restless and unable to sleep if unable to assume that position. A person who is accustomed to sleeping with someone may experience difficulty in sleeping alone. The habit of reading one's self asleep may prevent sleep when the habit cannot be indulged. The principle of absence of familiar stimuli furnishes the basis of the trouble in the transition period when one tries to abolish drugs and sleep without their aid. Taking a sedative becomes part of the pattern necessary for sleeping, and any change in the pattern breaks up the series of adjustments essential for sleep. Intensive analysis of several cases of insomnia by Rothenberg (602) led him to the conclusion that the individuals had strong death wishes against some one over a period of time. The insomnia is precipitated when actual or imminent death in the environment exists. This latter factor tends to reactivate older emotional patterns. Knott et al (603), in studying manic depressives, found that the electroencephalograms during sleep varied from those obtained from normal subjects.

Whatever the cause of insomnia, we must discount the statements as to the amount of sleep lost by insomnia patients. Their reports are exaggerated since unfilled time is usually overestimated under normal circumstances.

It cannot be denied that prolonged insomnia is followed by grave physiological and psychological consequences. Studies have been made on both humans and animals under controlled conditions, so that a fairly accurate account can be given of enforced deprivation of sleep. De Manacéine (604) found that young puppies could survive loss of sleep for less than a week; 2 died in 92 and 143 hours. These animals were artificially fed and heated, thus death could not be assigned to

starvation. Examination showed fatty degeneration in ganglion cells; capillary hemorrhages and an increased number of leucocytes. Crile's (605) report on the effects of 72 hours of wakefulness indicates similar effects. Cellular changes occurred in the central nervous system which were quite similar to changes produced by starvation, muscular exhaustion, and narcosis.

Insomnia, for a period from 40 to 115 hours produced, according to Kleitmann (606), in healthy human subjects no apparent variation from the normal in the following factors: mean temperature, rate of oxygen consumption, blood sugar, number of leucocytes and of red blood cells, alkaline reserve, and body weight. Similar results were obtained by Moss (607) and his associates from 60 hours of sleep deprivation. These authors maintain that there was an increase in leucocytes and a decrease in red cells and hemoglobin. Katz and Landis (608) found that a 10 day vigil of one subject produced no evidence of any real change in physical or physiologic function which could be attributed to the period of sleeplessness. Metabolic rate, blood pressure, pulse rate, blood count, and urine analysis were unaltered by the vigil. The psychological effects of insomnia have been investigated by Gilbert and Patrick, Robinson and Hermann, Robinson and Robinson, Laslett, Kleitmann, Smith and Moss and his associates. The details of these experiments will not be given. In general, it may be said that deprivation of sleep for periods ranging from several hours up to 115 hours produced no significant effect on accuracy in aiming, rate of tapping, gripping, reaction time, association time, memory, learning and relearning, mental arithmetic, scores on "intelligence tests," threshold for auditory sensitivity and electrical stimulation, extent of the peripheral field of vision and the knee-jerk. Ataxia was increased and the pupillary reflex change was decreased. It is unsafe to conclude from these studies that loss of sleep causes no inimical effects, since Katz and Landis have discovered such effects from a more prolonged vigil. Many of the subjects of the earlier experiments showed definite symptoms of irritability, confusion, headache, nervousness, emotional disturbances and a wide variety of signs that could not be misinterpreted. The status of the matter is that the tasks set were inadequate for bringing out the induced changes. This is in general agreement with the findings on alcohol consumption, oxygen deprivation and carbon monoxide poisoning. The organism seems to be capable of temporarily compensating for such disturbances. Clark and others (609) found a definite decline in performance on complex psychological tasks after 50 hours of sleep dep-

ivation. Licklider and Bunch (610) showed changes in the behavior and growth of rats kept on schedules of enforced wakefulness from 12 to 24 hours daily. Many of the animals died from fighting among themselves, and the growth of some of the control animals was impaired.

Selective sleep is one of the topics about which relatively little is known. Almost every one is familiar with an individual who says that he can awaken at any time. The well-known phenomena of the mother awakening to the slightest movement of her offspring and the awakening of the nurse anticipating the wants of a patient belong in the same class. Much speculation concerning the reliability of such performances has been written, but the authors are inclined to be skeptical of most of it. Apparently integration is so arranged that the threshold for a particular type of stimulation is lowered. This theory of selective arrangement of thresholds is difficult to explain on a basis of stimulus-response psychology. It almost demands a mystical explanation in terms of the unconscious mind or the assumption of mental processes independent of neurological processes.

Two other abnormalities intermediate between waking and sleeping are *pavor nocturnus* (nightmare) and *somnambulism* (sleep walking). Pai (611) studied 117 male neurotics alleged to walk in their sleep. He mentioned that the clinical condition was one of incomplete sleep with varying degrees of consciousness. These sleep walkers contrast with post-epileptic patients who have automatisms. The latter, Pai believes, are entirely devoid of consciousness. The explanations of these disorders are quite similar to those advanced for sleep itself and other dissociated phenomena which will be discussed later.

NARCOLEPSY OR SOMNOLENCE

Undue or compulsive desires for sleep are called narcolepsy. Numerous conditions of this kind occur in the population at large and were of sufficient frequency in the armed forces to be given careful attention. Fabing (612) attributes the following etiological classification to Wilson: Narcolepsy may be produced by (1) trauma, (2) toxic-infectious states such as encephalitis, (3) epilepsy, (4) endocrine disturbance, (5) psychopathological disturbances, (6) local lesions (vascular and tumor), and (7) cryptogenic (obscure) conditions.

In order that we may understand the significance of these etiological factors some of the neurological conditions which operate in sleep must be discussed. Present evidence indicates that the hypothalamus is largely responsible for the regulation of sleep. This in turn is influenced by

fibers originating in the cerebral cortex, especially the hippocampal, angular, frontal, premotor, and temporal convolutions. The hypothalamus is further influenced by connections with the thalamus, the striopallidum, and the hypophysis. The importance of the neurological tracts specified has been demonstrated in a number of ways. Experimental lesions on animals, electrical stimulation of various brain areas, injections of various pharmacological substances and clinical case material have all contributed to the picture. Ranson (613) produced experimental lesions in the hypothalamus area in monkeys and concluded that this area is the integration center for emotions as well as a waking center. When its function is disrupted, somnolence occurs. Harrison (614) also found that somnolence resulted from bilateral lesions in the hypothalamic area. White (615) produced a tendency toward drowsiness in man by mechanical and electrical stimulation of the hypothalamus. Hess (616) claims to have induced sleep by stimulation of the brain stem although Harrison, Magoun and Ranson (617) showed that the electrical stimulation was not the agent but rather lesions produced by the electrical current were the agents.

Sleep disturbances and sleep have been investigated by the injection of various drugs. Since sleep has been presumed to be due to the dominance of the parasympathetic nervous system, those drugs that have an affinity for this system have been utilized. Marinesco, Sager and Kriendler (618) have tried injections of choline on animals. Choline tended to produce a sleep-like condition. Henderson and Wilson (619) tried injecting acetylcholine into the hypothalamic regions of humans but were unsuccessful in producing sleep. Ergotamine has also been employed but without success. Injections of calcium and other chemical substances produce sleep-like conditions (Brunelli, 620). However, other experiments tend to show that the calcium blood level change is coincidental with sleep rather than preceding it.

The evidence from many sources tends to support the theory that the hypothalamus is one of the essential neurological mechanisms involved in sleep and its disorders.

We should like to return to a consideration of the psychological theories of sleep for a few moments before continuing a discussion of narcolepsy. While sleep may be thought of as a general lessening of mental and biological activities of the organism, the theorists hold that this lessening or diminution is a psychobiological protective mechanism against exhaustion. Sleep may be considered as a repression to avoid conflict with environmental problems, or stated in Freudian terminology, sleep

is a reenacting of life in utero in which the ego escapes contact with the world and reality. Sufficient data have been given to show that unusual desire for sleep may arise from any one of the several causes listed earlier. More attention has been paid to insomnia but there are few studies on narcolepsy that contain a sufficient number of cases to warrant discussion. Solomon (621) found that negro recruits for the army had an incidence of this disorder which was 60 times that among white recruits. Nineteen of 10,000 negroes were found to be affected. Of the 19 cases found, 16 appeared to be idiopathic and had their symptoms since childhood. Levin (622) reported 25 cases of soldiers discovered asleep on sentinel duty. He ascribed their delinquency to the following causes: rebellious psychopathic personality, insufficient rest, and idiopathic disability. He interpreted the somnolence to a suppression of the impulse to escape a threatening situation or the somnolence may be due to excessive susceptibility of the cortex to widely irradiated inhibition (Pavlov's concept). Langworthy and Betz (623) studied 6 cases of idiopathic narcolepsy. They found no signs of disease of the central nervous system but ample indication of emotional disturbances. Stimulants afforded only temporary symptomatic relief but the patients did respond to psychotherapy. They also thought that the condition was an escape from emotional issues.

TREATMENT OF INSOMNIA

Many people ask, how can insomnia be overcome? There are certain practical suggestions that can be given in answer to this question. The environmental conditions should be made as favorable for sleep as possible. Exclusion of light, proper ventilation and maintenance of general noise conditions are advisable. These factors should be made to conform in so far as possible to those to which the individual is accustomed. Removal of physiological factors which produce discomfort, i.e., pain, flatulence, and muscular tension are advised. Similarly, emotional excitement and extreme mental activity should be avoided. The ability to overcome such inhibitors of sleep is abetted by the direction of the thought into a single channel. The old remedy of counting sheep or listening to the clock tick may help. In general, reestablish the pattern usually assumed when going to sleep. Changes in circulation produced by eating or drinking something warm, alcohol rubs, and tepid baths tend to be sleep-inducing since increase in blood in the extremities and stomach tends to decrease it in the brain. Avoidance of stimulants is a good rule to follow although the amount of

caffeine taken in a cup or even two cups of coffee is usually insufficient to keep one awake unless the belief is strongly entrenched. Giddings (624), using motility as the index of sleep, found that 6 ounces of warm milk at bedtime produced quiet sleep in normal children and that beverage which contained .6 of a grain of caffeine produced no more restlessness than a similar quantity of orange juice. Baths, either warm or cold, did not produce constant effects. It would appear that the effects are individual in part and should be worked out to suit the case. If all of the aids mentioned are ineffective, recourse may be had to a variety of drugs. These are advised only under the guidance of a competent physician since some of them are habit-forming and since knowledge of their effects on the nervous system is limited. Some of them have been administered for periods of years without any apparent harmful results. If the use of drugs is accompanied by worry about their effects, the benefits will certainly be lessened. Another method, which should be applied only by an expert in the technique, is hypnosis. The writer favors this method, since no neurological breakdown can ensue. Post-hypnotic suggestions may be given at the same time, which will help the patient establish normal sleep habits.

DREAMS

The reader of this book has in all probability been mystified at some time or other when he has attempted to explain why certain things or events have played a part in his dreams. No two psychologists would give identically the same answer to his questions and if psychoanalysts were consulted, still wider variations of explanation would be offered. Since psychoanalysis has been in vogue, few psychological studies of dreams have been made. In this section of the book we will try to set forth the pertinent facts about dreams and ignore the pseudo-psychological interpretations of the analysts. These have been discussed partly in an earlier chapter.

The basis of our discussion will be the reaction theory which hypothesizes the four following points:

(1) Stimulation of receptors which arouses afferent current; this afferent current reaches the brain stem or spinal cord and is finally shunted through the cerebrum or cerebellum which in turn results in efferent current to the muscles or glands.

(2) In the central nervous system there are any number of possible synaptic connections so that any given afferent current may be shunted on to any given efferent route.

(3) The central nervous system tends to unify or integrate all of the afferent impulses. Instead of having a number of independent reactions, the manifold afferent impulses tend to become functionally connected and result in a single discharge or orderly series of discharges.

(4) Instead of an isolated stimulus producing a reaction of an isolated muscle group, the total mass of stimuli affect the action mechanism of the body generally, although a limited group of stimuli and a restricted group of muscular activities may predominate at any given moment.

With these assumptions Dunlap (625) says in writing of sleep and dreams that:

we should expect to find, as the integration falls apart, that certain parts of the system might continue to function with fair efficiency, as small systems, just as we do find the "vegetative" functions and certain mechanized reaction processes going on: and we are not surprised that these should show occasional "spurts" of high activity.

Sensory stimulation will not, in general, during sleep, produce its customary reactions, and hence not its customary consciousness. But detached effects are produced, and sometimes, if the stimulation is sufficiently intense, integrative results somewhat resembling the normal will be momentarily produced. Moreover, random detached ideational processes must occur; for ideational process must inevitably be found to be a reaction process, just as is perceptual process. In short, on the basis established, without referring to experience at all, we could predict that *dreams* must be possible. It could be predicted that these dreams would vary all the way from the lowest degree of vividness (degree of attention), and the lowest degree of inconsequentiality, to a vividness and connectedness resembling the most attentive and coherent waking thought processes and perceptions. In fact, odd as the statement may seem, if we had not this firm basis in sound theory, we would have real difficulty in establishing that dreams actually occur! For, it might be urged that all so-called dreams are really constructed in the first process of recalling them, since it is a demonstrable fact that a great deal of what we report as having been dreamt *is* constructed in the recalling. But we have the evidence for the reality of dreams in these facts: first, that on our empirically derived theory, dreaming is obviously possible; second, that the physiological functioning of sleepers is affected in the way it should be if, in accordance with the theory, dreams occurred; and third, that it has been experimentally shown that stimuli applied to sleepers produces on their alleged dreams precisely the effects it should produce on real dreams.

Dreams are unquestionably initiated by sensory stimulation, feelings, desires and general ideational processes concomitant with low degrees of integration. The rôle of sensory stimulation in the production of dreams has been most extensively studied by Horton (626, 627, 628). He explains all dreams on a basis of sensory impressions that are elaborated or misinterpreted by the attempt of the integrating system to organize these sensations into some orderly system. The ability to reduce them to a system is lacking because of the low function of the

integrating tendency. Auditory sensations may be elaborated into battles, accidents or storms; cutaneous sensations may give rise to dreams such as wading in water or lying in the sun on a beach; proprioceptive and interoceptive stimuli may lead to dreams of being choked, fainting, flying or levitation dreams. An example or two of sensorially aroused dreams will help to clear up the matter. (1) One person who suffers from head noises due to an ear disorder has recurrent dreams of thunder and lightning, sometimes accompanied by windstorms and tornados. Invariably these dreams take place when atmospheric conditions increase the head noises. The sensations arising from the circulatory changes in the ear are interpreted as thunder, and the elaboration of the dream adds the lightning and wind. The processes of association are not unlike those in normal waking life since thunder is usually accompanied by lightning and sometimes by windstorms. (2) The following dream was related by a student who went to sleep with a mild toothache. He was engaged in a boxing bout with one of his college friends in which he received numerous blows on the jaw. After the bout was over his face was swollen and sore on one side. The pain sensations were thus interpreted in terms of blows on the jaw.

The experimental investigations of Cubberly (629) in which he applied pieces of gummed paper about $\frac{3}{4}$ of an inch square, or oily substances over an area of 3 inches in diameter to various parts of the body illustrates clearly the effects of these mild forms of stimulation upon dreams. In an analysis of 750 dreams the influence of these agents was marked. For example, when the tension is applied to the sole of the foot, dancing was foremost in one of the dreams; when the relaxing agent was applied to the right wrist on the palmar surface, one dreamed of fitting a tube into a pipe to control the overflow from a cistern. The use of the hands is indicative and Cubberly discusses a series of these dreams in terms of the position taken by the hands in performing various tasks dreamed about.

Although stimulation of the special senses can be shown to be effective in causing dreams, this is insufficient reason to rule out many of the more complex methods of arousing reaction. Desires, feelings, and emotions, whether carried over into sleep or aroused during sleep have their effects when their respective mechanisms come into play. Aversion, fear, hope, worry are very efficient in dream production. Anticipation in conjunction with an emotional state is probably the most effective, although emotions without anticipatory elements are demonstrably effective. A pleasurable or painful experience unassociated with

anticipation or wish may recur in a dream; or the emotion recurring, may arouse some other past experience, through association with the same emotion. The ideational factor connected with the emotion in the dream may be one previously associated with it and not the one of the moment; hence the first of these ideational factors and not the second is responsible for the occurrence of the emotion in the dream. Another quotation from Dunlap (630) presents the point of view which we hold

In the low integration of sleep, a given perception, or a given idea, will not in general arouse in memory the associated idea which it would be most likely to arouse in waking life. The same laws apply in sleep as in waking, but the conditions of associative recall are always exceedingly complex, and any change in the condition must change the result.

To assume that ideas are associated with each other, and with emotional factors, in simple one-to-one ways, is to miss entirely the facts of association. Undoubtedly, in cases where dreams are directed by stimulation of the external senses, as in the universal dream of nakedness, which in most cases is so clearly due to dermal chilliness, the direction is in large part through the unpleasant emotion directly aroused by the chilliness. In such circumstances, the dreamer seldom if ever dreams of pleasant situations, although if the dream were really a "fulfillment" of a "repressed" sexual wish, as the Freudians ingeniously suppose, we should expect the fulfillment to be most frequently pleasant.

The importance of the emotional factors in dreams is strongly emphasized by the universal dreams, such as that of being nude. The dream of flying: of moving through the air by merely "flapping" the arms, or by some other absurd means, is apparently due to respiratory feelings. The dream of falling, always colored by a strong emotional feeling, may perhaps be due (this is a tentative explanation), to spasmodic contraction of a certain group of genito-urinary muscles: a contraction which uniformly occurs in actual falling, or even in the sudden thought of falling, as when one comes unexpectedly on an open elevator shaft, or the perception of some one else falling. In any event, the emotion aroused is the important thing, and suggests the ideational factors of the dream.

Many dreams aroused through emotional processes are reproductive in type; that is, in the dream the individual relives a particularly strong emotional experience. The dream of the hypnotic subject related earlier in this book was of that nature. There was a reproduction of an actual incident in the subject's life. Some dreams of collisions in automobiles and the recurrent dreams of soldiers, of shells exploding are produced by the activation of some mechanism which was involved in the original perceptual experiences. Other dreams are indirectly aroused in this manner through association processes. Wish fulfillment and aversion dreams may not be simple reproductions but more complicated in their arousal. The importance of emotional factors in such dreams has been stressed by Selling (631) in his study of juvenile delinquents and convicts. About 80 to 96 per cent of the dreams of the juvenile delinquents was about their home life and about 72 per cent of

the dreams of adult prisoners was a straightforward account of what they admitted they visualized during waking hours.

There are some general facts that may be stated about dream content. The types of imagery that prevail in dreams are comparable to those that prevail in waking life. Visual and auditory imagery head the list. The content of children's dreams varies with the social condition of the home and as the child grows older fear begins to be manifested. The fact that fear is not manifested until late in life in dreams opposes Watson's notion of fear being one of the innate emotional responses. One characteristic of dreams which is somewhat difficult to explain is the fact that they are more often unpleasant than pleasant, especially in view of the findings that pleasant experiences occur much more frequently than unpleasant experiences. The speed of dreams and telescoping of time intervals have aroused considerable interest. For a long time the notion was held that the rate of dreaming was faster than the rate of waking associations and thinking. The fallacy of this contention has been pointed out by many writers. Accurate data are not available to determine just how long a dream lasts although Max's study of action potentials of deaf-mutes shows that their dreams occupy more than the conventional 1 or 2 seconds.

Max (632) has developed an ingenious method for determining whether dreaming is taking place, the length of time it lasts, and the effect of various forms of sensory stimulation on the response mechanism. By securing the action potentials during sleep and comparing the changes that occur throughout sleep, he is able to predict when the subject is dreaming, how long he dreams, and what part of the musculature is involved. If the subject is awakened when the action potentials reach a certain level during sleep, it has been found that the subject was almost invariably dreaming. He has found also that the high action potential level lasts during the time that the subject dreams.

Some people have gone to sleep and a few moments later have been awakened and have reported lengthy dreams; others have been awakened immediately after specific sensory stimulation and have reported dreams which have been initiated apparently by the stimulus. These dreams that require considerable time for their telling or even thinking through can be explained by the fact that a few detached dream ideas have been woven into a connected story by normal associative processes adequate for interpreting the fragments. This idea of waking elaboration gave impetus to the theory that dreams are manufactured after awakening. Successive relation of dreams indicates that the dream becomes better

organized, and many details which were lacking in the first telling appear in later recountings. Moreover, stimuli which are incorporated into dreams in an inverted order, that is, a considerable part of the dream is put before the stimulus, appear too frequently to assume that they just fitted into a dream already in progress. For example, an elaborated dream of fighting may terminate with a loud crash. It is highly probable that the loud crash really initiated the dreams, but in the process of fabrication the dream preceded the stimulus. Telescoping of time is not infrequent in dreams just as it is carried out in novels. One dreams of skating across a lake and before he has reached the other side, spring has set in and the ice has melted. This type of association could be predicted on a basis of normal associations. A skillful writer may have his character in a story grow up from an infant to an adult within a few paragraphs. Simultaneity of dreams is due to the waking organization of a great many dream fragments into two or more unified parts. This procedure is the simplest and requires less additional material for making them connected narratives.

In a general way, the problems and every day experiences, as well as the personality of the individual, are important in shaping dream life. Pierce (633) has compared the dreams of a writer, a lecturer, a farmer, a teacher, a scientist and individuals in other occupations and finds a marked similarity between the dream content and the factors pertaining to their daily environment and personality. This is not surprising in light of our knowledge of dream motivation and the processes of association both in the waking and dream life. It has also been shown that dreams of psychopathic patients conform to their general feeling tone as well as to their mediate and immediate experiences. Similarly, the dreams of drug addicts are probably influenced by the feelings aroused by the drugs themselves.

Hall (634) has demonstrated rather clearly that dreams are initiated by present emotional conflicts. He asked students to record their dreams over a period of time and by obtaining a number of them in sequence he could reconstruct the conflict situation in a rather accurate manner. A complete series of dreams of one of the students is quoted from Hall's¹ study.

Case B

“Subject: Female, 19 years, college sophomore.

Basic conflict: A desire to remain faithful to her husband, who is in the army overseas, vs. a wish for sexual gratification.

¹ Hall, C. S. Reprinted by permission from the *Journal Abnormal and Social Psychol.*, 1947, 42, pages 77-78.

Spotlight dream B1. Last night I dreamed that I was walking up the stairs in the administration building and some way or other my dress was flying up around my waist. I remember being terribly embarrassed as the stairs were crowded with students. As I remember, I was running for some sort of an office (that is, I was a candidate) and that was no way to win an office.

Spotlight dream B2. Last night I dreamed that I was waiting to be served in a restaurant. I waited an extremely long time and became very impatient.

Interpretation: These two dreams inform us that the dreamer is growing impatient and contemplates direct action to satisfy her sexual need. The embarrassment is a twinge of conscience for having libidinous thoughts.

Dream B3. I dreamed my husband was home. We were driving to a picnic (on the beach) and we had a carload of people. I kept praying that I wasn't dreaming, that it was true that he was home. I kept telling myself it must be so because it was so real. I was disappointed when I awakened and found it was just a dream.

Interpretation: This dream represents the best solution for her conflict, namely, the return of her husband.

Dream B4. I dreamed that I was in Fort Smith, Ark. I was at some sort of a party and it was in the woods. I suddenly saw my husband. Of course, he kissed me and then we sat down to talk. He said he was bringing some German prisoners over from Germany and he didn't have long to stay. I noticed that he wasn't wearing his wedding ring. I asked him if he had been going out with other girls and he said that he had. I asked him if we could go for a walk to get away from the people and to talk. Just as we started for the walk, I awakened.

Interpretation: This is a nice rationalization of an impulse to be unfaithful. If the husband were not true to the dreamer, it would excuse her infidelity.

Dream B5. I dreamed that my husband was dead and was in a suitcase in my closet at the dormitory. My roommate and I were frightened when we found him. The undertaker took him (suitcase and all) to a theatre and placed him up where the projector ordinarily is placed. I was sitting there with him crying while at the same time there was a wedding taking place on the stage. The bride was a friend of mine (a red-head) and she had on a pink wedding gown. As I remember, my husband wasn't dead, but he was "kidding" me. I might mention that I quite often dream that my husband is dead.

Interpretation: Under the circumstances it would be better if her husband were dead, since this would leave her free to marry another man. The wedding represents her own remarriage. This interpretation is supported by the color of the wedding dress, which would not look well on a red-haired person but which would be becoming on the dreamer, who is blond. This solution, i.e., the death of her husband, is not acceptable to her, so she treats it as make-believe.

Dream B6. I dreamed that I was talking to my brother-in-law and he suddenly turned into my husband.

Dream B7. In my dream, my cousin and I were riding and then we suddenly stopped to wait until a helicopter came along to pick us up. I believe I dreamed that we were taken in the helicopter (horses and all) to another trail where we continued our ride.

Dream B8. I dreamed that my brother and I went to a small restaurant to get something to eat. Dr. H. was the cook there and he was making waffles. Then he suddenly was sitting in a living room and a woman was there. I introduced my brother to him and asked if the woman was his wife. He said, "yes"; but then I remembered that I had met his wife and this woman was very definitely one I had never seen before.

Interpretation: Although desiring male companionship and love, she cannot be pro-

miscuous. A brother, brother-in-law, cousin, or teacher are respectable substitutes for her husband. B8 has interesting possibilities. It may mean that she is trying to rationalize her own conduct by projecting infidelity onto a respected teacher or that she is attracted to the teacher and wishes him to be unfaithful to his wife in order to justify her own desire to promote an affair with him."

An attempt was made to test the validity of the interpretations by subsequent discussions with the dreamer. While Hall is extremely cautious in his claims for validity, he has shown without much doubt, that a series of dreams do enable one to obtain a fairly good picture of conflicts that belabor dreamers. These findings are in disagreement with the tenets of some psychoanalysts.

There is one point in connection with the dreams of psychoneurotic patients that should be mentioned. Some hysterical conditions seem to be produced as a result of vivid dreams. For example, functional paralysis of the hand following a vivid dream about letter writing or functional blindness following a dream of looking at a strong arc light may theoretically occur. At least Janet reports similar instances. The probable explanation is that some emotional factor dissociated in normal waking life, subsequently influences the dream. The recall of the dream or the reassociation established in the dream now makes the emotional state operative in normal waking life. The other explanation is that the dream is imaginary or that the falsification of memory for time is such that the whole thing is projected into the waking state.

HYPNOSIS

The skepticism of the phenomena of hypnotism existing among the uneducated as well as the educated can be well understood in view of the fact that their enlightenment has been obtained from observations of stage performances. These performances are usually veiled in mystical rites and the processes involved are no better understood by the hypnotist than by his audience. The seemingly impossible tasks performed by hypnotized subjects are magnified in the minds of the on-lookers since they do not know the capabilities of the un hypnotized individual in making the same performances. Many physicians and psychologists have been similarly tricked into believing that the hypnotized subject possesses some unusual power. One of the stock performances is to show a hypnotized subject four or five filing cards containing no apparent identification marks and to suggest to him that a picture of an animal is on each card. After these have been presented they are shuffled and the subject picks out the correct card on which the

picture of each animal supposedly occurred. The cards had been previously marked lightly on the back so that they could be identified by the hypnotist or another person but in such a way that no clues were afforded to the subject. How is it accomplished and can an unhypnotized person do it? The supposition is that the hypnotized subject has increased visual acuity, but then almost every one else has similar ability. The average person can do the task successfully since usually there are minute texture differences which can be perceived when the attention is focused on them. No one need question the authenticity of hypnosis. The statements of reliable experimenters, who do not have the charlatan's incentive of money and notoriety, and of the subjects themselves are all the proof necessary. It is not implied that all the claims of the experimenters are to be accepted without question or reservation since we will show later in this chapter that some of the claims are highly improbable in light of our knowledge of physiology and neurology.

The very antiquity of the practice makes it a topic of considerable interest.² An Egyptian papyrus dating about 3000 B.C. has been discovered in which is set forth the procedure of modern hypnotism. The Medes, Chaldeans and Indians (Asiatic India) were very familiar with the hypnotic state. The methods have probably been handed down through the priests of Egypt, the Persian Magi and the Levites. The temple sleep induced by these priests was likely hypnotic. The Romans and Greeks at a later date were found to engage in the practice. From these sources it spread throughout Europe until Mesmer in 1774 conducted some experiments and later set forth the theory of Mesmerism. Later investigators including Charcot, Bernheim, Liébeault, Krafft-Ebing, Forel, Beaunis and La Fontaine took it up. The latter introduced it into England, where Braid undertook a serious investigation of Mesmer's theories. It found its way into America; the practice of hypnosis in this country was kept alive by Quimby, Gumes, Sutherland, and Beard.

A discussion of hypnosis leads to a certain amount of overlapping with the topic of waking suggestion, since the hypnotic state is initiated in the waking state. Likewise, there are some factors common to both sleep and hypnosis that are a source of confusion. The relation of

² Moll and Bramwell have written excellent books dealing with the field of hypnotism. Although the books do not contain any recent experimental work, they bring together the early work on the topic. More recent books by Hull and Estabrooks are also recommended.

sleep, hypnosis and waking suggestion will be taken up later in this chapter.

There are certain facts which will be presented in relation to the method of securing responses to suggestion. It is necessary to remind the reader again that the individual who has not been hypnotized must first be led to respond in the normal waking state. If you ask an individual to mail a letter, stimulation of the auditory and visual receptors results in the sequence of responses necessary for carrying out the request. You may say, and correctly so, that suggestion is not involved. If you state in the presence of the same person that you have a letter which should be mailed, and the sequence of responses is made which results in mailing the letter, is suggestion involved? In common parlance it would be called a hint or suggestion. How do the stimuli and responses differ in the two situations? The same receptors are stimulated and the same effectors are active in the total process. The main difference lies in the ideational aspects of the two situations which in turn are influenced by previous experience. Again you may ask is this related to hypnosis? The question is pertinent and the answer is affirmative. If one volunteers to be a subject for an hypnotic experiment, the past experiences and ideational processes at the moment determine to a certain extent at least whether the suggestions given will be complied with. The nature of the suggestion, as well as the "mental set" of the subject, are important in inducing the more complex phenomena of hypnosis. Let us first consider the types of stimuli usually employed. These may be divided for convenience into groups which conform to the predominant types of modal stimuli.

METHODS OF INDUCTION

Visual stimulation is one of the historical methods and is still in vogue. The use of moving stimuli to attract attention and hold it is one of the outstanding characteristics of advertising media. This method has been carried over into the field of waking suggestion for inducing hypnosis. A flashing light and revolving glass cut in such a manner that light is reflected have been employed. Opposed to the moving stimuli, the fixation of the gaze on a bright light, on a highly polished reflecting surface, and on the experimenter have been utilized. These stimuli are especially effective in bringing about the closing of the eyelids, although they are ineffective for some subjects. The efficacy of these stimuli is explained by certain anatomical and functional factors. When these stimuli are used, they are presented slightly

above the level of the eyes. In order to fixate the object the eyes need to be raised, and this is the position of the eyes during sleep. The result is that the habitual sequence would require eyelid closure; and if appropriate ideation accompanies this, sleep may follow. The objection may be raised that simply gazing at a point or a light will not normally produce these reactions. Unless the visual stimuli are reinforced by other stimuli or ideas, there is a high probability that nothing will happen. Appropriate auditory stimuli, such as, "you feel drowsy, the eyelids are getting heavy, you are going to be hypnotized," repeated continuously, have their effects.

This brings to the fore the use of auditory stimuli per se. Most writers suggest the use of monotonous sounds such as the repetition of the same sentence or phrases, counting, the ticking of a clock or a metronome. Certainly no one believes that listening to a clock tick without the proper attitude on the part of the subject will produce hypnosis. In conjunction with visual and tactual stimulation, clock ticks, accompanied by the belief in their influence, will induce the phenomena. One subject whom the writer had attempted to hypnotize but who could not be thrown into the trance state by visual fixation and the usual verbal stimuli, however, when left alone for about five minutes with the instructions to listen very carefully to the ticking of a watch placed behind him was found in a fairly deep hypnotic state upon the writer's return to the room. Estabrook's graphophone record for inducing hypnosis and the hypnotization of people listening to the radio indicate that auditory stimulation alone will suffice with the proper rapport. The use of the word *sleep* in inducing hypnosis has caused the writer considerable difficulty since the actions required later of the subject are not compatible with his ideas of what one does while asleep.

Visual and auditory stimuli augmented by tactual stimuli will probably be more effective than either used alone. Stroking the forehead, gently stroking down over the eyelids and face, and stroking of the limbs, are the tactual stimuli most frequently utilized. Slight touching of the eyelashes tends to close the eyelids and when reinforced by the statement that the eyes are going to close, the movement likely will follow. These stroking movements, in addition to aiding muscular relaxation, are part of the ritual carried over from Mesmer's notion of "animal magnetism." It was by these means that the flow of magnetism was transferred from the hypnotist to the hypnotee. Although the theory had been disproved, the ritual still survives and serves a useful purpose for some subjects.

We cannot say, because of limited knowledge, that any one type of stimulation is more effective than any other. The type that is most effective for one patient may not be effective for another. In general, all of the methods should be combined with emphasis placed on the type that seems to be productive of results for the particular subject. The usual procedure is to have the subject recline on a couch or relax in an armchair. Explain to the subject that you would like his coöperation and something of the results which can be obtained. Caution must be exercised in what the subject is told will happen, if experiments are to be carried out, since this will influence his behavior. Have him gaze for a brief period at an object held in front and slightly above the level of the eyes. Tell him that he will be relaxed, calm and comfortable. Gently stroke the eyes and face and add the suggestion that his eyes are getting heavy, that they are closing somewhat. Continue talking in a smooth even tone, suggesting relaxation, closing of the eyes and deep breathing. Usually the eyes will close; now suggest opening the eyes and closing them more rapidly. From this point on, the procedure varies with the degree of hypnosis desired.

The author has found it desirable in most cases to open the eyes and have the subject stand. Again close the eyes and suggest swaying. When the eyes are closed, there occurs involuntary swaying to which the subject pays little attention. If the attention is directed to the swaying by the suggestion that the subject is swaying this will be interpreted by the subject as having been produced by the suggestion. Similar tricks may be employed to build up the subject's belief. If the arms are extended across the front of the body with the fingers interlaced and touching the back of the opposite hands, there is some difficulty in pulling the hands apart. This is due to the size of the knuckles. When the subject is told that he will have difficulty in separating the hands and actually finds such to be the case, further belief and expectancy is established. Suggestion of rigidity of the arms and the body will probably be accepted. Some subjects, however, are not amenable to any of these methods.

Jastrow (635), Friedlander (636), Kauffmann (637), and Schilder (638) have used narcotics to reinforce the suggestion of sleep. This raises the question whether it is due to the action of the narcotic on the central nervous system or whether it is simply another method of establishing credulity. The writer is inclined to the latter view since several subjects who have resisted the other methods have succumbed when allowed to inhale what they thought was an anesthetic but which

in reality was the odor from a fountain pen. Baernstein's³ check on the influence of scopolamine hydrobromide (truth serum?) on enhancing the swaying response showed that the drug did not influence all of the subjects. Those subjects that were normally suggestive were found to be more suggestible after an injection of $\frac{1}{200}$ of a grain of the drug in solution than after an injection of a similar quantity of sterile water. Subjects whose knowledge of physiology is limited will sometimes respond to the statement that the reduction of circulation of the blood to the brain produces sleep and hypnosis, if one proceeds to press the fingers on appropriate portions of the neck. The subject should always be made to place his fingers on the artery so that he can feel the pulse beat. The foregoing account presents the essential facts for the production of hypnosis. The timing and the sequence of the suggestions given are of equal if not greater importance. No general rules can be laid down in regard to these matters since each subject presents a different problem in his attitude toward the occurrence of the phenomenon. Experience with a variety of subjects enables the experimenter to gauge the optimal time for new suggestions.

PRESTIGE AND NONPRESTIGE SUGGESTIONS

In the literature on suggestion, reference is made to prestige suggestions, nonprestige suggestions, waking suggestions and hypnotic suggestions. Prestige suggestions are those in which the suggestion is given in a direct form by another person or by mechanical means such as a phonograph. You are going to sleep; your eyes are closing; and you are going to be hypnotized; are typical examples of direct suggestions. These suggestions may be given either in the waking state or in the hypnotic state. Nonprestige suggestions are those in which a situation is set up so that an expected stimulus may occur but does not actually take place. A typical example of this kind of suggestion is found in the creation of illusions of warmth and pain. The subject feels pain when an inductorium vibrates; but when a short circuiting switch is closed and no current is imposed on the subject, he may again feel pain provided the original stimulus was near the limen. There is, of course, no reason to assume that these suggestions would not work just as well in hypnosis although they are usually referred to as nonprestige suggestions only when administered in the normal waking state. The distinction between waking suggestions and hypnotic suggestions is an

³ Reported by Hull in *Hypnosis and Suggestibility*. Appleton Century Co., 1933.

artificial distinction since all suggestions are administered in a waking state, otherwise the subject would in general not respond to them.

SUSCEPTIBILITY TO NONPRESTIGE WAKING SUGGESTIONS

We shall now consider some factors related to nonprestige suggestions administered in the normal waking state. Illusions have been used extensively as measures of normal suggestibility. Size-weight illusions, illusions of movement, illusions of smell, and illusions of warmth can be produced in children and adults. Murphy (639) has presented an excellent summary of this work in his book on Experimental Social Psychology. On the illusion of seeing a ball thrown into the air Triplett (640) reports that about 50 per cent of 165 children in the fourth to the eighth grades saw the ball thrown into the air. Small (641) found that 73 per cent of school children smelled odors when water was sprayed into the air and about 76 per cent saw movement of a toy animal when a crank was turned which supposedly moved the toy. Guidi (642) found that on warmth illusion children ranging from 6 years of age to 15 years of age were suggestible in percentages ranging from 50 to 33 per cent. These findings are in accordance with those of Gilbert (643) on size-weight illusions. He reported that suggestibility increased up to about the age of 9 and decreased from that point on. Heron (644) from a warmth illusion similar to that of Guidi, found that 28 college students from a total of 54 (approximately 51 per cent) accepted the suggestion of heat. The women were slightly more suggestible than the men.

Do these varied experiments actually support the thesis that suggestibility decreases with age? The answer is not clear cut. On warmth illusions the percentage found by Guidi was about 50 for the lower age groups which corresponds with Heron's figure of 51 for college students and also compares favorably with the percentage found by Triplett on the ball being tossed into the air. Small's figures of 73 and 76 per cent for illusions of movement obtained on children are probably higher than would be obtained on adults. Likewise the size-weight illusion can be established more often in children, since their experience with weight of objects is more limited than that of adults. That children are suggestible cannot be denied and that they are more suggestible than adults is probably true, but caution must be used when making inferences from a specific type of suggestibility to general suggestibility.

In regard to the relative suggestibility of men and women, the experi-

mental data show that for specific types of suggestion or situations, women are more susceptible than men. Warner Brown's (645) study of sex differences in suggestibility is the most extensive and carefully controlled piece of work thus far accomplished. The first 4 experiments invoke a least perceptible sensation or rather, they are designed in such a way that the subject imagines a sensation in the absence of specific stimulation but under circumstances appropriate for the occurrence of the sensation. In his odor test, the subject was given these instructions:⁴

It is the object of this experiment to measure the delicacy of your sense of smell.

The experimenter will let you smell a comparatively strong sample of each of three odors—peppermint, wintergreen, and ethyl alcohol.

You will then be given ten bottles in succession. You are to smell each of these carefully and report in each case whether you smell one of the odors you have just sampled, some other odor or no odor at all.

The ten bottles actually contained only distilled water.

INSTRUCTIONS FOR THE WEIGHT TEST

You will see a set of small cork weights, some of which are so light that they cannot be felt at all. It is the purpose of this experiment to find the lightest of this set of weights which you can feel on the top of the middle finger. When the experimenter says "ready" you are to see whether you can feel the weight or not and report to the experimenter immediately

The subject was then shown that one of the corks aroused no sensation of weight, whereas a somewhat larger one would. The hand of the subject was then shielded from his view and only the imperceptible corks used as stimuli.

INSTRUCTIONS FOR THE HEAT TEST

It is the purpose of this experiment to determine the smallest amount of heat which you can feel with your finger.

Wait until the box has been heated by the electric current for one minute. Then let the index finger follow the indicator slowly into the hole until you feel the least perceptible warmth from the heated coil within.

If you do not feel the warmth the first time allow the current to heat the box for another minute and then try again. If you still fail to feel the warmth, it means that your sense of temperature is not sufficiently delicate and the experiment must be given up.

The box was so arranged that no heat was transmitted to its interior

⁴ All of the quotations appearing in the following section are reprinted from W. Brown, *Individual and Sex Differences in Suggestibility*, Univ. of California Press.

and the whole setting was favorable for establishing the idea that the box was heated.

INSTRUCTIONS FOR THE ELECTRIC SHOCK EXPERIMENT

It is the purpose of this experiment to measure the weakest induced current which you can feel passing from one finger to the other.

You are to sit with the first and second fingers of your left hand dipped in the glasses of water which contain the electrodes. The experimenter will start the current through the primary coil and then pull the secondary coil slowly up until you feel the current distinctly. This is merely to acquaint you with the working of the apparatus.

The experimenter will then push the coil back and start it up again very slowly. You are to keep a sharp lookout for the first faint shock and as soon as you are sure that you feel it tell the experimenter to stop.

In case you do not feel the current soon enough, the experimenter may again return to the starting point. The experiment may be repeated two or three times at the discretion of the experimenter.

The subject was shocked when the apparatus was first demonstrated. For the control work the coil of the inductorium was moved but the current to the electrodes was cut off.

The results of these four experiments indicate that individuals vary in the way in which they yield to suggestion. The illusion of odor was established in 90 per cent of the subjects; touch in 72 per cent; shock in 78 per cent; and heat in 60 per cent. Intercorrelations of the test performances were positive although small, which indicates that suggestibility is a trait which functions in tests having certain characteristics in common. Women were on the whole more suggestible than men.

The student should be able to form an adequate idea of the nature of the tests from the above presentation. In the subsequent section only one type of test will be taken up which illustrates the general mode of procedure.

The next four tests involve the illusory perception of a change in brightness, pitch, size or motion. Actual changes were first demonstrated and the subjects were then instructed to indicate when they thought a change had occurred although no change was made. These instructions were given for the change in size.

It is the object of this experiment to see how small a change in size you can notice. You will see a bright area on the screen. This can be made gradually larger or smaller. Watch it closely and as soon as you see any change of size tell the experimenter whether it is increasing or decreasing in size.

Similar instructions were given for brightness, pitch and motion. Fifty-five per cent yielded to the brightness illusion in 10 seconds; 41 per cent to pitch; 68 per cent to size; and 61 per cent to motion. In respect

to suggestibility of men and women these tests yielded the same results as the previous tests.

Two tests originally designed by Binet were included in the battery. Suggestibility in these tests was introduced by having an appreciable increment in weight or in size of lines for the first 4 or 5 judgments and thereafter no actual increment. For example, in the weight series the first 5 boxes weighed 20, 40, 60, 80 and 100 grams, all of the others weighed 100 grams. Since the subject expected the increment to continue, there was a tendency for the next 100 grams weight to be judged heavier. Of 140 subjects tested, only 2 were unsuggestible to the weight change and of 137 tested on progressive lines, only one was unsuggestible. The women were more suggestible than the men.

Five tests involving recognition of form, recognition of position, recognition of size, memory for pictures and an Ink Blot test for imagination were utilized as the next step in procedure. The principle of the first 4 of these tests is to present a pattern or form briefly for the subject to see. Some details in the pattern or form again presented are altered and the instructions are designed in such a way as to bring about the tendency to identify the second pattern or form with the first. On the Ink Blot test the directions were as follows:

Individuals differ greatly in the fertility of their imagination. It is the aim of this experiment to find out how many things will be suggested to your mind by a senseless ink blot. This particular blot may make you think of some kind of animal, or of any number of other things. See how many things you can write down in two minutes that the blot might be a picture of.

The number of subjects affected by the Form Test were approximately 70 per cent; by the Size test 75 per cent and by the Position test, 60 per cent. In regard to sex differences the women seem more suggestible on the Recognition of Form Test, the Position test and Ink Blot Test. There is no reliable difference on the other 2 tests.

The remainder of the battery of tests of suggestibility are based upon the principle that if a subject is told what the usual judgment made by others is, or what factors in a situation tend to make for error, he will modify his judgment to conform to the stated average or to compensate for the error factors. These tests are similar in some respects to prestige suggestions.

The tests are listed below:

1. Size-Weight Illusion
2. Müller-Lyer Illusion
3. Estimation of Distance

4. Estimation of Weight
5. Preference for Proportions of Rectangle
6. Preference for Proportions of Triangle
7. Preference for Proportions of Cross
8. Preference for Proportions of Divided Line
9. Preference for Color
10. Preference for Tone
11. Preference for Color Combination

In 5 of the above tests, Brown found that women were more suggestible than men; in one more they were probably more suggestible; in one, men were more suggestible than women; and probably in 2 others the last relation holds.

We may conclude that in most of the traits tested women were more suggestible than men; and although intercorrelations of the tests yield, on the whole, low positive results it is unsafe to say that suggestibility is a unit trait. It may probably be true that a few individuals who are suggestible in one test will also be suggestible in others, and it is also true that other individuals will be found who are not uniformly suggestible. This is in agreement with Chojecki's (646) conclusions on a group of 60 college men and women. He found no correlation between suggestibility on warmth illusion, progressive line test and a change in sensitivity after a magnet had been applied to the finger. Data derived from experiments by Aveling and Hargreaves (647) show that there is a low positive intercorrelation among the several tests of suggestion employed by them. Such illusions as warmth, progressive lines, and progressive weights give a maximum correlation of $+ .32$.

SUSCEPTIBILITY TO PRESTIGE SUGGESTIONS (HYPNOSIS)

All people do not respond equally well to waking suggestion, and consequently we would expect that some people would not be easily hypnotized. Specific statements such as women are easier to hypnotize than men; children are easier to hypnotize than adults; weak volition is necessary; or emotional imbalance such as is manifested in hysteria favors the process, have in the past not been founded on fact. The susceptibility to hypnosis is determined by at least 3 factors: (a) the subject's previous experiences, (b) the hypnotist and (c) the method of induction. These three variables account for the wide divergence in statements made. Serog (648) claims that 100 per cent of normal healthy men are susceptible to some form of hypnosis. Other writers give figures ranging from 10 per cent up to 100 per cent.

Whether people who are unwilling to be hypnotized can be hyp-

notized has never been satisfactorily settled. The writer has succeeded in hypnotizing 2 college students who insisted they could not be hypnotized, after about 12 sessions of several hours each. They were willing to cooperate but insisted that they could not and would not be hypnotized. After the initial hypnotization a wide variety of phenomena could be produced. The inference must not be made from this experiment that all individuals can be hypnotized against their will. Unless they are willing to take the time and submit themselves to the process, nothing can be accomplished. Careful selection of subjects will increase the percentage; repeated attempts to hypnotize will also yield an increased percentage and change of hypnotists will cause some heretofore unsusceptible subjects to become susceptible. Prince (649) and Haupt (650) believe that even in the same individual the susceptibility varies from zero to 100 per cent at different times.

Hull (651) in summarizing studies by Barry, Mackinnon, and Murray; White; and Jenness, concludes that a number of prestige tests in the waking state are diagnostic of whether the subject is susceptible to hypnosis. The response to suggested arm movement and suggested postural change has been correlated with rate of lid closure and the production of other hypnotic phenomena. On the contrary, the frequency distribution curves of response to waking suggestions of hand levitation, to waking suggestions of electrical shock, and to waking suggestions of a swinging pendulum are U shaped. These U shaped curves do not correspond to the frequency distributions found for responses in hypnosis which in some cases are linear. Body sway and illusion of heat show a high correlation with susceptibility to hypnosis, according to Furneaux (652). One might argue, therefore, that the phenomena of indirect waking suggestion, direct waking suggestion and hypnosis are dissimilar and that the relationship is relatively slight. Such a conclusion is based on data obtained from dissimilar groups of people, dissimilar techniques and different hypnotists and should be accepted with maximum reservations.

In our previous discussion of susceptibility to waking suggestion, we showed that susceptibility to the various forms of nonprestige suggestion was not equal or uniform. Hull finds, however, that prestige suggestions of various types show a fairly high degree of intercorrelation and also correlate with susceptibility to hypnosis. He arrives at the conclusion, which the writer suggested earlier in this text, that direct waking suggestion and hypnotic suggestion may be encompassed in the same definition.

Age differences are probably important in determining susceptibility

to hypnosis. We might anticipate that a study of this factor would reveal that the tendency conforms to other types of suggestibility.

Other traits such as submissiveness, introversion, extroversion, egotism, and neuroticism have been mentioned as essential characteristics of good hypnotic subjects. Davis and Husband (653) have attempted to discover if such relationships exist. They correlated the scores made on Thurstone's Personality Schedule, Laird's so-called Introvert Test, Watson's Test of Fairmindedness and the Pressey X-O Test for Affective Reaction with susceptibility to hypnosis. They set up an arbitrary scale of susceptibility of 5 steps, which ranged from unsusceptible to the somnambulistic trance. The validity of this procedure may be questioned since the ideation and belief on the part of the subject markedly influences the type of phenomena exhibited. No significant correlations were found between the test scores and susceptibility. In other words, individuals who were neurotic, introverted or easily influenced emotionally were no better subjects than those who did not possess the traits. The Rorschach test has been employed by Sarbin and Madow (654) and Brenman and Reichard (655) to determine the relationship between personality characteristics and hypnotizability. The former investigators held that the W/D ratio separated the good hypnotic subjects from the poor hypnotic subjects. "W" refers to the situation in which the ink blots are responded to as wholes and "D" to the situation in which the response is made to details of the blots. The latter investigators do not agree in their findings.

Baumgartner, (656) working along similar lines, attempted to determine whether the suggestion of falling forward when one stands up with the eyes closed, shows any relation to such character traits as beauty, optimism, honesty, sympathy, sweet temper, tactfulness, positive suggestibility and negativism. These character traits were assigned values by the supervisors. Small positive correlations were found between the amount of swaying and sympathy, sweet temper, tactfulness, and suggestibility as rated by the supervisors. Williams (657) applied suggestions of postural swaying to catatonic, paranoid and manic depressive patients. The latter patients were in the manic phase. The paranoid and manic patients were not found to differ to any great extent from normals but the catatonics showed definite negative responses. Some cases exhibited definite overcompensation in the attempts to avoid the effects of the suggestions.

Davis and Husband (658) found no significant sex differences in susceptibility to hypnosis in a group of 55 college students. The notion

that certain characteristics favor the susceptibility to hypnosis seems to be without foundation. Emotional disturbances are not necessarily favorable for inducing hypnosis since an excited patient or a drug addict in need of his drug is exceedingly difficult to hypnotize. The writer has found two types of individuals usually hard to hypnotize; (1) those strongly averse to the procedure and (2) those overanxious. The person who is in a state of indecision seems to be the most desirable one to select. Brenman and Reichard have found similar results through the use of the Rorschach. In these individuals, negativism and anticipation do not prevent the suggestion from being expressed in ideomotor activities.

PERSONALITY OF THE HYPNOTIST

The psychoanalytic doctrine has been utilized for explaining certain factors in the hypnotic procedure. Among these has been the explanation of the type of person who will likely make the best hypnotist. Ferenczi's (659) theory incorporates the doctrine that every successful reaction to suggestion takes place because the subject regresses to an infantile state in which the infantile attitude toward the parent of the opposite sex is assumed. McDougall (660) in criticising this theory states that:

If we take the theory seriously, we should expect to find that the normal man is susceptible only to the coöperative or "maternal" form of suggestion; or the normal woman only to the domineering or "paternal" form. But there is no indication, and no claim is made, that any such rule holds good.

This brings us to a consideration of whether the domineering hypnotist is more successful than the nondomineering hypnotist. Likewise, is a man or a woman more successful?

Answers to the questions are pure speculation. Unquestionably some individuals succeed in hypnotizing more often than others. The personality that is successful in controlling the activities of individuals normally varies. A glance at our industrial and military leaders will convince the worst skeptic. The education and other qualifications of the subject enter into the problem. The greatest assets of a hypnotist are experience and prestige. Experience dictates the opportune time for giving new suggestions and enables the experimenter to recognize the signs of acceptance or rejection. Some suggestions that are not immediately accepted can be reworded so that resistance to their acceptance will not be built up. Prestige, while not proved by controlled experiments, plays a large rôle. A subject who has seen the hypnotist

give a successful demonstration is likely to be influenced by the fact that it had already been done. Well-known facts derived from the field of advertising support the notion of prestige. The largest, the best and the strongest are successful appeals in influencing people to buy commodities. The writer has tried the following experiment. Student A hypnotized in the presence of student B was unsusceptible to B in spite of the similarity of methods employed. This is not true, of course, for all subjects. The difference apparently lies in the prestige of the instructor as contrasted with that of the student hypnotist.

STAGES OF HYPNOSIS

Certain phenomena related to hypnosis have been discussed under the names of waking hypnosis, and auto-hypnosis. The term waking hypnosis has been introduced into the literature to account for many of the phenomena that occur from suggestion without the direct suggestion of sleep or any of the symptoms of sleep. Wells (661) has succeeded in producing anesthesia of the hand, cure of headache, and amnesia, in waking hypnosis. This form of procedure does not add anything to our knowledge of the mechanism involved. All that has been accomplished is to show that by modifying the instructions some of the more complex actions can be produced without the intervention of a series of steps to build up the credulity of the subject. Certainly, all hypnosis is waking, to the extent that the initial suggestion of closing the eyes is given while the subject is awake. It is not surprising then that some subjects will experience an initial loss of sensation if suggestions of this type are given first and especially if they think that anesthesia is one of the characteristics of the hypnotic condition. Wells seems to be questioning the validity of the different stages of hypnosis.

Hypnosis has been divided by some authors into various stages which are separate and distinct states; the number varies with the particular author consulted. These may be referred to as light, medium, and deep hypnosis, or hypnoidal, cataleptic, and somnambulistic. These classifications of hypnotic phenomena are grouped in accordance with the usual sequence in which they are produced or in accordance with the complexity of the phenomena.

Davis and Husband, using the gaze fixing method and giving suggestions of eye closing, rigidity of arm and leg, total muscular rigidity, "glove" anesthesia, amnesia, a variety of hallucinations and post-hypnotic suggestions showed that 29 per cent of their subjects were susceptible to the hypnoidal state, 18 per cent to the light trance, 15

per cent to medium trance, and 29 per cent to the somnambulistic trance. Their findings are interesting but are not conclusive, since another technique and another hypnotist may secure an entirely different ratio. It is probably safer to say that there are no distinct stages of hypnosis and probably no graded series of phenomena. The ease with which a given state can be induced is dependent upon numerous factors.

Auto-hypnosis produced by auto-suggestion is the state in which ideas are accepted and acted upon in such a manner as to bring about phenomena similar to hypnotic phenomena. Whether auto-suggestion is essentially different from hetero-suggestion is not agreed upon by theorists. The writer is inclined toward McDougall's theory in which he maintains that auto-suggestion is really hetero-suggestion. Hetero-suggestion depends upon stimulation of some kind from the environment or from another individual; these stimuli may directly result in response or they may, through association, arouse ideational factors that result in reactions of a particular sort. In auto-suggestion, the external stimuli, especially those from another individual, are eliminated, but a wide variety of feelings and proprioceptive stimuli are still operative. These may result in direct activity or they may arouse ideational factors which produce the behavior normally ascribed to auto-hypnosis. If some one happens to mention that it is 6 o'clock and almost dinner time and I proceed to leave my office for home, is this reaction essentially different from my going home if I happen to feel hungry about 6 o'clock? There are certain differences in the neural pathways involved, but the functional processes are not unlike. The reaction of the individual who believes in the repetition of Coue's formula, "I am getting better and better" is not essentially different from the reaction of the individual who accepts the physician's word that he is getting well. The medium who goes into a trance or the hysterical patient who has functional paralysis is reacting to stimuli in a manner determined by the integration at the moment. We will have more to say about this topic in connection with our discussion of the theories of hypnosis.

INFLUENCE OF HYPNOSIS ON PHYSIOLOGICAL FUNCTIONS

The physiological concomitants of hypnosis and the effects of hypnotic suggestion upon physiological functions are of interest and must be understood before an adequate theory of hypnotism can be constructed. Physiological changes accompanying hypnosis have not been adequately investigated. Some writers report changes without definite suggestions of such changes, but rarely do they state the exact nature of

their instructions. Casual observations on subjects indicate that some circulatory changes occur. Increased pulse rate and slight rise in blood pressure have been noted. These increases may be due to emotional excitement rather than to hypnosis, per se. Walden's (662) early plethysmographic study indicates a sudden short constriction of the peripheral blood vessels at the beginning of hypnosis followed by gradual dilatation until the end of the hypnotic sleep. At the instant of awakening there is again a brief constriction. Pulse rate and respiration are slower; a steady slight fall in rectal temperature is observed; and the surface temperature is higher. The writer has found a decrease in systolic and diastolic blood pressure and a fall in the pulse rate as compared with the normal for a period of fifteen minutes. Jenness and Wible (663) have concluded the most extensive studies on cardiac and respiratory changes during hypnosis. They find no significant difference between the normal state and hypnotic state in the absence of direct suggestions. They do find that respiration is increased with direct suggestion but that the cardiac rate is not. Beaunis (664) in 1884 felt that muscular strength was lessened, although not uniformly, without definite suggestion to that effect. He also reports a decrease in auditory acuity of approximately 50 per cent without suggestion. Even if these changes are not brought about by the suggestion of sleep, relaxation, and similar suggestions, expectancy on the part of the subject may play an important part.

The influence of direct suggestion upon functions controlled by the autonomic nervous system has been the subject of a great amount of controversy. The autonomic system is partially under voluntary control. The sphincter muscles of the bladder and anus, erection of the glans penis, pulse rate, respiration rate, probably secretion of the stomach, and certain of the endocrine glands are subject to partial voluntary control. It is not unreasonable to suppose, then, that these functions can be modified and controlled to a certain extent by direct suggestion since the same neural mechanisms are involved. All that is accomplished through hypnosis is the substitution of an unusual set of stimuli for the varied stimuli which alter the physiological processes. An increase or decrease in blood pressure, evacuation and retention of the bladder and bowels, digestion, kidney secretion, increase and decrease in temperature, blanching and flushing of restricted parts of the body, formation of blisters, rate of healing of tissue, secretion of the mammary and sweat glands, production and inhibition of menstruation, configuration by blanching or irritation of specific areas, and the weakening of

the effects of adrenalin, pilocarpine and atropine have been reported. The production of these phenomena are usually taken as evidence that hypnosis, per se, has some extraordinary influence on the nervous system or that the nervous system is functionally altered in some respect. This conclusion is not necessarily warranted since most of the above phenomena can be brought about by a number of situations in daily life.

Blood pressure changes are concomitant with emotional states, exercise, fatigue and even atmospheric conditions. In appropriate social situations both retention and evacuation of the bladder and bowels occur. We do not know, for example, just how long the sphincter ani can be contracted after the administration of a purgative. Luckhardt and Johnson (665) have shown that the acidity of the stomach is about the same after the ingestion of a test meal, after a hypnotically suggested meal and after talking about a meal in the normal state.

Temperature regulation seems to be one of the most difficult phenomena to explain; nevertheless, worry, excitement and even the continual remarks about the hot and cold weather probably have their effects. In regard to blanching, McDougall (666) reports a case of a subject who could voluntarily throw himself into a trance-like state in which his circulation was modified so that a needle thrust into his arm produced no bleeding. The formation of blisters and healing of tissue are normal events; we do not usually think of these things as subject to voluntary control. McDougall again mentions the formation of blisters by suggestion and cites Delboeuf's work on healing. Delboeuf burned two similar areas on the forearms of a subject. He suggested that one area would heal rapidly and the other was left to heal at its natural rate. The reduction of inflammation produced by suggestion apparently brought about a greater rate of healing. Without questioning the accuracy of the observations, we need to have more details concerning the experiment so as to exclude the possibility that the subjects did not irritate the surface of the arm in the production of blisters or did not either aid or hinder the healing process of the burns. Jerdriassik (667) and Krafft-Ebing (668) are reported to have formed blisters which corresponded to the shape of an object or a letter pressed on the skin. The only criticism of the experiments that can be made is whether they had properly controlled conditions to rule out extraneous factors. Ullman (669) claims to have induced a secondary burn as well as herpetiform lesions in an hysterical subject through direct suggestion. Pattie (670) has reviewed all the literature on the topic of blister formation through hypnosis. He reports experiments dating back to 1886

and extending through 1927. His summary and conclusions still leave doubt concerning this fundamental problem, which should be cleared up by a thorough study. The mammary glands will secrete normally under proper stimulation and ideational factors so the same result could be predicted under hypnosis. The same applies to menstruation. Fear, warmth, cold and excitement all tend to influence this function. A critical attitude must be maintained in regard to configuration through blanching or cyanosis. The neural mechanism is such that control of gross portions of the body could be anticipated. Work by Lipkin, and others (671) has demonstrated that gross circulation changes in the periphery can be modified by hypnotic suggestion. They succeeded in relieving vasospastic symptoms and made observations of changes in capillary flow. Neural ramifications, however, do not conform to patterns. Almost all of the phenomena mentioned are influenced by normal waking conditions; hence it is not improbable that the reinstatement of these usual experiences either through hetero-suggestion or auto-suggestion, is adequate to account for the reactions. If the subject feels that the reaction is one that goes along with hypnosis, then the association processes are likely to lead him to situations that have previously evoked these responses.

INFLUENCE OF HYPNOSIS ON PSYCHOLOGICAL FUNCTIONS

The variety of psychological phenomena that can be produced under hypnosis covers the entire field, including sensations, feelings, emotions, negative and positive hallucinations, amnesia, and almost the entire range of motor responses which the subject is normally capable of making.

An increase, decrease and perversion of the sensations is easily demonstrated. Sensation for warmth, cold, touch will be denied by most subjects with appropriate suggestions. Apparent increased sensitivity is manifest in many of the hypnotized subjects' reactions. Threshold changes have been pointed out by some experimenters. Beaunis (672) reduced auditory sensitivity but could not increase it with suggestion. Travis (673) has indicated that in reverie there is a lowering of the threshold of auditory sensitivity. Whether pain is felt to any considerable degree when anesthesia is suggested is a question still not satisfactorily answered. Pain of major operations such as amputation of the leg, appendectomy, and of child birth has been successfully assuaged by hypnosis. Many experimenters have demonstrated the fact that the arm or hand of a hypnotized subject can be burned or cut without any

observable signs. Nevertheless there is a sensation of pain, since if the subject is rehypnotized and told to recall his experiences he will state that pain was experienced. This simultaneous perception of and lack of perception of sensation is one of the most troublesome problems for psychology. How real is the anesthesia? Some writers contend that the anesthesia is no more real than the anesthesia of the person who has a tooth extracted without an anesthetic and with an air of bravado says it didn't hurt at all. The stoicism of the American Indians in the face of pain is well known, and hence some say that the hypnotized subject shows only marked discrepancy between the actual feelings and the manifestation of the feelings. The subject's own statement that a burn did not hurt should of course be given some weight. The experimental data are more to the point than these casual observations. Neutra (674), the German obstetrician, has observed that the post-operative and post-delivery shock is greater following hypnosis than following an anesthetic. This of course indicates that the feelings or sensations are just as strong as without hypnosis. Kroger and De Lee (675) in their report on the control of pain in childbirth seem to hold that there are no consequences attendant upon the use of hypnosis. The work of Dorcus and Kirkner (676) and Kroger and Freed (677) indicates that the painful cramps associated with dysmenorrhea can be alleviated to a marked degree of hypnosis. Similarly, the intractable pain associated with paraplegic conditions can be partially controlled by hypnotic suggestion, as has been shown by the former of these investigators. Bechterev (678) maintains that the usual reactions to pain stimuli, i.e., change in respiration, heart rate and the pupillary reaction, do not occur with hypnotically suggested anesthesia.

Sears' (679) carefully controlled experiments on facial expression, respiration, pulse activity and skin resistance show that these functions which are partly voluntary and partly nonvoluntary have different characteristics under normal inhibition than under hypnotic suggestion. Sears states, "That hypnotic anesthesia is in any sense a conscious simulation seems doubtful." Work by Dorcus shows that the galvanic skin resistance varies in a similar way for both the normal and hypnotic state. Anacusia, amnesia, and anesthesia hypnotically induced are followed by psychogalvanic reflex actions, whereas an anesthesia brought about by local injection of novocaine destroys the response. These responses are shown in plate II.

Dynes (680) maintains that the cardiac and respiratory changes normally following sharp painful stimulation of the skin are reduced to

a minimum. Pattie (681) has approached the problem in a somewhat novel way, and his findings furnish a better clue to the subjective state in hypnotically induced anesthesia than many of the other experiments. He compared the ability of subjects to discriminate the number of touches in the normal and in the hypnotic state when the hands were clasped either in the normal way or in the position of the "Japanese illusion." The "Japanese illusion" results in a confusion of knowledge concerning the hands. The hypnotic subjects experienced no difficulty in counting the number of touches on the fingers of the unanesthetized hand when the hands were clasped in normal fashion, but difficulty was encountered in suppressing the touches on the anesthetized hand in the "Japanese illusion" position. This experiment definitely shows that the hypnotic anesthesia is not a genuine anesthesia but depends upon accurate perception of the stimulus if the subject even attempts to carry out the suggestion.

Pattie (682) in another experiment on unocular blindness hypnotically induced found that he was unable successfully to produce the phenomenon. All of his subjects were eventually shown to be faking (perhaps not in the usual meaning of this term), since they were unable to pass complicated tests for visual malingering.

A series of experiments by Dorcus (683) on nystagmus, the falling reaction, pupillary reaction to light and the production of colored after images, showed that in no case was there an alteration of the normal processes of response by hypnotic suggestion. A comparison of the eye movements following suggested rotation, with the eye movements following actual rotation, showed that the movements were not truly nystagmic but of the voluntary exploratory type. Similarly, the after images of suggested colors were appropriate only so far as the subject knew what the after images should be and could simulate them. When the situation was made complex, the after images were always those of the physical stimulus. The falling reaction following suggested rotation never took place until the subject had first had the experience from actual rotation.

These experiments show rather conclusively that the suggestions do not produce the actual neurological patterns that are invoked by the physical stimulus.

It is unquestionably true that the sensory thresholds may be raised by hypnotic suggestion, but that they can be lowered seems somewhat doubtful. No one has successfully demonstrated that visual acuity, auditory acuity, tactual acuity or olfactory acuity has been increased

by suggestion. Apparent increases in acuity have been reported, however. These measures have been founded on the observation of over-activity on the part of the subject to the same stimulus. Direction of attention to the task to be done and lack of knowledge of the waking performance of the same subjects accounts also for some apparent increases.

The production of emotions and feelings can be demonstrated by relating to the subject a sad story or a joke. Copious weeping and the appearance of dejection occur upon the suggestion of a death of an imaginary chum. Any commonplace story, even if it is not funny, will be reacted to in an hilarious manner if the subject is told that it is going to be funny. These affective states are more easily provoked if there is some semblance of truth in them or if they sound plausible. Levine, Grassi and Gerson (684) studied Rorschach protocols of an hypnotic subject in whom they had induced such emotional states as elation, depression, and apprehension. These protocols were compared with the protocols obtained under normal conditions. The records for the two states were sufficiently similar to show that the same basic personality was being observed but the "emotionally induced" records had features common to those found in clinical cases with emotional disorders. Simulated disorders without hypnosis are needed to ascertain the real effects of the hypnotic emotions.

Positive and negative hallucinations of hypnotized subjects have been witnessed by almost all spectators at hypnotic demonstrations. Imaginary animals, imaginary sounds, and imaginary objects and people in the environment will be treated as though they exist, if a positive hallucination is induced. Observing the behavior of subjects under such circumstances raises the question as to whether the subject has full realization of the deceptions practiced.

Admission of knowledge of deception can be brought about under rehypnosis and sometimes in the waking state. On the contrary, certain performances suggest that the hypnotee is unaware that he has had hallucinations. The writer has caused a hypnotized subject to walk into the wall from which he sustained a nosebleed when told to walk through an imaginary door in the wall. Other subjects, seem actively to avoid walking into objects in the environment when told to walk down an aisle filled with chairs.

This brings up a consideration of the problem of how far a hypnotized subject can be made to conform to the hypnotist's instructions. Reports of subjects stabbing a dummy with a knife or dagger, firing blank

cartridges at a person who has done them an injury and administering what the subject believes to be poison in tea or coffee cannot be doubted. Similarly, the commission of immoral acts by some subjects can be expected. The experimental evidence on this point is contradictory. Rowland (685), Wells (686), Brenman (687), and Watkins (688) have adduced evidence which they believe supports the thesis that antisocial acts will be committed by hypnotized subjects. Erickson (689) reports contrary results which are in accordance with some of the early experimental work of the French school. The positive evidence includes having subjects pick up hallucinated snakes, thrusting their hands into a cage of snakes (supposedly rattle snakes), attacking with intent to kill an enemy Japanese, stealing money from the experimenter's pocket, and throwing acid at the hypnotist who was protected by a glass screen. The negative evidence is somewhat comparable, in that the subjects refused to carry out similar suggestions. There are certain facts that should be mentioned concerning these phenomena.

The subject in every case knows that the experimenter is responsible for whatever happens while he or she is hypnotized. No situation has been constructed in which the subject may not feel with certainty that drastic harm will not be allowed. If a subject were instructed to stand in a street in front of traffic, there is a high probability that the trance would be broken. With most women suggestion of immoral acts would probably terminate the hypnotic state. Unquestionably certain harmful and immoral acts would be carried out by hypnotized subjects who had no aversion to performing these acts normally. In the writers' opinion these situations do not satisfactorily test the hypothesis. The occurrence of emotional responses, hallucinations and perversions of the reasoning processes should not be questioned. Whether these reactions are real or authentic and are occasioned in some manner contrary to normal stimulation must be determined by further experimentation. Weitzenhofer (690) attempts to reconcile the differences by holding that the subject will commit those acts if the situation appears socially acceptable to the subject. If the situation appears contrary to his ethical system, he will not commit them.

Following the early observations of Rieger (691) and Charcot (692) on the relative fatiguability of the arm muscles in the hypnotic and normal states, a series of investigations were undertaken by Nicholson (693), Young (694) and Williams (695). Rieger and Charcot felt that when the arm was extended and held in position in the hypnotic cataleptic state, it could be maintained in position longer and with

fewer oscillations than when the arm was held rigidly in the normal waking state. Williams has carefully attacked this problem. Smoked tracings of arm movements of 8 subjects were obtained by means of a string attached to the arm and a stylus writing on a kymograph. The results were contrary to those reported earlier by Rieger and Charcot. The subjects could not hold their arms up any longer in the trance state than in the normal state. There were, however, fewer oscillations of the arm during the hypnotic state.

The problem of work and fatigue is complicated by the nature of the instructions given in the normal and trance states and the mere introduction of the trance itself without any suggestions whatever. Nicholson found an increase in muscular work on the ergograph by hypnotic suggestion. This was reflected in the amount of work accomplished and a lessening of both subjective and objective fatigue. Even when the subject was exhausted in either the normal state or the hypnotic state, if changed to the other state no apparent fatigue existed. Young found increased ability to grip a dynamometer through hypnotic suggestion which is in agreement with Hadfield's (696) earlier work. Williams corroborates partially the findings of these earlier experiments. He found an increase in the work done in the trance state as compared with the normal state when equivalent suggestions were given in each. On the contrary, the trance, *per se*, did not inhibit the onset of fatigue nor did shifting from one state to another obliterate fatigue.

These apparent differences between fatigue in the hypnotic state and normal state can be accounted for only in increased motivation, but our knowledge of motivation is so limited that any conclusions are apt to be wrong. If the motivation were not artificial or if the penalty were sufficiently great for inferior effort, there is a high probability that no significant differences would be found. Suppose a number of subjects were hypnotized and positive suggestions of increased strength were given them. If their performances were then checked against their performances when one hundred dollars were offered to them to excel their hypnotic performance, the outcome, in our opinion, would favor the normal condition. We are presupposing that no knowledge of the reward existed at the time of the hypnotic performance. Hypnotic subjects are motivated to conform to suggestion by the mere fact that they serve as subjects and most of them have heard stories concerning unusual strength.

One of the diagnostic tests for deep hypnosis is amnesia. If the subject does not remember what occurred during the trance state, he is

said to have been deeply hypnotized. The spontaneity of amnesia has not been investigated although expectancy plays a large rôle. Amnesia can be induced by suggestion so that loss of memory for money or jewelry given up during the trance occurs upon awakening. These amnesic events can be restored through rehypnotization. This form of amnesia is entirely unlike forgetting, since a word from the experimenter will re-establish the events in memory. Forgotten material, on the other hand, has to be laboriously relearned. The recovery of "so-called" dissociated events seems to be favored by the hypnotic technique. Emotional factors that inhibit recall can be effectively removed. The reality of hypnotic amnesia is open to question since it may be simple verbalization in which the subject denies the experience. An experimental study by Huse (697) on the recall of nonsense material partially learned under controlled conditions does not show that the trance is superior to the normal state for the recall of such material. Sidis (698) has also favored a state more nearly approaching the waking state for recall. The reason why hypnosis apparently succeeds in helping to recall certain events lies in the fact that the subject's attitude is such, that events that would normally cause some embarrassment, are told at a time when they are not embarrassing. The attention can also be directed and restricted to a certain extent so that more ideas related to a given topic will arise through the processes of association. In an experiment by Strickler (699) on learning material similar to nonsense syllables, it was found that the learning in the trance period was accelerated when compared with normal learning in the first few trials. The later trials are almost identical. Attention in the trance period is probably favorable for learning, but in the latter part of the series this factor may not be so potent. Bitterman and Marcuse (700) suggested amnesia for a list of words during an hypnotic session. After a 48 hour lapse of time, during which the subject apparently did not remember the words, the words were read again with other words. The subject did not recognize the words, according to their report, but autonomic reactivity occurred.

There is another phenomenon that may be mentioned at this point; namely, hypnotically induced dreams. There is no reason why dreams should not be expected to occur. Whether they are genuine dreams is another matter. Subjects may conform to the suggestion by concocting stories that are related in the waking state. Since dreams do occur normally, we are inclined to accept related dreams as genuine. Klein (701) has shown that almost all varieties of dreams can be produced by

slight sensory stimulation while the subject is in an hypnotic sleep. In fact, he has shown that all the dreams in which the analysts revel can be produced by such stimulation. Sirna (702) attempted to test the hypothesis that the hypnotically induced dream is not the same in cortical effect as the normal sleeping dream. He obtained encephalographic records of the two conditions and found no significant trends in the records which would indicate similarity or dissimilarity.

Post-hypnotic suggestions are suggestions given in the hypnotic state which are carried out in the normal state upon a prearranged signal or at a set time. The variety of post-hypnotic acts that will be performed is limited only by the suggestions given. If one is told during hypnosis that at 9 o'clock the next day he will go to a store and buy perfume, the act will be executed at that time. If the subject is instructed to imitate the song of a bird when the instructor begins lecturing, at least a crude attempt will be made to carry out the suggestion. The explanation usually offered for such performances is that the trance is reinstated by the suggested stimulus or else there is a partial carry over of the original hypnotic condition. Reinstatement of the trance will be produced occasionally by unintentional stimulation. One subject used by the writer in some experiments a few years ago was hypnotized by counting the number series from one to ten. This same subject was working for another man on the problem of crossing out numbers; when he ran across the number series from one to ten on his work sheet he fell into an hypnotic trance. Post-hypnotic suggestions are similar to normal waking suggestions that are carried out at a later time. If you suggest to your friend that a particular suit or dress would be becoming and the apparel is subsequently purchased, the original suggestion may not be remembered, but it has nevertheless been acted upon.

The hypnotic subject's estimate of time has long been a mystery. Many writers claim that hypnotized subjects have unusual ability to estimate the lapse of time. Accurate experimental data on this point are needed, but this ability like many other abilities probably conforms to the normal standards. If the hypnotized subject is told to awaken in fifty minutes he will approximate the time. If the hypnotized subject is given no suggestion, he will awaken in a period of time. How long he will remain in the trance state depends entirely upon the attitude or belief that he happens to hold. Some subjects terminate the trance almost as soon as the hypnotist leaves; others remain hypnotized for a period varying from fifteen minutes to an hour; while still others remain

in the hypnotic state for several hours or longer. No reports have been made of individuals remaining indefinitely in a hypnotic trance without definite suggestions to that effect or without suggestions reinforced from time to time. An experiment by Dorcus, Brintnall and Case (703) shows that in the absence of definite suggestions, most subjects terminate the hypnotic state when the experimenter leaves or when they have some other important engagement. If the subject passes from a hypnotic state into a natural sleep state, habits will be influential in his awakening. A discourse on time estimation by normal people is out of place here. It is sufficient to say that there are many possible cues, such as change in sun position, general movements of people, habits of feeling hungry, counting the respiration rate or the heart rate. Much space has been devoted to post-hypnotic estimation of time and the duration of post-hypnotic suggestions. Many instances of post-hypnotic performances after a lapse of months and in some instances after a lapse of a year have been reported. Bramwell (704), McDougall (705) and Hooper (706) report experiments to which the students may refer for more specific information. McDougall stresses the point that whatever the method the subject uses for keeping track of time, it is done sub-consciously. He maintains that they have no thought of the act to be performed until almost the exact time of its performance. If one wishes to send a birthday greeting to a friend, it is unnecessary to think of it constantly from one year to the next. In fact, one frequently does not think of it until the day of the birthday. Now if you were asked to recall just how you remembered that the birthday fell on that day, the associative steps could probably not be recalled. It is therefore not surprising that some hypnotized subjects cannot recall the associative step involved in remembering that a specific act was to be performed on a set date.

CRITERIA OF HYPNOSIS

In our preceding discussion, some of the characteristics of hypnosis have been considered. It is impossible to construct a theory that will account for all the manifold factors that have been mentioned without at some point contradicting some of the facts. Practically all theorists maintain that an adequate theory must explain the increased suggestibility in hypnosis, amnesia, loss of volition and rapport. The validity of these criteria needs to be examined.

Hull and Huse, (707) in a study of the suggestibility in the normal and waking states, found in securing the falling reaction that $2\frac{1}{2}$ times as

much time was required for the waking suggestion to be effective as was required for the trance suggestion. Habituation to suggestion was also clearly demonstrated. The mean suggestion time for 8 subjects on the fourth experimental session was approximately half that for the first session. Quantitatively, increased suggestibility may be a valid criterion. On the contrary, the phenomena produced in the waking state are as varied and complex as the phenomena produced in the trance state. Wells, Forel, and Moll have induced almost the entire gamut in subjects never hypnotized.

Amnesia, which may be related to absent-mindedness, is not a valid criterion of hypnosis, since the amnesia is more apparent than real. Strickler's work on the post-hypnotic amnesia for nonsense material seems to confirm the notion that amnesia is more prevalent in the trance state than in the normal state. However, his findings are vitiated by the fact that he selected subjects in whom amnesia was the outstanding characteristic. It is not surprising that they would have difficulty in recalling and in relearning nonsense material learned under hypnosis since their set favored the condition.

Loss of volition is genuine only to a certain extent. Thinking, involved in carrying out many suggested acts and the avoidance of objects in the environment, must be taken as negative evidence.

Is rapport the one essential feature of hypnosis? Rapport may be defined as the state of dependence of the subject upon the hypnotist. Young (708) corroborated the contention of Braid and Moll that the condition is really an artifact of suggestion. Subjects, by prior auto-suggestion, exhibit whatever degree of rapport they decide upon. They may be in rapport for only a limited number of suggestions or a wide variety of suggestions. The cataleptic state in animals resembles closely the cataleptic state in humans; yet no writer has seriously contended that a state of rapport exists in animals.

Some years ago, phenomena were reported that seemed to differentiate hypnotized subjects from normal subjects. The reports indicated that the alpha brain waves were present when a suggestion of blindness was given even when the eye was stimulated by light. The waves were suppressed when the suggested blindness was removed. These supposed facts tended to support the notion of an altered visual pattern. More recently work by Lundholm and Lowenbach (709) proves that the original investigators erred. Dynes (710) and Ford and Yeager (711) have demonstrated rather conclusively that the electroencephalograms of hypnotic subjects in the absence of positive emotional

suggestions do not differ from those in the waking state. Dynes found that the sleep records did not conform to either the waking or hypnotic records.

It is obvious that the so-called criteria of hypnosis are not necessarily valid criteria and hence any theory founded on such bases is invalid.

HYPNOTIC REGRESSION

One of the areas that has been explored in recent years particularly for psychotherapeutic purposes is regression under hypnosis. This is the attempt to reestablish earlier levels of activity under direct suggestion. The data are equivocal. Young (712) tried to reestablish the 3 year age level of hypnotic subjects and tested their ability on a standard intelligence test. Their performance on the average was that of the 6 year old child. Unhypnotizable control subjects when attempting to simulate the 3 year level gave approximately a similar mental age. These findings may indicate that this is the earliest age level that can be recalled readily by the subjects. Sarbin (713) gave the Stanford Binet to subjects regressed to the 8 or 9 year level and later administered the same test to the same subjects simulating similar age levels. The results were not clear cut but he felt there was some relation between the depth of hypnosis and the success of regression. Gidro-Frank and Bowersbuch (714) attempted to control the plantar reflex through hypnotic regression. This reflex is present only in the early months following birth. They claim that 3 of these subjects showed the reflex when regressed to the 5th month level but 2 others did not. Studies of handwriting and drawing under hypnotic regression have been carried out. There is evidence of a change toward infantile types of drawing and childish writing, but these need to be compared with samples of writing of the same subjects at early age levels. A report has come to the writer of a change in the brain wave pattern of an epileptic whose seizures began later in life. According to the report, when regression took place, the brain wave pattern was that of a normal subject. Much experimental work needs to be done in this area before proper evaluation of the technique can be made.

THEORIES

Theories founded upon neural exhaustion by monotonous stimuli, the function of the synapses, circulation changes, sleep-like states, analogies to hysteria, dissociation, and restriction of volition, fail in the main to satisfy numerous points that can be raised. A brief summary

of each of these theories is presented in the following section. Bennett (715) has propounded the theory that hypnosis is a result of fatigue of certain parts of the cerebral lobes through monotonous stimulation with consequent overactivity of the nonfatigued parts. The theory can have little value in light of our knowledge of the unitary functioning of the cortex. The ease and rapidity with which the hypnotic state can be induced and abolished also argues against the acceptance of the idea.

The circulatory theories have arisen from the supposition that hypnosis is a modified form of sleep, and therefore the same criticisms may be made of this theory that were made against accepting hyperemia or anemia as causes of sleep. The fact that drugs seem to aid the establishing of the hypnotic trance has been used as an argument in this connection, but this influence of drugs is primarily due to suggestion rather than the modification of circulation. Bernheim, Forel, and Bechterev have held that hypnosis is a modified form of sleep since stimulation similar to that which produces dreams results in partially integrated activity. The theory had its inception in the observation of phenomena common to both states. Factors, such as monotonous stimulation, relaxation, and expectancy, tend to produce both sleep and hypnosis. Hypnotic sleep is similar to normal sleep. Opposed to the identity or similarity of sleep and hypnosis are such factors as differences in respiration, pulse rate, and blood pressure in the two states. Studies by Wible and Jenness (716, 717) and by Bass (718) show that sleep and hypnosis are dissimilar states. Electrocardiograms and pneumographic records obtained by the former investigators show that the records more closely resemble the records of the waking state than the hypnotic state. The latter investigator found that the patellar reflex and the response to a buzzer are diminished in sleep, while in hypnosis they are practically the same as in the waking state. Catalepsy which is one of the phenomena of hypnosis is not prevalent in sleep. Stimulation in sleep results in awakening or at best very poorly integrated activity whereas stimulation in hypnosis does not terminate the trance unless specific suggestions are given to that effect. Since the theories of sleep are inadequate, it follows that any theory of hypnosis constructed on a similar basis would be inadequate.

Charcot's (719) theory, which in the main is subscribed to by Janet, assumes that hypnosis is an artificially induced neurosis. It is closely allied to hysteria, and only those people who have a definite neurotic tendency are susceptible to hypnosis. In hypnosis, as well as in hysteria, there occurs a permanent or temporary diminution of psychic energy

which produces a breakdown in the synthetizing forces of consciousness. This restriction of consciousness gave rise to the concept of a narrowed field of consciousness, which goes along with hysteria according to Janet. If these conditions are artificially produced through monotonous stimulation and direction of attention, hypnosis is the resultant state. Narrowing of consciousness, however, is only descriptive of the actual state and affords no explanation for the actual mechanisms involved.

The dissociation theory held by Coriat, Prince and others has already been elaborated in Chap. VI under the discussion of dissociation and need not be restated here.

In general, the facts derived from physiology and neurology seem to offer very little direct evidence for explaining hypnosis in these terms. One of Bernheim's (720) ideas is the most tenable. He holds that hypnosis is suggestion, and no marked difference exists between normal acts carried out as a result of suggestion and supposedly hypnotically induced acts. Actions on the part of the hypnotized subject are not involuntary, unconscious, or dissociated. Volitional control in the popular sense still exists, otherwise the many complex phenomena would never occur. Voluntary action according to Dunlap (721) "is either merely action in which the idea of the act itself (or of its result) is essentially involved, or it is a series of acts in which the idea of the final act is involved in the first one. This definition includes James' ideomotor action and properly so." When the suggestion is given for closing the eyes, the subject acts voluntarily or, stating it another way, the idea is the action itself. In some complex phenomena, the idea of the first act is involved in the final one. The subject may reply, if questioned, that he could not resist closing his eyes. This simply means that no intervening idea occurred which involved contrary action. If the subject is questioned as to why no contrary ideas occurred, a satisfactory answer cannot be given, except that he was trying to follow instructions or cooperate. This is again evidence of voluntary action. Why are some people good subjects and others poor ones? The answer is that systematization of ideas concerning the sequence of acts has already been established through reading, thinking or demonstration. The acts of the hypnotized individual are appropriate for his ideational sequences. The only reason that the observer or audience considers them inappropriate is because the same series of ideas does not occur to him or to them. This would account for the fact that children more readily act upon suggestion than adults. The knowledge of the appropriateness of the act is limited. The mere fact that one acts with limited

knowledge or without inhibitory ideas does not make his acts any the less voluntary. Most subjects tacitly agree to carry out suggestions when they submit to hypnotic experimentation, and those subjects that are apparently hypnotized against their "will" have undergone a radical change in their sequence of ideas. You may maintain that people do things under the influence of hypnosis that they would not normally do. We have attempted to show that all forms of activity that can be produced under hypnosis can also be produced in the waking subject under appropriate ideational circumstances. Many people play the clown at times and they appear foolish, but certainly their acts are not involuntary. It seems to the writer that the phenomena of hypnosis can be explained in terms of the subject's voluntary acceptance of ideas suggested to him and in terms of his attitudes and beliefs in regard to hypnosis. No experiments have shown successfully that totally inappropriate acts have been carried out by hypnotized subjects. It does not follow that the hypnotized subject is simulating response. On the contrary, he is voluntarily carrying out the act to the best of his ability. The phenomena of auto-suggestion favor voluntary action rather than involuntary action. Cases of conversion hysteria indicate that actions which are appropriate to the ideas of the subject occur and are volitional, although they are inappropriate according to the observer.

If modifications of processes not under voluntary control occur, then some revision of the notions set forth above will have to be made. Our knowledge of voluntary control of so-called involuntary processes is so limited for the waking state that no clear-cut statements can be made.

Welch (722) (723) has recently reemphasized the conditioning theory of hypnosis. He explains the hypnotic state in the following manner:⁵

"Having prepared his subject, the hypnotist performs his first act of 'hokus-pokus' and initiates the first step in the process of conditioning. He asks his subject to stare at a light or small bright object, usually held in a position which will cause a slight eye strain. Staring at this object will naturally tire the subject's eyes, make him blink, and eventually give him the desire to rest his eyes by closing them. The hypnotist capitalizes on the effects of these purely physiological factors. He first tells the subject that his eyes feel tired, very tired, very tired indeed, and of course they do feel tired from staring at the bright object. Note, however, that just as salivation in the Pavlovian situation, brought about by the presence of food, became associated with the sound of the bell, so the feeling of tiredness in the hypnotic situation, brought about by staring at a light, became associated with the words of the hypnotist, 'Your eyes are tired.' Without such an association

⁵ Welch, L. Reprinted by permission from *Journal Abnormal and Social Psychol.*, 1947, 42, 360.

there would be no more cause for the subject's eyes to feel tired than for Pavlov's dog to salivate when a bell was sounded under ordinary conditions.

Next, the hypnotist may tell his subject that his eyes will blink but because of the eye strain they blink anyhow. A second time the hypnotist's words have become associated with what he has described. When the subject was told that his eyes were tired they felt tired, when told that they would blink they actually blinked, and now, when told that he feels like closing his eyes, because of the eye strain there is a tendency for him to close them. Thus, the hypnotist has so far brought about three successful stages in the process of conditioning.

All of the hypnotist's instructions from the very beginning have been given in a soft, monotonous tone of voice. Any monotony in a sense modality is conducive to a soporific state and hypo-associative activity. This is a psychological fact. Anyone with sufficient power of concentration can put himself into a drowsy state if he merely attends to some soft monotonous series of sounds. Once more the hypnotist capitalizes on a physiological effect. He tells the subject that he is completely relaxed, he is sleepy, very sleepy, he is sinking down into a deep sleep, etc. He may even stroke the subject's forehead very lightly and rhythmically with the back of his finger. Hence, the hypnotist is able to associate the instruction to 'sleep' with the soporific effects both of his voice and of the tactual stimulus produced by his finger stroking the subject's forehead."

There is much to be said for this point of view. However, the postulations of conditioning for hypnosis would have to go back over a much longer period of time to explain those cases who become deeply hypnotized by the hypnotist simply pointing a finger at them. In these cases, there is no long preparatory period except the ideas that the subject held previously. This would involve very complex forms of conditioning.

White (724) has stated in somewhat different language, the general hypothesis to which we subscribe, and it is repeated at this point since it may enable the student to obtain a firmer grasp of the theory.

"As a first step it is proposed that hypnotic behavior be regarded as a meaningful, goal-directed striving, its most general goal being to behave like a hypnotized person as this is continuously defined by the operator and understood by the subject. Such a view replaces the older notions of automatism and dissociation which have persisted in a peculiarly rigid and unenlightened form to the great detriment of hypnotic theory. Reasons for preferring the hypothesis of goal-directed striving are found by a direct inspection of typical hypnotic phenomena. The application of the hypothesis puts several of these phenomena in a quite new light, particularly the post-hypnotic behavior which has played such a prominent part in experimental studies. The subject, it is held, is ruled by a wish to behave like a hypnotized person, his regnant motive is submission to the operator's demands, he understands at all times what the operator intends, and his behavior is a striving to put these intentions into execution."

CHAPTER X

CLASSIFICATION AND HISTORY OF MENTAL DISEASES

INTRODUCTION TO CLASSIFICATION AND HISTORY

In the following sections we shall examine, classify and describe some of the more important disorders, the psychoses and the psychoneuroses. The discussion of these disorders is sometimes carried on as if they were entirely removed from and unrelated to normal psychological reactions, an error which has induced much misconception. Consequently, before we turn to an examination of these phenomena, it will be well to consider basic facts.

The difficulty of drawing a dividing line between the normal and abnormal has already been mentioned. It should now be obvious to the student that no individual exists who may be said to be perfectly normal in all traits. Just as one deviates from the average or normal in certain physical traits such as height or weight, so one also deviates from the normal in mental traits or reaction patterns. It is only the more serious deviations which render the individual incapable of adjustment to his environment that are viewed as abnormalities.

The appreciation of the behavior of the patient comes only through a thorough analysis of the entire life of the individual. The evaluation of the part played by both organic and functional factors can be obtained only from a careful study of what the individual was to begin with and how he has changed as a result of his life experiences. Since we view the individual as a psychobiologically integrated organism, the understanding of the behavior of this organism must be a result of an analysis of all factors, genetic and environmental.

There is still a widespread popular belief in the extent and potency of innate tendencies. Especially there is a tendency in the popular mind to consider social and individual maladjustments as manifestations of some inborn perversity of human nature. The more complicated and difficult a problem is, the greater is the tendency to explain it on the basis of some easy and mysterious force. One of the easiest of such methods is the instinct theory. It is not necessary for us at this time to go into a detailed discussion of the various classifications of the alleged instincts. It is sufficient to note the diversity of opinion and lack of agreement.

One of the earliest of these classifications asserted that there were two fundamental instincts, self-preservation and race preservation, while Bernard (725), in a survey of the writings of several hundred authors, reports that 14,046 human activities had been termed instinctive by someone. McDougall's (726) list, which was probably the most influential, specified 7 major instincts, the number later being expanded to 14; and Carr (727), examining several standard textbooks, found 38 instincts mentioned, 16 of which were cited by a majority of the writers. It must be obvious that a term so widely and loosely used can be of little value to scientific psychology.

The use of the term popularly is even more complicated, so much so, in fact, that it is now frequently used when the exact opposite is meant to be implied. For an example, one frequently hears a person say that he "instinctively" did this or "instinctively" did that when he means to indicate that his behavior in a certain situation has been so well learned by repetition that it appears to be practically automatic.

In view of the recent demonstrations of the fact that many of the so-called instincts do not exist and that many so-called instincts are really learned, the older instinct theories have lost their value for the explanation of behavior. For an example, the so-called hunting instinct can be shown to be nothing more than a positive reaction toward many things and a tendency to manipulation. The maternal instinct, a very popular one among adherents of the instinct school, does not hold up under careful scrutiny. Certainly many of the mothers of illegitimate and unwanted children show no such tendency, and the assertion that motherhood gives instinctive skill in the handling of the child is pure and simple fiction. Anyone who has had the opportunity to observe carefully must have been aware of the new mother's clumsiness in the care of the new-born and must have seen that skilful maternal care develops through learning and experience. The so-called gregarious instinct, or the tendency to be better satisfied when in the company of others than when alone, is another obvious tendency to give the name instinct to a behavior pattern which is the result of learning. In the beginning, the child is helpless and must depend upon others for the satisfaction of its needs. Thus his satisfactions are obtained when others are present, and he may be expected to learn to desire the company of others in order that his satisfactions may be greater. It may be argued that the individual also experiences many dissatisfactions in the company of others; and consequently, if gregariousness is not an instinct, it should disappear. As a matter of fact, this is precisely what happens. If the

dissatisfaction in group situations greatly outweighs the satisfactions, the individual tends to withdraw from the group and exhibits a desire to be alone.

Even the supposedly fundamental instinct of self-preservation will bear careful examination. It would appear that the individual does not desire merely to preserve himself, but he desires to live in order that he may satisfy other desires. On the whole, the instinct theory was a confession of ignorance. Any activity that could not be explained was assumed to have come about just by the nature of things and was called an instinct.

Another group of psychologists, influenced primarily by the behaviorists, attempted to explain behavior mainly in terms of reflexes. For these investigators it was merely necessary to determine what acts appear at birth and to consider that these are the native responses. The term reflex is, however, merely a convenient abstraction describing the simplest possible neural circuit. Actually no such simple circuit ever operates in isolation. A response may take place in a relatively circumscribed muscular or glandular organ as a result of a relatively specific stimulus, and it is this kind of response that is now being called reflex by most psychologists.

It may be possible to refer to some of the more complex learned acts as chains of reflexes, but complex behavior more likely develops from the diffuse, less specific mass reactions which are in evidence at birth. This diffuse, non-specific activity of the infant, in which the body acts as a whole, is probably to be explained as being due to the unorganized condition of the nervous system of the new-born. Any stimulus tends to spread its effect over a number of pathways and results in the activity of many effectors.

At this point it may be well to observe that the appearance of responses at birth is not necessarily evidence that such responses are native and that they have not already been modified by learning. The infant does not spring from nothingness to emerge at birth into complete functional existence. The structure of the nervous system and the behavior of the organism develop gradually during the prenatal period. The embryological studies of development may yet teach us much about the origin of traits, particularly with regard to the rôle of stimulation and of environmental factors before birth. Indeed, most of the specific activity present at birth has been prenatally learned, and that behavior appears initially as a mass reaction of the entire organism.

Coghill's (728) study on the larval *Amblystoma*, a tadpole stage of a

variety of salamander, is most illuminating in view of the fact that this amphibian begins life in a transparent egg and can be easily observed from fertilization to maturity. As a result of his experiments, Coghill says, "Behavior develops from the beginning through the progressive expansion of a perfectly integrated total pattern and the individuation within it of partial patterns which acquire various degrees of discreteness." He was also able to show that the course of individuation is from head to tail and from central to peripheral. Experiments with human and other mammalian fetuses tend to agree with the results obtained by Coghill in his study of the *Amblystoma*. Thus embryological experimentation indicates that behavior appears initially as mass reaction of the entire organism, individuation developing later. At birth, however, the organism displays, along with the mass activity, a number of specific reflexes; and some psychologists have attempted to explain how these may have been learned before birth. For an example, in the mass activity of the fetus, the contraction of the hand and arm muscles involved in grasping may occur first as a part of the total activity pattern. When this occurs, the pressure receptors of the palmar surface of the hand will be stimulated by the pressure of the fingers against them, sending a sensory impulse to the central nervous system. In this way two reactions involving adjacent neural tracts, the sensory and the motor, are simultaneously active. The pressure on the palm, acting at the same time as the motor response, will become connected to it and thereafter elicits the specific response, the grasping reflex. For more complete discussion of this topic reference may be made to Holt's (729) work.

In any event, the balance of evidence seems to point to the fact that in the beginning the organism responds as a whole, any kind of stimulation eliciting diffuse movements rather than specific ones. The beginning of the learning process may, therefore, be assumed to be this pattern of mass activity. Learning, then, is not the addition of reactions, but the refinement of the total pattern and the development within it of partial patterns of various degrees of independence. In early infancy, as a part of mass reaction, progressive movements of the legs similar to those later used in walking may be noticed. The actual walking must wait, not only for growth and the general strengthening of the body, but for the separation of specific coordinated movements from the pattern of mass activity. Our failure to recognize that learning progresses in such a fashion is probably somewhat due to the fact that much of the experimental work in this field has been carried on by

examining isolated and specialized portions of the complex whole. For an example, the effect of reactions occurring together has been investigated by experiments in which attention has been directed towards only a relatively simple part of the total stimulus pattern and a very specific part of the total response. Such experiments may be best understood by referring to the work of Pavlov (730) whose investigations were carried out under rigorously controlled conditions. Pavlov's studies showed that if a drop of weak acid was placed on the tongue of a dog, he would respond with an increased flow of saliva. The acid could then be said to be adequate stimulus for the salivary response. The sound of the bell, which is not connected with the salivary response, would not cause the dog to salivate but would result in the hearing response, which includes, among other things, the pricking up of the ears. If, however, the dog was put through a training period during which time the bell was always sounded when the acid was dropped on the tongue, eventually the sound of the bell alone would be sufficient to cause a marked salivary response. This process has been referred to as the conditioning of responses.

Watson (731) has shown in his work with infants how the emotional life of an individual becomes much more complicated through association and the conditioning of responses. The child evidences a fear response to a loud noise, but shows no fear at the appearance of furry animals. If, however, the loud noise is always sounded when the furry animal is presented to the child, the fear response will eventually occur when the furry animal is presented alone. The child has been conditioned to a fear of the animal because the animal has become associated in its experience with a loud noise by which it was originally frightened. We may now carry this farther and condition the child to fear his rattle, by presenting it always at the same time with the furry animal which the child has learned to fear. The complex emotional life of the individual is built up in this way by the transfer of feeling from one thing to another through association. The tracing of the origins of these fears in the infant is a relatively simple matter because of the limited number of experiences that the new-born has had; but in the adult, or even the older child, it is a more difficult problem.

A case may make the situation a bit clearer. A young woman, an excellent airplane pilot, who was considered by her classmates to be especially fearless, asked the biology professor to excuse her from the day's work because she was dreadfully afraid of worms. She reported that she knew, of course, that the worms were not dangerous, but that

it was impossible for her to get near them. She could not remember ever having been frightened by them, but some careful tracing of associations led to the following disclosure. As a small child she had had two rather unusual and terrifying experiences; and on each occasion she had been playing with a couple of small worms. It is important to recognize that every experience is a complex experience, composed of many elements; and any one of these elements may evoke the total response at a later date. Unfortunately the original situation which produced the fear is frequently not remembered by the subject, and consequently it appears to be a fear with no explicable basis.

That the conditioned reaction does not depend on conscious processes or on any act of deliberation is well indicated by the work of Cason (732) on the conditioning of the pupillary reflex. Cason's experiment also shows how by training, the same stimulus may produce diametrically opposite reactions in different persons. An increase in the light falling on the retina causes a contraction of the pupil; a decrease causes a dilation. These activities are almost totally independent of voluntary control. The sound of a bell, on the other hand, has no appreciable original effect on the pupil of the eye, but causes an attitude of attentiveness. Cason, with one group of subjects, sounded a bell simultaneously with the increase of light intensity, and with another group sounded a bell simultaneously with a reduction of light intensity. In both groups, after about 400 repetitions, Cason secured conditioning so that the sound of the bell alone would stimulate a change in the size of the pupil. Such an experiment clearly shows the possibility of producing in two groups of individuals diametrically opposed reactions to the same stimulus which in the beginning was powerless to produce either reaction. Such conditioning processes are constantly going on throughout life. The understanding of such principles makes it unnecessary for us to use mystical explanations for the fact that two individuals have diametrically opposite feelings toward the same object. Figure 32 will illustrate what took place in Cason's experiment.

It should also be noted that the conditioned reactions are not only independent of volition, but that even the fact that the reaction has occurred may be unknown to the subject. Thus, the girl who feared the worm need not remember the experience by which she was conditioned. In many patients fears that appear absurd and ridiculous are, in reality, conditioned reactions that persist even though there is no memory of the conditioning episode.

In a large percentage of the responses made by the organism, however,

a period of time elapses between the stimulus and the response so that the reaction may be said to be delayed. During this time there may be active restraint or inhibition of the response. In such instances some purely extraneous stimulus may release the inhibition, and the complete response may appear. One of the authors saw a young married woman who had had a quarrel with her husband and was emotionally upset by the situation. She appeared in her office, however, outwardly calm and showing no signs of strain. When she attempted

ORIGINAL SITUATION FOR BOTH GROUPS		
Bright light (unlearned stimulus)		→ Contraction of pupil
Dim light (unlearned stimulus)		→ Dilation of pupil
TRAINING PERIOD		
<i>First group</i>		
Bright light (unlearned stimulus)	+ Sound of bell (indifferent stimulus)	→ Contraction of pupil
<i>Second group</i>		
Dim light (unlearned stimulus)	+ Sound of bell (indifferent stimulus)	→ Dilation of pupil
FINAL RESULT (AFTER TRAINING)		
<i>First group</i>		
Sound of bell (substituted stimulus)		→ Contraction of pupil
<i>Second group</i>		
Sound of bell (substituted stimulus)		→ Dilation of pupil

FIG. 32. Sketch showing the conditioning of diametrically opposed reactions to a stimulus which in the beginning was not connected with either reaction.

to use her typewriter, a lever became jammed, and she burst out in a torrent of tears and could not be calmed for a considerable period of time. Disorganized conduct may then frequently be seen as a failure of inhibition.

The ability to understand both normal and abnormal behavior is not gained, however, if we examine only how a man behaves and make no attempt to understand why he behaves. The facts underlying motivation have been presented in the chapter on Desires, Feelings, and Emo-

tions. It should now be clear that the instinct theory fails to explain motivation; nothing is gained by saying that the boy fights because of an "instinct of pugnacity." This is simply saying that one fights because he has a tendency to fight. The concept of motivation may be greatly clarified by a consideration of tensions. It has previously been pointed out that in the motive of hunger, the stimuli which arouse activity are the sensory reports of stomach contractions. Thus the inner physiological state is a stimulus that arouses activity. In many other conditions visceral tensions acting upon receptors can be seen as operating stimuli. It should also be noted that a loud noise (or any other overstimulation) is adequate stimulus not only for a muscular response, but also for a series of visceral changes which may persist after the noise stimulus has ceased. The loud noise may then be seen as setting up an inner physiological state or emotional tension which is a stimulus to activity. The first responses to such stimuli are not, however, specific in type, but are rather diffuse activities of the organism as a whole. From this point it is not difficult to see how other stimuli as a result of conditioning may become adequate for particular responses. The appet for the desire to quench one's thirst may be the dryness of the mucous membrane of the upper portion of the alimentary tract, but external stimuli such as the sight, odor, or mention of a drink that has been satisfying becomes an adequate stimulus for thirst. We should also note that this learning not only serves to extend the range of stimuli that will arouse the desire, but also tends to modify the activity that results. Thus the primary sources of activity are viewed as stimuli, especially internal stimuli in the form of visceral tensions. The field of motivation becomes complicated by the fact that many forms of learned behavior also function as desires even though they do so through the operation of the fundamental physiological states and tensions.

The ability to understand the behavior of the so-called abnormals, much of which may appear to be mysteriously acquired, is best gained by an examination of normal processes of adjustment. The strivings of organisms are not all open to immediate satisfaction. The animal does not always find food available when hunger pangs assail; the human is not always able to gain social approval, though the demand for it may be great. Many obstacles will appear which will thwart or delay the satisfaction of desires. The tensions which develop will stimulate the individual to many forms of reaction in attempts to gain satisfaction through the reduction of the tensions. The results of numerous experiments show that adjustment to undesirable conditions is not typically

human, but is found in some of the lowest animals. Jennings (733), for an example, describes the behavior of the stentor in response to experimentally induced annoyance and shows how this simple animal exhibits a repertoire of four adjustment reactions which it makes, one after another, until readjustment is effected. Ultimate satisfaction in adjustment depends in a large measure upon the ability of an individual to continue varying his responses until the tension is sufficiently relieved. In many instances satisfactory adjustment is difficult to obtain because of excessive persistence in an unadaptive mode of activity. Persistent non-adjustive reactions continue because of the inability of the individual to vary sufficiently the mode of response and because of the disorganized character of the emotional response. This is clearly seen in the worrier who makes the same useless responses again and again in spite of the fact that these responses do not lead to satisfactory adjustment.

Satisfactory adjustments are those which appreciably reduce the tension, and responses will, of course, vary considerably in their effectiveness. The unattractive girl develops tension as a result of her inability to attract men, and obviously this tension will be most satisfactorily reduced by actual success in attracting men. In general the most direct tension-reducing reactions are the most effective and satisfying; but when these are impossible or difficult to attain, substitute solutions of various types will be attempted. Thus the unattractive girl may use such substitute adjustments as withdrawing from competition, becoming a man-hater, competing with men in their own occupational fields, turning her entire attention to intellectual pursuits, or becoming emotionally attracted to members of her own sex. Such substitute solutions will vary in their effectiveness as tension reducers. It is a simple matter to note that some adjustments are better than others, but we must not fall into the error of assuming that any tension situation can be viewed without relation to other needs and wants. For an example, the most direct satisfaction of the mastery motive would be to fight and overcome one's rivals. Even if this could be attained, however, it might not be a superior form of adjustment, since it might severely thwart the achievement of other ends. The individual who attempts to reduce tensions resulting from one situation in such a fashion that other desires are thwarted may find that tensions are increased rather than decreased. Satisfactory adjustment demands integrated behavior of individuals to the total situation.

In our discussions of the psychoses and the psychoneuroses it will fre-

quently be necessary to speak of regressions, compensations, rationalizations, projections, and a host of other reactions which are not to be construed as abnormal except in respect to the degree in which they are manifested, and the conditions under which they occur.

An examination of their use by normal individuals will help us to understand the greater use that is made of them by abnormal people. The simplest human reactions in the face of frustration are either to increase the vigor of direct attack or to withdraw from the threat with fear and anxiety.

The development of direct aggression and the use of the temper tantrum are understandable in the young child who is being frustrated, threatened, and punished while he is still unable to grasp the reason why or to communicate adequately concerning his problem. Some use of aggression, even ineffectual direct aggression, will continue to be evidenced in the lives of all people, but in a number of individuals the use of direct aggression will become exaggerated and habitual and will constitute a serious personal maladjustment.

In much the same way we may expect to find that all young children will react to some threats by the adjustive technique of withdrawing. There is even a likelihood that this response will appear with greater regularity than aggression since in many situations it is more acceptable to others as well as more appropriate. Most of the early withdrawals are non-specific and inadequate, and consequently they become intimately associated with fear and anxiety. What complicates the problem is the fact that as the individual grows older, the direct external threats that are more easily understood are supplemented by personal attitudes. The rôles once played by parent, teacher, pastor and policeman are now embodied in rules of conduct, opinion of others, and one's own conscience. The task of fleeing from one's conscience or opinion is infinitely more complex than the childhood flight from the parental threat.

These techniques of direct aggression and simple withdrawal are gradually elaborated into innumerable complex reactions. Each individual continues to use a variety of combinations and intensities of these adjustive techniques, and it is not unusual to find withdrawal used as an aggressive technique, or aggression used in order to make withdrawal possible. Thus the person who has learned to prefer seclusion may employ direct aggression in order to secure his asocial privacy; or simple withdrawal may be used to bring about the vengeful destruction of another's plans.

The selection of one or another of these special adjustive techniques as an habitually preferred procedure will depend upon the same factors operative in other learnings. The assigning of names to the various types of adjustments is extremely difficult, but there is a practical necessity of presenting some classification. The types of adjustment most frequently described appear to stem from the fundamental aggression and withdrawal adjustments and are therefore frequently referred to as adjustments of defense and escape. Thus attention getting, identification, compensation, rationalization and projection may represent defensive techniques which are more or less aggressively directed toward the difficulty or its origin, while seclusiveness or insulation, negativism, regression, repression, and fantasy may represent escape techniques characterized by withdrawal and attempts to retreat from the problem. There is, however, much overlapping and they should not be interpreted as being fundamentally distinct types of adjustment.

Attention getting. One of the simplest and earliest adjustive techniques to make its appearance is that of attention getting. Crying, which is at first merely a part of the infant's vigorous activity, nevertheless tends to bring attention. It is not surprising, therefore, that through the ordinary learning processes, crying may become more or less habitual as an attention getting device resulting indirectly in the reduction of the tensions of need or anxiety. Breath holding, temper tantrums, thumb sucking, refusal of food, bed wetting and a variety of other activities develop as attention getting devices. As the child grows older, the scope of devices widens to include showing off, teasing, fighting, obscene behavior or language, deliberate disobedience, and various other activities. All of these activities will be found in normal behavior, and such attention getting devices cannot be considered abnormal unless they become excessive or are inappropriately used. Both the overprotected or overindulged and those who have been neglected may develop unsatisfied needs that may result in abnormal use of attention getting adjustments.

It is essential to note the subtlety of the operation of this adjustment as well as that of all of the other adjustments to be considered. Such adjustments may be effectively used without having been planned, recognized or understood by the person using them. In fact, it is the subtlety of the devices that makes them so effective as tension reducers.

The abnormal use of the attention getting device may be particularly noticeable in the behavior of hypochondriacal, hysterical and certain manic patients.

Identification. Tension reduction may be accomplished by identifying one's self with others whose achievement or standing is great. The child begins his life under circumstances which made identification inevitable. He starts life as a member of a family, and others identify him as being a member of this group. The growth of the identification may be noted by watching the child change from such statements as "I can do this, watch me do that", to statements calling attention to the father, the gang, team, church, etc. His personal status can be enhanced by identifying himself with an important individual or a going group or organization. Thus he may develop habitual attitudes of self-esteem and security on the basis of his identification. In many instances, the identification becomes so important to his security that any attack upon the identified person or organization will seem to threaten that security. It is not surprising, therefore, to find a disproportionate emotional violence displayed in defense of the individuals or organizations with which the identification has been established.

Identification is a normal form of adjustment often deeply ingrained by the trial and error processes of adjustive learning and likely to be exaggerated by those who have excessive feelings of inferiority. In those who are mentally ill it is seen most clearly in delusions through which the patient magnifies or sanctifies himself. The paranoid patient evidences a strong belief in his identifications and arrogantly defends them at all cost, whereas the manic patient usually does not seem really to believe the identification.

Compensation. The tensions and anxieties accompanying real or imagined defects may be compensated for by substitution of and over-emphasis on some other need satisfaction sequence. The compensatory habits may give satisfaction because they are close substitutes for real achievement and may serve to divert attention from real or imagined inferiority. Compensatory behavior as a means of reducing anxiety is plainly evident in all normal behavior. The small man who gets his feeling of mastery by a loud voice or authoritative manner, the mother who turns to her children when her husband's neglect brings anxiety, the unsuccessful athlete who puts all effort into study, the disappointed husband who turns all efforts to success in business or club work, all provide examples of compensatory adjustment in action. Much of the compensatory behavior is healthy and leads to accomplishment that might not otherwise have been attained. In many instances, however, the compensations are hit or miss affairs in which there is little opportunity for success. The manic attacks may sometimes be viewed as

compensatory reactions for a developing depression, and semi-compulsive rituals are substitutes for behavior that produces anxiety. Hypochondriacal, hysterical complaints may also be viewed as compensatory reactions to loss in self-esteem and failure in accomplishment.

Rationalization. Rationalization is a form of defensive behavior in which the individual gives socially acceptable reasons for his actions and thus reduces his tensions and anxieties. Children learn very early by trial and error, by example, and indoctrination to give socially acceptable reasons for their inadequacies or failures. They learn that the free expression of certain of their motives will bring them rebuke, rejection and disgrace. They may, however, secure approval by assigning other motives to their behavior. As with other adjustive techniques, it is the subtlety of the operation of the rationalization that makes for its efficacy as a tension reducer. Thus the fictitious reason becomes acceptable not only to others but also to the person who is rationalizing. The individual is, therefore, learning to deceive himself as well as others. Rationalization is not only a part of the behavior of the average person but a very useful protective device. Its use, within normal bounds, makes unnecessary the analysis of every trivial motive. Certainly there is no necessity for the analysis of some motives and great danger in the development of the tendency to attempt to track down the origin and meaning of every item of one's behavior. The rationalization may thus enable one to maintain his self-esteem and confidence and protect him from his natural anxieties. The inability to rationalize is strongly noticeable in some depressed persons who are consequently unable to deny their real or imagined failures.

The process may, however, be misused, and typical delusional behavior probably best indicates its most distorted and exaggerated usage. In such behavior the individual appears to be unaffected by contradictions that are obvious and, in fact, uses such contradictions for the development of further rationalization. Hypochondriacal, neurasthenic and hysterical patients also use their assumed incapacities as rationalization for failures in accomplishment.

Projection. Projection is a defensive adjustment, somewhat allied to rationalization, by means of which one reduces the tension and anxieties by attributing one's own traits and motives to others. The projection may be either assimilative or disowning in type. In assimilative projection one assumes, without sufficient evidence, that others are as he is and may regulate his behavior in accordance with such an assumption. The basic assumption that other people are like ourselves is formed in

most individuals in early childhood. However, those who have considerable practice in sharing the perspectives of others will learn much about individual differences and will be less likely to imagine that their ways are the ways of everyone else. Those not so practiced in rôle taking are more likely, in times of personal stress, to assume that others know what they feel and think.

In much the same way, the disowning projection develops as a means of protecting oneself from the unpleasant necessity of recognizing real or imagined failures, inadequacies and deficiencies. There one tends to attribute evil intentions and selfish motives to others and to disclaim them for himself. It is extremely unpleasant to fail to win the contest or to admit that the failure is due to one's own inadequacy. Consequently it is not surprising to find that one way to avoid the ego dissatisfaction is to project the failure outside of the self. The individual who is reaction-sensitive to certain real or believed inadequacies may develop considerable conscience which is unbearable and which he habitually handles by projection. In extreme instances the individual may react to his accusing self reactions as if they were the part of a plot directed against him by others, and such tendencies may result in a full-fledged delusional system. Under other circumstances a person may react to his self accusations as if they were the voice of someone else and may consequently begin to hallucinate.

Insulation and timidity. The adjustive techniques discussed so far have been primarily aggressive in type. One may, however, reduce the tensions of need and anxiety by retreat or withdrawal. Such withdrawals are normal when they do not interfere with social effectiveness and pathological when they affect perception of reality.

Situations that arouse tension and threaten one with failure and humiliation may be met with avoidant responses of timidity, seclusiveness, and insulation. In its simpler manifestations this behavior is simply an extension of the shrinking and hiding reactions of frightened animals. The effectiveness of insulation and seclusiveness is due to the fact that one cannot fail if one does not compete.

Since the shy and withdrawing child does not upset the environment as does the aggressive child, the withdrawing maladjustments are more likely to go unnoticed. Such children are frequently described by parents and teachers as being good children who cause no trouble. The continuance of such behavior robs the individual of the opportunity to establish satisfactory interpersonal relationships and understandings through the usual processes of give and take relationships. Thus one is able to recognize in every society the extremely shy and distant in-

dividuals who have developed special techniques for insulating themselves from others and who stiffen and shy away from every friendly approach.

Negativism. Withdrawal or escape is not always a quiet and passive process. One may withdraw aggressively with refusal, stubbornness and rebellion. Negativism in the small child appears to begin with simple attempts to continue activity in the face of restraint. Such behavior develops easily into temper outbursts, breath holding, refusal to eat and a variety of attempts to do whatever is forbidden. Those who continue to gain decided advantage through negativistic behavior establish habitual tendencies to respond in such a manner in times of stress. In older children and adolescents negativism is especially obvious in resistance to orders and readiness for argument and contradiction. While one is not expected to comply with all of the rules and regulations of those in authority, many anxious individuals attempt to reduce their feelings of insecurity by habitual and unreasoning negativism. The extreme use of negativism as a means of escape is seen most frequently in schizophrenic patients, but may also be seen in some cases of middle life depression and in cases of brain damage and deterioration.

Regression. One of the most natural methods of dealing with present tensions and dissatisfactions is to regress or go back to some earlier method or period which was more satisfying. This is another method of withdrawal or escape since the individual does not combat his difficulties but retreats to earlier and generally inferior types of adjustment. When present situations are frustrating, one tends to resort to habits that have been successful in the past. Thus the small child who feels insecure falls back on infantile behavior that formerly brought him maternal sympathy and attention. The maladjusted adult and adolescent may regress to childish behavior in the face of similar stress. Satisfactory living requires the gradual development of more mature methods of adjustment and the overcoming of infantile and childish dependency. Unfortunately many parents resent the growth of their children into mature and independent persons and handle them so as to keep them dependent as long as possible.

Such over-indulgence and over-protection increase the likelihood of regressive behavior in situations of insecurity. Since regressive behavior is a very common reaction to frustration, it will be in evidence in a variety of behavior disorders, but the most extreme manifestations are seen in certain schizophrenic patients.

Fantasy. When real attainments and satisfactions are not forthcoming,

all individuals derive some satisfaction through make-believe or fantasy. Day-dreaming is a perfectly normal adjustment that makes its appearance very early in the child. Every normal child learns to derive some satisfaction out of make-believe and thus comes to derive some satisfaction in fantasies which are perhaps not possible in reality. The fantasy is more evident in the young child since he verbalizes his fantasies and sometimes even gives his make-believe playmate a name. As the child grows older, he realizes that one does not tell all of one's day-dreams, but he does not stop indulging in them. Some of such day-dreaming is valuable since it reduces tensions and brings satisfactions. Indeed much of it is indistinguishable from imagination, which is so important to the development of the child. A considerable part of the planning for tomorrow's accomplishments is developed through imaginative dreaming. Indeed, creative thinking, which is responsible for new discoveries, is not completely distinguishable from fantasy. In normal day-dreaming, however, one either makes his dreams serve the purpose of making real accomplishment possible or uses them infrequently for recreation and refreshment.

The fantasy becomes dangerous when it becomes a satisfactory substitute for real attainment or reduces the effort to attain satisfactions in reality. If one develops the habit of resorting to fantasy the moment that anxiety appears or that life seems dull or difficult, the fantasy has ceased to serve a useful purpose and is becoming pathological. The withdrawal from reality into the world of dreams is most dramatically seen in schizophrenic disorders, but the pathological use of fantasy is evident in many of the behavior disorders.

Repression. Repression as an adjustive technique involves an attempt to reduce tensions by preventing occurrence of tension-producing reactions or by inhibiting recall. The individual learns to make avoidant responses to stimuli that suggest the recall of unpleasant experiences. He turns away from any external and internal stimuli that would suggest the recall of unpleasant situations. The repressions are not always complete, and in many such instances the tensions developed may be greater than those associated with the repressed situations. Incomplete repression, with emotional displacement, may be clearly observed in phobias, compulsive rituals and obsessive ruminations. In such situations the phobias, compulsions and obsessions have been substituted for the original anxiety excitants. These acquire their own anxiety components which the patient can discuss, but the original excitant has been repressed. Similar incomplete repressions are typical

also of many of the hysterical manifestations, whereas complete repressions are more frequently seen in the schizophrenic disorders and in hysterical inactivation.

In the psychotic and psychoneurotic disorders, frequent reference will be made to the use of the adjustive processes which have just been discussed. We will find, for an example, that the schizophrenic patient is frequently referred to as "projecting" his failures on to some cause other than his own deficiency. His failure to succeed in a certain venture is explained by him as being due to the fact that people in general, or some particular person or group of persons, are working against him. The mechanism of projection itself cannot, however, be said to be abnormal. The tennis player strokes his ball into the net or outside of the court and immediately proceeds to examine his racquet, projecting his own deficiency onto the racquet. The baseball "short stop" fumbles a ground ball and immediately examines his glove or throws a pebble out of the way. These individuals may not be conscious of their projections, but they are real just the same. It is, therefore, not the projection which is abnormal, but the degree of its manifestation.

The schizophrenic is also often described as having regressed to childish behavior. Again, it is not the mechanism, but the degree of its use which is considered abnormal. Such remarks as "don't be childish," "act your age," etc., which are frequently heard in groups of adults, are indicative of the fact that the mechanism is employed by normals. The desire to return to childish delights is well indicated by the song, popular some years ago, "How'd you like to be a kid again." The consideration of the regression as abnormal occurs, then, as a result of the *degree* to which the schizophrenic carries it. Even the delusion of the paranoid individual who believes himself a great inventor, financier, statesman, warrior or even Jesus Christ must be thought of as an abnormal use of a normal mechanism. Day-dreaming must be viewed as a normal function since all normals participate somewhat in it. The small child imagines that he has the toys and "goodies" which are not his in reality; the adolescent fancies in his day dreams that he is the hero on the football field or in the track meet, and even the adult builds his castles in the air and derives much pleasure from them. What makes the mechanism abnormal is the excessive use of it or the failure to be able to return to reality. The normal individual may even identify himself with some great personage in his day dream, but he is able to return to reality and recognize that he has been indulging in fanciful experiences. The abnormal, however, reaches a point where he is unable to differentiate

between fact and fancy, and so escapes to his world of dreams. What was at first fancy for him now becomes fact, or we may say he suffers a flight from reality. The mechanisms used by the abnormals are not different from normal reactions in kind but in degree, so that we have sometimes described the abnormals as being like us—only more so.

Another fact which should be kept in mind is that reactions are many times mentioned as abnormal without any careful consideration of the causes. If a small boy were to eat sand and later the matter were regurgitated, the action would be considered as normal for the circumstances. In just the same way we must be able to recognize that certain reactions in our patients, despite the fact that they are unusual or peculiar, are what might be expected to occur as responses to their unusual experiences.

HISTORY

With this explanation of the difference between the normal and the abnormal in mind, we may move on to study of the classification of the mental disorders with some attention to the history of the development of that classification. Since a complete treatment of this history would, however, involve a long and detailed discussion, only a brief summary will be attempted in this section. For a complete treatment of the history of medical psychology the reader is referred to Zilborg and Henry. (734)

Primitive. Our knowledge of primitive conceptions of mental disease is less than fragmentary, although it seems certain that primitive man showed his fear by populating his world with spirits which were the images of his own anxieties. It appears that from the beginning, man looked upon everything that disturbed or enhanced his well being as the direct or indirect result of interference by spirits.

Some of the imaginary beings were good or useful (as were some of his own impulses) and some were evil or injurious (like many of his own hatreds). In the formal thought of even very primitive people we encounter the beginnings of dualism in the distinction between the body and the spirit. When mental illness appeared and the familiar personality of the victim was transformed, it appeared to the onlooker as if some new being were present in the body. It was quite natural, then, that this being should be thought of as a demon or a spirit. In very primitive cultures a god was thought to be present so that the possessed attained great influence and his verbal productions were interpreted as good omens.

On the other hand, the destructive tendencies and the highly individualized activities of some of the mentally ill caused them to be re-

garded as possessed of inimical spirits or devils. Sickness was all mental or spiritistic as the primitive man might have used the word. There was apparently no division into physical and mental diseases, all diseases being attributed to supernatural causes. The psychological energies were therefore directed more to getting rid of the uncertainty and fear generated by the illness than to efforts to eliminate the illness itself. If the sick individuals were believed to be possessed by good spirits, they were respected and worshipped; but those unfortunate persons who were believed to be possessed by evil spirits were beaten, burned, and starved in an effort to remove or destroy the demon. Since head injuries were common in primitive times it is not surprising to find that primitive man gave great significance to the hole in the head as it related to the possibilities for good or evil spirits to escape or inhabit the body. It is interesting, therefore, to note that crude trephination operations were performed to allow the evil spirits to escape.

Ancient. The transition from magic to medicine was very gradual and led to many curious admixtures. The various ancient civilizations, even including the early Greeks, did not present conceptions of mental illness that differed markedly from those of primitive man. The trend of primitive man was still evident five thousand years before Christ in the days of Imhotep, the father of Egyptian medicine. The various medical papyri discovered in Egypt contain strange medicines such as fly specks, the fat of animals, and excreta of crocodiles; but there were also drugs of indisputable virtue—castor oil, opium, gentian and many others. To be sure, the special virtue of these was poorly understood, and all medicines were used with priestly incantations and charms which probably did little harm (other than obscuring the opportunity for advancing knowledge) and might have done some good. Music, as well as magic, was used by the Egyptians for dealing with the evil spirits assumed to be responsible for the mental disorders. The music was used by priests and magicians both to quiet the patient and to lure the evil spirit from the body.

Among the Hebrews of the scriptural ages there are recorded a large number of clinical descriptions of mental illness. Saul suffered from recurrent depression, both homicidal and suicidal, and the disease, manic-depressive in character, is attributed to evil spirits from God. "But the spirit of the Lord departed from Saul, and an evil spirit from the Lord troubled him".¹ These attacks recurred, and in between them were manic-like episodes. In the depressive phase he was self-ac-

¹ 1. Samuel, Chapter 16, verse 14.

cusatory, suspicious and much troubled. In the excited phase he "stripped off his clothes also, and prophesied before Samuel in like manner, and lay down naked all that day and all that night".² Hannah, the mother of the prophet, Samuel, was apparently afflicted with a severe neurosis, and the ecstatic states of some of the prophets are suggestive of pathological mental states. The understanding of mental disorders and the treatment of those afflicted did not depart much from tradition. The Bible quotes Moses as saying: "The Lord shall smite thee with madness, and blindness and astonishment of heart"³ and again in Leviticus it is stated that "A man also, or woman, that hath a familiar spirit, or that is a wizard, shall surely be put to death: they shall stone them with stones; their blood shall be upon them".⁴ Physicians and priests were the mental healers, and the therapeutic measures consisted mainly of prayer, magic, music and exorcism. The disorders were generally considered to be forms of punishment for incurring the wrath of God.

The earliest Greeks were probably no less superstitious than the Egyptians or the Hebrews. Their underlying philosophy was that of primitive religious dualism, and people suffering from fits and other symptoms were believed to be possessed of evil spirits. Aesculapius is traditionally considered the god of medicine, and the medical centers of the pre-Hippocratic days were the Aesculapian Temples. The practices were markedly artful, and the treatment began with imposing religious ceremonies. A form of dream interpretation may be noted since the patients were required to sleep near the temple and dream of a god appearing and producing the miracle of the cure. Not all of the mentally ill were recognized as being sick, and some were even chosen to interpret and cure human ills. Some of them were taken into the temple to be healed, or even to do the healing, while others were refused admittance and were stoned.

Greek medicine, however, begins with Hippocrates, who renounced the mystical and spiritual concepts of disease. Here almost completely removed from magical superstition, we have diseases studied in their natural history, with descriptions of their symptoms, signs and causes. The works of Hippocrates probably do not all proceed from one pen. Rather they indicate the rise of an objective scientific school of medicine, independent of, and opposed to, the priestly superstitions of the Aesculapians. Hippocrates is credited as the first to emancipate medicine from

² 1. Samuel, Chapter 19, verse 24.

³ Deuteronomy, Chapter 28, verse 28.

⁴ Leviticus, Chapter 20, verse 27.

religion and magic. He robed the priests of even the "sacred disease", epilepsy, holding it to be no more sacred than any other illness. He recognized the brain as the organ of thought and attributed mental illness rather to disturbances in the brain than to possession. He was a keen clinical observer, and his descriptions of some clinical types would be excellent even today. His views were liberal and flexible, and his psychological theories were in no sense one-sided. Depending upon the case and the occasion, he sometimes favored a purely anatomical view, represented by the extreme organicists of today, who believe all mental disease to be the result of brain injury. In other cases he favored the physiological theory represented by some of the endocrinologists of today, and yet at times he believed that purely mental emotional states may produce deep changes, even physiological, in the individual. The humoral theory of physiology and of temperament arose among the later Hippocratic writers and constitutes one of the earliest attempts at personality classification.

The early Romans associated mental disease with the presence of demons, and mental healing was chiefly in the hands of the priests. At about 150 B. C. many scholars began to migrate to Rome, and for a while Rome became the center of scientific productivity. There was no further great original contribution to the field until the appearance of Asclepiades. He was one of the first serious and humane students of mental illness. He, as did Pinel, eighteen centuries later, advocated opening the dungeons in which the insane were housed and treating them with sunlight, music and gentleness. He described frenzy, lethargy, and catalepsy in clear terms. He invented ingenious devices to make the patients more comfortable, prescribed many kinds of baths and objected violently to bleeding, which he considered equivalent to strangling. His psychiatric contributions served as one of the indications that Rome, toward the close of the pre-Christian era, was passing through a period of humanism in medical psychology.

It should be kept in mind that at this time the only advanced culture was on the shores of the Mediterranean, and only the privileged few had access to knowledge. In the background was the mass of people, as always, with their superstitions. It was during the first century that Christ and his disciples were curing the halt, the dumb and the blind by casting out devils, and mental illness in general was treated in terms of demonological possession.

Contrast the above with Aretaeus, who studied all sorts of nervous and mental disease and described both the symptoms and mental changes

in epilepsy. He discussed melancholy in terms that are in many respects close to our modern concepts. Distinguishing between melancholia and mania, he nevertheless considered a connection between them. He also recognized that such states are prone to recur, and he did not fail to observe that some conditions beginning as melancholia went on to deterioration. Soranus, the greatest physician of this period, was primarily interested in obstetrics and gynecology but paid considerable attention to mental disease. Soranus differentiated those deliria due to fever and described the behavior in some detail. He observed fever in some manic states and noted that in mental illness due to fever, the fever precedes the excitement. He observed the occurrence of stupors with immobility and waxy flexibility. He criticised the therapeutic measures that had been in use and described new treatments which emphasized his humane point of view.

Galen (c. 130-c. 200 A.D.), the last great physician of the Greek period, combined the scientifically founded principles of his day with careful administration of available medicines and sympathetic treatment of the patient. Following the death of Galen, the light of Greek learning flickered and failed, and the medical world entered the twilight of the Dark Ages.

The Dark Ages. The ancients had moved forward a great distance when they recognized mental illness as something going on within the individual, a disease some of the causes of which could be recognized. The first three centuries of the Christian era, however, even before the establishment of Christianity as a political and spiritual instrument, were marked by the rise of superstitious beliefs and a revival of the primitive concepts that the mind is unlike the body and divorced from it. The whole field of mental disease was torn away from medicine, and man came again to believe in demoniacal possession, sorcery and magic. Official Christianity attempted to combat the practice of magic, but was helpless in the face of its own dogmas since the Christian followers did not deny the existence of the supernatural beings postulated by the magicians. Medical psychology as a therapeutic art ceased to exist as religious miracles were sought as cures. European medicine descended to the levels of charms and incantation, amulets and magic. Thus it did not differ, in principle, from the demonological concepts of the earlier Chinese and Egyptians, even though cloaked with the sacred robes of the church. Psychiatry had become the study of the ways and means of the devil and his cohorts. Whatever was preserved of the Greek achievement was perpetuated, and later distorted, in Arabia or

buried in churches and monasteries. During the Middle Ages the Arabian physicians began drifting back into Europe, where they represented what scientific medicine there was. This was Greek medicine as it had become modified by oriental astrology and magic.

The general attitude toward mental diseases in the thirteenth and early part of the fourteenth century was very confused. The physicians, confronted with a psycho-pathological problem, attempted to put together the traditional physiologies of old Greece and Alexandria and the astrology, demonology, and simple prayers of their own time. Witches were thought to be responsible for impotence, loss of memory and a variety of types of pathological behavior. Man frequently took it upon himself to mete out to his own body the punishment which he believed the Lord wished him to endure, and self-torturing sects made their appearance over much of Europe.

The universal anxiety of the fifteenth century was most completely expressed by two Dominican brothers, Johann Spranger and Heinrich Kraemer, who methodically set out to lead a movement for the extermination of witches. These two theologians wrote a book entitled "Malleus Malficarum—The Witches' Hammer" which was destined to become the most horrible and authoritative document of the age. Under the influence of the Malleus, witchcraft became a pious sounding rationalization for anything which any one opposed or wanted to destroy, and hundreds of thousands of mentally sick fell victim to the violent movement.

While little progress was made in the treatment of the mentally ill during the Renaissance, the ground work was laid for a satisfactory understanding of psychological motivation. The psychologists did not reach scientific maturity in the consideration of human impulses, drives and emotions until the last years of the nineteenth century when Freud published his formulations. Nevertheless, Juan Luis Vives, a man who lived three centuries before Freud, clearly anticipated many of the later ideas. He was the first to point out and describe the importance of psychological associations, to recognize the emotional origin of certain associations and their ability to revive long forgotten thoughts, sensations and emotions. Although credit is usually given to Hartley and Hobbs for the discovery of associations, it is clear that Vives, a century before Hobbs, gave evidence of his understanding of associations and their relationship to remembering and forgetting. Vives anticipated Freud in many ways, describing the egotistic drives of man and discussing active and passive love in a way that was almost Freudian.

He made definite statements regarding the puzzle of double feelings and of the clash of mutually conflicting affects, a phenomenon which was considered illogical before Vives and for a considerable period after him until Bleuler, following Freud, introduced the term ambivalence.

Paracelsus and Weyer were others whose contributions were important during this period. Paracelsus rejected demonology and attacked witchcraft. Weyer anticipated many later developments and completed the process of divorcing medical psychology from theology. He clearly stated many progressive and humanistic concepts of modern law such as that of the "irresistible impulse".

In the seventeenth century great strides were made in neuro-anatomy, neuro-physiology and neuro-pathology, but there developed a separation of psychiatry from psychology. Psychology lost favor with medicine and was delivered into the hands of speculative thinkers. Bacon, Descartes, Hobbs, Locke, Malebranche and Spinoza carried the burden of concern regarding the rôle of volition and emotions in the actions of man.

Mesmer, like Vives, must be credited with having been of great importance to the history of psychoanalysis. Although a student in medicine, Mesmer was greatly interested in the influence of the stars on mental health. He experimented with the use of magnetized plates for the treatment of mental patients, and when he noted that he could get the same beneficial results in his patients by substituting his hands for the magnetized plates, he developed a theory of animal magnetism which came to be known as Mesmerism. Mesmerism was vigorously opposed by the medical profession and Mesmer was generally considered a charlatan.

James Braid, an English surgeon, studied Mesmerism and became impressed with the subjective factors of response to the magnetizer. He concluded that the mesmeric sleep was a subjective psychological state induced by visual fixation. He introduced the new terms, hypnotism, hypnotize and hypnotic. In 1860 Liebeault, a French country doctor, began to study hypnosis and to use it for both treatment and research. The further development of hypnosis for the treatment of the mentally ill awaited the work of Charcot and Bernheim, who were to dignify hypnosis and to stimulate the work of Sigmund Freud.

In the meantime the attitude toward those who were mentally ill was being affected by the social and political changes of the time. Progress was being made in every country in Europe, as well as in America, in the care of the mentally ill. The fact that King George III suffered from a mental disorder served indirectly to make for better care of the

mentally ill. Although the King was treated by England's best physicians, there are indications that he did not escape the brutal treatment which was characteristically given in such cases. This brutal treatment led to parliamentary investigations and to protective legislation which provided for more humane care of the English mental patients. Throughout the entire previous period, the lot of the mentally ill had been deplorable in the extreme. The belief in possession had led to the confinement and chaining in dungeons of many people; some were stoned and driven out to fend for themselves in the woods; others were burned at the stake as witches. The place of confinement was often enough a prison dungeon in which the convicts were the keepers of the insane.

The progress of medicine brought little help to the mentally ill until the eighteenth century in which both the American and French Revolutions occurred. The way was prepared for these upheavals by the humanitarianism of such men as Voltaire, Montaigne, Rousseau and others. The American Revolution was largely an attempt to secure political and religious freedom, but the French Revolution grew out of oppression by the nobility. It is not surprising that simultaneous with these broad movements a revolution took place in the management of the insane. This change in attitude had its first tangible effect when the first modern hospital for the treatment of the insane, the Asylum of St. Boniface, was built in Florence. The patients were no longer huddled together, chained or confined in cells and dungeons, but were treated kindly and given medical care. Real impetus was given to the movement when Pinel assumed control of the Bicêtre Asylum in Paris in 1792. There Pinel struck the chains from the mentally ill and led them into the sunlight and fresh air for exercise. Together with his pupil and colleague, Esquirol, he brought about a general improvement in the asylums throughout France. Almost simultaneously with Pinel, a tea merchant of York projected the founding of a Retreat for the mentally ill under the auspices of the Society of Friends. The building was called the "Retreat" in an effort to avoid the stigma usually associated with the terms "lunatic asylum" and "madhouse". The institution was built in 1796 and resulted in calling attention to the flagrant abuses then prevalent in England. Emphasis was placed on the treatment of mental patients as guests rather than as inmates, and the place stood out in strong relief against the practice otherwise in England where the mentally ill were chained in cells, exhibited to the curious public for a small fee on holidays, and left naked and uncared for.

In America during Colonial times the handling of the mentally ill

had followed the pattern set in Europe, and consequently the insane were persecuted as agents of the devil and witches were hunted out and burned at the stake. The first institution for the exclusive use of mental patients was built in Williamsburg, Virginia, in 1773, and it remained the only such institution until 1824 when another state hospital was opened at Lexington, Kentucky. While Pinel and Tuke were humanizing the treatment of the insane in Europe, Benjamin Rush, the father of psychiatry in America, was introducing similar reforms in America. He emphasized humane care, separated the sexes, restricted the use of mechanical restraints, and introduced occupational therapy and exercise for the patients.

Once the patients were hygienically housed under the care of interested and competent physicians, the opportunity was at hand for careful observation and study of their illness, and scientific advance became possible. Demonology had run its course, and the patients were again in the hands of medical physicians. While the disorders were no longer believed to be caused by evil spirits, there was still no real understanding of the functional mental illness. Although the somatists had won the ascendancy and mental illness was, in general, assumed to be due to physical organic changes, the most exciting changes in understanding and treatment were still to come.

Modern Period. During the nineteenth and twentieth centuries, important changes in the understanding of mental illness came so rapidly, that the names of the contributors are too numerous for mention. Griesinger, however, sounded the death knell of the demonological school when he published his works in 1845 bringing together clinical observation, psychological analysis, and physiological and pathological changes. The Hippocratic doctrine that mental illness is the result of brain disease was restored and has had a powerful influence up to the present time. There are still those who maintain that organic pathology will finally be shown to be the cause of what are now called functional disorders. The philosophical foundation of the somatic school lies in dualistic (psycho-physical) parallelism (which holds that every mental change must have its physical cause), or in materialistic-mechanistic monism. The rapid advances in neurological and neuro-physiological research strongly entrenched this organic point of view. The inability of the physician to point out the organic lesions responsible for certain disturbances led to the postulation of functional etiology for these conditions. Thus Charcot took the position that a morbid idea could produce an hysterical symptom.

By the nineteenth century a number of German physicians were

making history in the study of mental illness. The outstanding contribution of this group was made by Emile Kraepelin. His classification of mental illness is a landmark in objective psychiatry and is still the basis of most present day classifications of mental disease. Kraepelin's classification was a symptomatic one and involved minute subdivision and detail. He made very systematic and descriptive presentations of clinical material, and he made good use of his experimental training in the study of abnormal behavior.

The most exciting discoveries, however, were those stemming from the work of Vives and championed by Paracelsus three hundred years earlier. Mention has already been made of the contributions of Mesmer, Braid, Charcot and Liebeault. Charcot was a highly respected French physician, competent in organic medicine, and his position, therefore, was not likely to be challenged by organicists. He explained hypnosis in terms of physiological processes and viewed it as a manifestation of hysteria which he believed to be a disease of the nervous system. The value of his work was principally the stimulating effect that it had on many later students such as Janet and Freud. While Charcot dignified the use of hypnosis, he was not cognizant of the fact that the symptoms of hysteria could be learned by the patient.

Bernheim raised many objections to the theories of Charcot. He pointed out that Charcot had failed to note that many of the patient's manifestations were the result of the hypnotist's inadvertant suggestions and not the nature of the disease. He called for greater study of the process of suggestion and recognized that it was not limited to hysterical persons. He pointed out that hypnosis was closely related to sleep and could be produced in many normal persons, and his success in the use of hypnosis as a treatment for hysteria brought him many students.

One of Charcot's foremost pupils was Pierre Janet, who popularized the notion that the psychoneurosis was the result of a constitutional weakness of the nervous system. Janet used hypnosis as an investigating technique and developed a dissociation theory of personality which was later greatly elaborated by Morton Prince. For Janet, the personality was a systematic integration of ideas and tendencies which remained relatively stable. The neurotic personality was characterized by the dissociation of these tendencies brought on by the exhaustion or emotional strain and dependent upon a constitutional weakness. While he developed a systematic psychological explanation for many neurotic disorders, his premise exercised a deadening effect on therapy since the neurosis was viewed as a natural consequence of a biological handicap.

The most prominent of all of Charcot's pupils was Sigmund Freud.

He had been early associated with Breuer, a general practitioner in Vienna, who was treating his neurotic patients by hypnosis. Breuer had been allowing his patients to talk about their illness under hypnosis and had noted that in doing so they displayed a good deal of emotion and were much relieved when they awakened. Freud became interested in Breuer's methods and went to study Charcot's work on hysteria at the Salpêtrière in Paris. Later Freud used hypnosis only in order to permit the patient to speak spontaneously and to discharge the emotions connected with his fantasies. Because of the regular discharge of the emotions, the method was called catharsis. Freud soon discovered, however, that if he dispensed with hypnosis and let the patient talk at random, the patient overcame some of the inner obstacles that stood in the way of remembering. This new method was called free association, and the method of analyzing and interpreting what the patient said and did was elaborated into the system of psychoanalysis, which has been discussed earlier in the text. The further development of psychotherapy has continued to stem from the concepts of Freudian psychoanalysis. The contributions of Freud's two most celebrated pupils, Jung and Adler, have been given attention at other places in the text, and the contributions of other Freudian pupils are too voluminous to be recounted here.

While great strides were being made in the development of fundamental concepts for the understanding of the mentally ill, there was a considerable lag in the care and treatment of patients. In America, despite the fact that a number of mental hospitals had been erected during the early nineteenth century, many patients were still housed in jails, prisons, and almshouses and were ill-fed, poorly clothed and brutally treated. About the middle of the nineteenth century, Dorothea Lynde Dix began a movement which exposed and eventually improved the deplorable and shocking conditions. For many years Miss Dix traveled all over America and abroad demanding adequate and humane care for the mentally ill. She was eminently successful in her efforts and was largely responsible for the development of the state mental hospital system in America. Soon after Miss Dix's campaign got under way, 13 mental hospital superintendents organized the Association of Medical Superintendents of American Institutions for the Insane, which was the forerunner of what is now known as the American Psychiatric Association. In 1895 the Pathological Institute of the New York State Hospital was established as a center for research and clinical observation. In 1902 the name was changed to the Psychiatric In-

stitute, and Adolph Meyer was appointed as the Chief psychiatrist. Meyer immediately organized a training course for psychiatric interns, and the institute became the center of psychiatric training in the United States. Meyer remained at the Institute until 1910 when he became professor of psychiatry at The Johns Hopkins University. He was the foremost proponent of holistic and evolutionary views in regard to mental disease. In 1911 he coined the word psychobiology to encompass the idea that we are working with the biological functions of the total organism.

He considered mental illness to be an illness of the total person in distinction from the part (organ or system) illness with which medical men are generally on more familiar terms. If these illnesses did not so often have topical etiological agents such as bacteria, poisons or physical traumata, they have, in common with all biological phenomena, a natural history which can be objectively studied, understood and modified to advantage. His position that a mental disorder represented a maladjustment of the entire personality in relation to its environment had far-reaching influence, and from it developed the therapy known as distributive analysis and synthesis.

The contributions of Pavlov, the Russian physician and physiologist, in relating the conditioned reflex theory to the understanding of psychopathology have been discussed in an earlier chapter. It should further be noted that Pavlov led the way to the study of the experimentally induced neurosis in animals.

Meduna, Sakel and Cerletti and Bini pioneered the development of the various shock therapies that have gained prominence in the last fifteen years. Meduna began convulsive treatment of schizophrenia in 1928 using camphor in oil to induce the seizure. Finding camphor undesirable as a convulsant, Meduna later perfected the technique of using metrazol to produce shock and convulsion.

At about the same time Sakel observed that accidental insulin shock in drug addicts resulted in the disappearance of schizophrenic like symptoms. He therefore developed a method of using shock doses of insulin for schizophrenia and other psychotic conditions.

A few years later Cerletti and Bini, working in Rome, developed a method of treating patients by electrically induced convulsions. All of these methods of shock therapy are being extensively used in the treatment of mental patients.

While the care and treatment of the mentally ill is of utmost importance, the greatest hope for the future lies in prevention rather than in

cure. The prevention movement, oddly enough, got its impetus from a former mental patient, Clifford W. Beers. He was for three years a patient in both private and state hospitals, and upon his discharge from the hospital he decided to devote his life to the improvement of the conditions in mental hospitals and the prevention of mental disorders. He wrote about his illness and the conditions surrounding it and secured the help of many prominent men, including William James and Adolph Meyer, in the development of his plans. Meyer suggested that he apply the term "mental hygiene" to his projected movement. Beers assisted in the founding of the Connecticut Society for Mental Hygiene in 1908 and pushed for the development of a national organization. In 1909 the National Committee for Mental Hygiene was organized with Beers as its first secretary. Since that time, the mental hygiene movement has had a considerable growth, and a number of by products such as child guidance clinics have been established. The child guidance movement developed primarily from the impetus given by William Healy, who established the Chicago Juvenile Psychopathic Institute in 1909; but full maturity awaited the more complete development of the National Committee for Mental Hygiene. Mental Hygiene clinics associated with the schools or the courts and as civil projects rapidly followed in order.

Classification

The history of the development of an understanding of mental disorders will indicate many reasons for the difficulty of present day classification of such diseases. The classifications have undergone many changes and are always in the process of revision. The early and medieval notions of good and evil spirits emphasized the position that all mental disorders were "mental" in origin. The physiological and endocrinological studies, on the other hand, made clear the fact that certain mental disorders were caused by organic changes occurring within the individual. The advocates of both points of view continue to offer evidence to support their positions. This is indicated by the attempts of one group to treat schizophrenia by psychoanalysis and the attempt of another group to treat the same disorder by shock and psychosurgery.

The classification system now in use stems primarily from Kraepelin (735) and is basically symptomatic in type. This type of classification has been extensively used, probably because it involves merely the observation and recognition of the behavior symptoms of the patients. Such a classification serves a very definite need, but it tells nothing

about the causes of the disorder. It is one thing to be able to name a patient's malady and another thing to be able to prevent or cure it.

If we were able to demonstrate the underlying pathology of all of our cases, the problem of classification would be solved, but unfortunately this is not possible at the present time. The psychiatrist has erred frequently in his classifications because of ignorance of underlying pathology. It is, for example, comparatively recently that paresis has been shown to have an organic basis. The symptoms, originally supposed to be functional or of psychogenic origin, may now be definitely referred to the organic changes in the development of syphilis. The continuation of the study and the development of scientific technique will undoubtedly bring to light the pathology of other disorders.

The hope of the future in psychiatry, however, lies in prevention, and consequently in an understanding, of the causes of the disorders. In all considerations of etiology we must consider several factors and above all recognize the fact that the disease processes are the end results and therefore explainable not in terms of one of the factors, but in the combination of all of them. In other words, a mental disorder is the result of a long series of processes, hereditary, congenital and environmental, and cannot be explained completely on a basis of any one of these factors. The difficulty may have begun in the unfertilized germ plasm; other causes may have operated in the fetal period; and still others may be found in the environment to which the organism is subjected. The classification of the patients according to causation of their mental disorders has certain definite and obvious advantages. The most important of these is that we may take steps to prevent the development of the disease as well as develop specific treatment. We must, however, recognize the limitations of this classification. Symptoms have been confused with causes with the result that the treatment succeeds in curing the symptoms, but the disease remains. This is undoubtedly true in a large number of cases of chronic alcoholism. The alcohol is withdrawn and the subject's body freed of its effects, but the individual does not return to normalcy as is frequently claimed. In many instances the alcohol is not the cause of his difficulties, but is merely a way out of his disturbing dilemma. It furnishes him a temporary escape from his real problem and should be considered a symptom rather than a cause.

In any discussion of mental diseases on a basis of causation it has been customary to group the disorders into two major divisions, organic and functional psychoses. Under the term "organic" are included all of the disorders which are known to have a definite organic basis, while those

whose origin is claimed to be psychogenic are called functional. The disturbances of thought, feeling and action may in some cases (organic) be definitely correlated with impairment of structure, while in other cases (functional) no such structural impairment can be shown. Certain abnormal reaction patterns can, for example, be shown to be the results of toxic infections, glandular disturbances, brain injuries or bacterial infection, etc. In other disorders, however, the functions are disturbed, that is the mental aberrations are present, but no structural injury or disorder can be shown. The available information that we have is not sufficient to merit the dogmatism that is frequently expressed with regard to the causation of these conditions. Paresis, as already mentioned, was originally described as a functional disorder but is now definitely recognized as organic, the result of a certain stage of syphilitic infection. Discoveries of this nature have led many to adopt a viewpoint of extreme organicism and to state that one can understand function only in terms of structure. According to the extreme organicist, every mental disorder is the result of some definite injury to nervous material. For such investigators the inability to account for any mental difficulties in terms of specific organic disturbances is due to a lack of knowledge. To the student of psychology, who understands the principles of habit formation and learning, such an extreme viewpoint will appear unsatisfactory. We know, of course, that a blow on the head, bacterial infection or glandular disturbance may condition an individual's later reactions, and we know just as surely that terrifying or distressing experiences or the frustration of his desires may also condition them. Such attitudes as suggestibility, negativism, suspiciousness are learned, that is, acquired, through experience. The personality must be considered as dynamic, constantly changing with each new experience, and the development of reaction patterns which are viewed as abnormal can be explained by the same laws used to explain normal habit formation and learning. The complex emotional life of the adult is built by transferring the feeling from one object or event to another through the process of association. The child is afraid of only a few things, the adult has learned to fear many; the child does not have many attachments but the adult has transferred the feeling to a great number of things. The reaction patterns of the adult must be interpreted in terms of his experiences in life.

With this in mind it should not be difficult to recognize that since the life experiences of individuals vary markedly, the reactions to these experiences may be expected to show extreme differences. Recognizing

that glandular disturbances, deficiencies in cell nutrients, injuries to nervous tissues and the introduction of bacteria and toxins may result in mental aberrations, we must not lose sight of the fact that the present behavior of any individual is also dependent upon his past life experiences. The fact that one patient's delusions are those of grandeur while another considers himself persecuted is suggestive of the importance of environmental factors, and even in those disorders with a definite organic basis we frequently see differences in reactions which cannot be explained in any other way. It is hoped, therefore, that though we may discuss the disorders as being organic or functional, depending upon which factors play the dominant rôle, the reader will understand that all factors must be viewed as having a definite part in the end result.

Recently a great amount of material has appeared in the literature under the caption of psychosomatic medicine. The contention of the psychosomatic group is that when emotional factors are associated with organic disease, too little attention is paid to the emotional factors. It is claimed that while most physicians acknowledge the psychic causes of such physiologic phenomena as blushing, weeping, gooseflesh and vomiting, they nevertheless, find it difficult to believe that more prolonged (chronic) disturbances of a physiologic nature can possibly be psychic in type. The psychosomatic studies show clearly that emotional factors are prominent in the etiology of many serious physical disturbances. The contributions of psychosomatic medicine have been presented in an earlier chapter and Weiss and English (736) present a good bibliography of the work in this field. It should be noted that the psychosomatic enthusiasts, like the extreme organicists, have, at times, overstated the point; but a real contribution is being made to the understanding of mental disorders. It may not be long before the disorders will no longer be classified as either organic or functional, but attention may be given to how much each case is organic and how much functional.

Some confusion also exists regarding the distinction between the psychoses and the psychoneuroses. While there are some difficulties of differential diagnosis, the psychoses, in general, may be viewed as the more serious disturbances. Some differences between the two are readily distinguishable. The psychotics frequently show some disorientation for time, place and person. That is, they may be confused with regard to who they are, where they are, and may also have lost track of time. They are also frequently not in contact with reality and manifest difficulty in separating the products of their imagination from the realities

of life situations. They also frequently have hallucinations and delusions and are likely to be lacking in insight into their condition.

The psychoneurotics, though sometimes just as seriously disabled, present less severe disturbances of their psychic life. They are usually well oriented for time, place and person. They do not suffer from hallucinations and delusions, and while they may indulge in fantasy, they are able to distinguish these fantasies from reality. They usually have relatively good insight in the sense that they recognize their condition, although they may be incapable of doing anything about it.

Condensed Form of New Classification Adopted by the Committee on Statistics and Approved by the Council of the American Psychiatric Association

1. Psychoses with syphilitic meningo-encephalitis (general paresis)
2. Psychoses with other forms of syphilis of the central nervous system
 - (a) Meningo-vascular type (cerebral syphilis)
 - (b) With intracranial gumma
 - (c) Other types
3. Psychoses with epidemic encephalitis
4. Psychoses with other infectious diseases
 - (a) With tuberculous meningitis
 - (b) With meningitis (unspecified)
 - (c) With acute chorea (Sydenham's)
 - (d) With other infectious disease
 - (e) Post-infectious psychoses
5. Psychoses due to alcohol
 - (a) Pathological intoxication
 - (b) Delirium tremens
 - (c) Korsakoff's psychosis
 - (d) Acute hallucinosis
 - (e) Other types
6. Psychoses due to a drug or other exogenous poison
 - (a) Due to a metal
 - (b) Due to a gas
 - (c) Due to opium or a derivative
 - (d) Due to another drug
7. Psychoses due to trauma
 - (a) Delirium due to trauma
 - (b) Personality disorder due to trauma
 - (c) Mental deterioration due to trauma
 - (d) Other types
8. Psychoses with cerebral arteriosclerosis
9. Psychoses with other disturbances of circulation
 - (a) With cerebral embolism
 - (b) With cardio-renal disease
 - (c) Other types
10. Psychoses due to convulsive disorder (epilepsy)
 - (a) Epileptic deterioration

- (b) Epileptic clouded states
- (c) Other epileptic types
- 11. Senile psychoses
 - (a) Simple deterioration
 - (b) Presbyophrenic type
 - (c) Delirious and confused types
 - (d) Depressed and agitated types
 - (e) Paranoid types
- 12. Involutional psychoses
 - (a) Melancholia
 - (b) Paranoid types
 - (c) Other types
- 13. Psychoses due to other metabolic, etc., diseases
 - (a) With glandular disorder
 - (b) Exhaustion delirium
 - (c) Alzheimer's disease (presenile sclerosis)
 - (d) With pellagra
 - (e) With other somatic disease
- 14. Psychoses due to new growth
 - (a) With intracranial neoplasm
 - (b) With other neoplasms
- 15. Psychoses due to unknown or hereditary cause but associated with organic change
 - (a) With multiple sclerosis
 - (b) With paralysis agitans
 - (c) With Huntington's chorea
 - (d) With other disease of the brain or nervous system
- 16. Manic-depressive psychoses
 - (a) Manic type
 - (b) Depressive type
 - (c) Circular type
 - (d) Mixed type
 - (e) Perplexed type
 - (f) Stuporous type
 - (g) Other types
- 17. Dementia praecox (schizophrenia)
 - (a) Simple type
 - (b) Hebefrenic type
 - (c) Catatonic type
 - (d) Paranoid type
 - (e) Other types
- 18. Paranoia and paranoid conditions
 - (a) Paranoia
 - (b) Paranoid conditions
- 19. Psychoses with psychopathic personality
- 20. Psychoses with mental deficiency
- 21. Psychoneuroses
 - (a) Hysteria (anxiety hysteria, conversion hysteria and subgroups)
 - (b) Psychasthenia or compulsive states (and subgroups)

- (c) Neurasthenia
 - (d) Hypochondriasis
 - (e) Reactive depression (simple situational reaction, others)
 - (f) Anxiety state
 - (g) Anorexia nervosa
 - (h) Mixed psychoneurosis
22. Undiagnosed psychoses
23. Without mental disorder
- (a) Epilepsy
 - (b) Alcoholism
 - (c) Drug addiction
 - (d) Mental deficiency
 - (e) Disorders of personality due to epidemic encephalitis
 - (f) Psychopathic personality
 - With pathologic sexuality
 - With pathologic emotionality
 - With asocial or amoral trends
 - Mixed types
 - (g) Other nonpsychotic diseases or conditions
24. Primary behavior disorders
- (a) Simple adult maladjustment
 - (b) Primary behavior disorders in children
 - Habit disturbance
 - Conduct disturbance
 - Neurotic traits

CHAPTER XI

ORGANIC PSYCHOSES

Since the organic psychoses constitute over 40 per cent of the first admissions to hospitals in this country, they represent a major problem in the care and treatment of the mentally ill. Attention has already been directed to the fact that the organic causes for disturbances of psychological function are many and varied. The most frequent of these are: (1) infection: paresis, epidemic encephalitis; (2) intoxication: alcohol, drugs, exogenous poisons; (3) trauma: *severance of nervous tissue by mechanical insult*; (4) endocrine dysfunction; (5) circulatory or blood stream conditions: arteriosclerosis; (6) neoplastic conditions: tumors, thickening of meninges. All of these conditions may bring about some degree of brain injury which results in disturbances of psychological function. Some of the agents attack the brain tissue directly while others produce their effects on the nervous tissue indirectly. The development of psychotic behavior appears to be dependent upon injury or damage to the cerebral cortex, although damage to subcortical areas and other parts of the nervous system may result in marked disturbances of consciousness. Experimentation on animals and clinical evidence with patients tend to support the position that the psychosis develops primarily after gross lesions or the destruction of diffuse areas of the cortex.

The organic reaction types may be either acute or chronic. The acute reaction is usually the result of a temporary toxic process affecting the brain tissue, such as the delirium accompanying acute fevers. The chronic reaction is the result of more *severe tissue* damage usually showing progressive deterioration, as in the senile psychosis.

The acute reactions usually include disorientation, hallucinations, and false perceptions accompanied by a memory defect mainly for recent events. There is, however, usually no profound personality change.

The chronic reaction more frequently shows profound personality or character changes that are progressive. Memory for both recent and remote events is affected, and comprehension is disturbed.

No attempt is made here to give a complete account of the organic disorders, but a brief discussion is presented of the most important ones.

In some instances the mental disturbance is pronounced enough to be called psychotic, while in other instances the loss of intellectual and emotional control and the disturbances of other functions may not be extensive enough to justify such a diagnosis.

PSYCHOSES ASSOCIATED WITH EXOGENOUS TOXINS

The etiology of the toxic psychoses is direct and usually ascertainable as: an exogenous poison like alcohol, morphine, or lead poisoning; endogenous, as in the course of acute infections; and loss of metabolic support of the brain, as in endocrine disorders. It is our purpose here to discuss the first of these conditions; namely, the psychoses and personality disorders associated with alcohol, opium, morphine, cocaine, marijuana, barbiturates, gases, bromides and metals. The disorders are the results of elements which penetrate the body by way of the blood stream and attack vulnerable brain tissues. The extent of the disorganization of the personality depends upon the quantity of the drug ingested, individual tolerance, and various other factors. The incidence of mental disorder associated with alcohol and drugs is increasing, but the understanding of the problem is complicated by the fact that the use of alcohol and opiates is quite often a symptom as well as a cause of mental disorder.

Alcoholic disorders

The excessive use of alcohol is frequently encountered in those who seek psychiatric treatment, and consequently the reasons for taking alcohol as well as the effects of alcohol deserve careful scrutiny. Although alcohol is frequently thought of as a stimulant, all experimental evidence indicates that it is a depressant resulting in the impairment of both muscular coördination and mental efficiency. As Emerson (737) has indicated, alcohol, unlike food, passes from the stomach and intestine into the blood stream in exactly the same form as taken into the mouth. From the blood stream it is carried into the heart from where it passes to the brain as well as to every other organ and tissue of the body.

A variety of reasons for the taking of alcohol have been presented. In some instances alcohol is taken to conform to the social pattern or to be sociable, to experience the physiological or psychological effects, to escape from troublesome problems or conflict situations, or to satisfy physiological needs. What remains to be explained is why some individuals must turn habitually to alcohol. There is a growing tendency

to favor the position that the alcoholic has been emotionally mal-adjusted long before he became alcoholic and that the alcohol is a symptom of the personality disorder. Thus the drinking is viewed as a means of escaping from long standing insecurity. Schilder (738), along with other investigators, has insisted that the roots of alcoholism are the insecurities of early childhood. Many psychoanalytic investigators have emphasized the rôle of repressed homosexuality in the etiology of alcoholism. Whether alcoholism is symptomatic of a major personality defect or develops out of other causes is difficult to answer in every case, but there appears to be ample evidence for the fact that many insecure people use alcohol as a means of escape from their tensions.

Specific alcoholic mental disease may take several forms, but the three main clinical types are delirium tremens, chronic alcoholism and Korsakow's psychosis.

Delirium tremens. This disorder rarely occurs before thirty years of age, and, as the name suggests, is characterized by generalized tremors, chiefly of the facial muscles, tongue, and fingers, and a state of delirium. The patient finds it very difficult to sleep and, if sleep is induced, he has vivid nightmares. There are vivid hallucinations most frequently visual, but also haptic and auditory. The usual visual hallucinations are of snakes, rats and elephants. The haptic hallucinations are usually of animals crawling over the skin and are probably based on paresthesia. The condition usually follows a "drunken bout" but may occur in a chronic alcoholic following acute illness or sudden injury. There is great restlessness and fear, and at the height of the delirium, frequently complete disorientation. Suicidal or homicidal attacks may be present in response to the hallucinations.

Chronic alcoholism. The chronic alcoholic is the habitual drinker who suffers deterioration of intellect and character. The characteristic physical degenerations are well known and include tremors, paresthesia, circulatory and gastro-intestinal disorders, cirrhosis of the liver, gastritis, nephritis and generalized arteriosclerosis. Impotence resulting from the poisoning of the nervous system is frequently present.

The intellectual and moral deterioration is no less disturbing. There are loss of memory, impairment of judgment, inability to concentrate and sometimes disorientation. Since the higher inhibitory centers are paralyzed, the patient acts in accordance with his present mood without the possibility of sound judgment. He becomes irresponsible, shiftless, careless, and is many times found bewailing his fate and stating that

everyone is against him. Some authorities have attempted to show that a large percentage of chronic alcoholics are essentially homosexual, but though homosexuality is frequently a factor, it should be kept in mind that it is only one of many possible factors.

As Henderson and Gillespie (739) have stated:

The psychological understanding of a chronic alcoholic is an individual affair, and each case must be tackled as a special problem on its merits. The factors which have helped to precipitate a chronic alcoholic habit and to sustain it do not differ in any kind from those producing any other morbid mental reaction; and sufficient weight should be given to the influence of habit, to the influence of nagging friends and relatives in accentuating it and to the manner in which the alcoholism becomes a part of the ego-ideal, so that to keep on drinking becomes a point of honour.

It is our belief that the psychopathology of alcoholics is most frequently represented by emotional immaturity. The individual who has been prevented, by parents and others in his environment, from making mature emotional adjustments frequently becomes alcoholic. The alcohol is easily obtained and quickly takes him away from unpleasant realities and allows him to regress to lower emotional levels.

Korsakow's psychosis. This syndrome, first described by Korsakow, seldom occurs before fifty years of age, is commoner in females than in males, and is usually of sudden onset.

The disorder is generally of alcoholic origin, but sometimes it follows the toxic vomiting of pregnancy or is the result of lead poisoning, typhoid, malaria, or influenza.

It is characterized by loss of memory, particularly for recent events, and retrospective falsification. The patient frequently forgets what happened just a few minutes ago, and is extremely susceptible to suggestion. With these elements as a basis, the patient also displays disorientation, especially for time, visual and auditory hallucinations and complete lack of insight. Further symptoms, characteristic of alcoholic polyneuritis such as abolition of the tendon reflexes, tenderness over the nerve trunks, pains and hyperesthesias of certain muscular regions, occur in an association with the disease, while in pronounced cases nystagmus is frequently present, and in some instances there is wrist or foot drop.

The course of the disorder is usually a long one, and the prognosis is poor. Those cases of alcoholic origin often begin to show some improvement in about the sixth or eighth week, but many take a considerably longer time. The patients seldom recover complete efficiency, especially with regard to memory, some residue of mental deterioration remaining even after all physical symptoms have cleared.

Drug psychoses

Opium and morphine. The extent of the drug problem, other than that of alcohol, can be seen in the report by Moore and Gray (740). Of 115,845 first admission cases to mental hospitals during the period from 1917 to 1937 inclusive, 841 were associated with the excessive use of drugs. These 841 cases were distributed as follows: 43.2 per cent involved the use of opium derivatives; 24.7 per cent, barbiturates; 12 per cent, bromides; 3.2 per cent, other sedatives; 1.7 per cent, analgesics; 2.2 per cent, gases; and 2.1 per cent, metals. The important problem in the psychoses due to drug addiction involves an understanding of why the patient began to take the drug. Again we may find that in a number of instances the addiction to drugs is a sign of some deeper difficulty. Many writers have pointed to the use of drugs in medical treatment to relieve suffering and consequently have placed the blame on the physician for the production of drug psychoses. While it is undoubtedly true that some physicians administer drugs too freely and that some patients become addicted in this way, statistics appear to show that the large percentage of drug addicts are people of psychopathic make-up. In a great number of cases, therefore, the patient takes the drug because of some personal difficulty not so obvious as the physician's treatment with drugs.

The physical symptoms include dryness of skin, hair, and mouth, loss of appetite, strongly contracted pupils, constipation alternating with diarrhea, impaired digestion and, in some cases, impotence and paresthesias. The skin may show many marks of injections if the drug is taken hypodermically.

The mental symptoms are no less marked than the physical. There is an increasing inability to sustain the attention, memory is poor with considerable fabrication. The addict loses ambition, and all sense of responsibility disappears. He becomes suspicious of all those about him and develops ideas of persecution. The confirmed addict will go to great extremes to procure the drug, frequently resorting to lying or stealing and even to murder.

When the addict is deprived of the drug, there result certain characteristic changes which are known as the withdrawal symptoms. The patient becomes excessively fatigued and appears ready to collapse, muscle tremors occur and the body may tremble all over. The addict is unable to sleep, is unusually restless and unable to concentrate. The effect is usually one of fear and misery frequently with horrible hallucinatory experiences. He is certain that the end is near or that some terrible

thing is about to happen to him. Since the sudden withdrawal of the drug proves too distressing, often resulting in complete collapse and sometimes proving fatal, a gradual breaking of the habit by reducing the dose or using substitute drugs is advocated.

Cocaine. Although cocaine is not used as much as many of the other drugs, it is one of the most ruinous. It is used as a substitute for morphine in treatment or is taken in conjunction with other drugs. The drug in small doses is productive of a descending stimulation to the central nervous system, resulting in overactivity, talkativeness and restlessness. Headache and dizziness usually precede the feeling of peace and well being during which the addict experiences pleasant, vivid hallucinations.

While the abstinence symptoms are not so unpleasant as those associated with morphine, they include fearful hallucinations, anxiety, depression, peculiar creeping sensations under the skin (cocaine bug), muscular weakness, gastric disturbances and, not infrequently, delusions. The delusions are often persecutory in nature, having to do with jealousy and infidelity, and in these states the patient may be quite dangerous.

Marijuana. Marijuana, which is taken by smoke from cigarettes or pipes, is not used in this country for any medicinal purpose. While marijuana, unlike most of the other drugs, is not complicated by withdrawal symptoms, specific craving or increased tolerance; nevertheless even mild doses result in general disturbance with flight of ideas, inability to concentrate, impulsiveness, and disorganized behavior. Definite psychotic symptoms, including hallucinations and delusions, may result from the use of marijuana over a prolonged period of time.

Miscellaneous Drugs. A number of other drugs in general use for medicinal purposes when injudiciously taken may result in psychotic symptoms. The drugs popularly referred to as the bromides and barbiturates are the ones most frequently used. These drugs are often taken as a steadying device or as relief from insomnia. Prolonged use or overdosage may result in a confusion and delirium which is very much like other psychotic pictures.

Gases and metals

Psychotic symptoms are occasionally seen as a result of severe gas or metallic poisoning. Carbon monoxide and other gases if absorbed in large quantities may result in severe poisoning with loss of consciousness sometimes lasting several days. Mental symptoms including confusion, aphasia, apraxia often follow such poisoning. In many instances the patient is amnesic for the event.

The inhalation of metallic dust or fumes from metals such as lead, mercury, arsenic and manganese may similarly be complicated by the appearance of mental symptoms. In the case of lead poisoning the mental changes are often so extensive as to justify the diagnosis of lead psychosis. Such patients show restlessness and anxiety, are sometimes delirious and suffer with insomnia. Hallucinations are not uncommon, and delusions of persecution are frequently seen.

DISORDERS ASSOCIATED WITH INFECTION

A variety of personality disorders are caused by infections. Microorganisms such as bacteria or viruses may reach the brain and destroy nerve tissue. Such infections may result in disturbances of psychological functions of sufficient magnitude to produce a psychosis. Psychotic conditions are seen most frequently in syphilitic infection but other infections such as epidemic encephalitis and cerebrospinal meningitis may also be accompanied by psychotic behavior.

Psychoses associated with syphilis

Syphilis is a contagious venereal disease which is responsible for approximately 10 per cent of the hospitalized nervous and mental disorders. Despite the well known disastrous results of the disease, as well as the clear understanding of its etiology, there is still a great need for a more practical approach to the problems for the control of the disorder.

There is evidence that syphilis is, in whole or in part, responsible for several mental and nervous diseases. Three definite disorders stand out in which syphilitic infection plays the dominant rôle.

Dementia paralytica or paresis. Dementia paralytica, sometimes termed paresis, is an organic disease of the brain of an inflammatory and degenerative nature, manifesting itself in progressive mental deterioration and accompanied by certain definite physical signs and serological findings. The disorder never occurs except in persons who have had previous syphilitic infection. The direct cause is always the invasion of the brain by the *treponema pallidum*. Paresis usually does not appear until 10 or more years after the initial infection. The disease is more common in males than in females with the incidence peak in the fourth and fifth decades.

An examination of the pathology of this type of mental disorder will clarify an understanding of it. Definite organic indications appear in the brain, which usually seems smaller and diminishes in weight. The frontal and parietal lobes are atrophied with a consequent widening of the sulci. The brain membranes are thickened, and there are areas of

haemorrhagic pachymeningitis. The main pathological changes, however, are microscopic. Many nerve cells are completely destroyed and the form of others distorted. There is, in addition, a marked increase of neuroglia, usually along the vessel sheaths.

This is far from a complete explanation of the pathological changes, but it is sufficient to indicate that we might expect to find resulting mental disorders.

The chief clinical signs of the disorder are motor incoördination, tremors, disturbances of the reflexes and convulsive seizures which may be epileptiform or apoplectiform in type. There is sluggishness or total absence of the light reflexes and inequality of the pupils. A marked tremor of the tongue causes characteristic speech disorders in which the thick, indistinct and slurred method of pronunciation may be demonstrated by asking the patient to pronounce such words as Methodist Episcopal. The handwriting shows inaccuracies comparable to those found in speech. There is the tremor, omission or duplication of syllables or, in some cases, the transposition of the syllables so as to distort the words completely. As the motor incoördination becomes more marked, the writing becomes even less legible. The convulsive seizures so closely resemble apoplexy or epilepsy as to be taken for them, and after the seizure of either type, the patient is usually much worse. In advanced stages of the disease the patient suffers from extreme malnutrition; tremors and motor incoördination are accentuated; and the seizures become more frequent.

The chief serological signs are positive Wassermann and Kahn reactions of the blood and spinal fluid, an increased number of lymphocytes in the spinal fluid and a typical paretic colloidal gold curve.

Paresis usually shows three general stages: (*a*) prodromal, (*b*) fully developed, and (*c*) terminal; and three main types: (*a*) exalted, (*b*) depressed, (*c*) demented. It is impossible to differentiate the stages clearly since arrest occurs in some cases and remissions may also be present, but in general there is a progressive decline.

The mental symptoms are frequently the first signs of distress that are noticed. There is often a complete reversal of personality traits, and in practically all cases the conduct of the paretic is noticed as being essentially different. The neat, well dressed individual becomes careless and slovenly; the efficient business man shows poor judgment in his office; the moral, upright man suddenly becomes degraded, associates with the most undesirable companions and becomes involved in theft, alcoholic bouts, etc.; the previously faithful husband and father loses

interest in his wife and children and seems to lack ordinary thoughtfulness and courtesy.

This deterioration in the personality was well summarized by Campbell (741).

The change in the personality which at the later stage becomes obliterated by the grosser disorders, is first shown in a loss of that special responsiveness which distinguishes the individual as a social unit. The responsiveness to ethical, aesthetic, intellectual, and certain conventional standards is involved; the patient no longer shows the same judgment, the same sense of value, a function different from that of mere intellectual activity, and one upon which depends the attitude of the whole individual in the face of actual situations.

General mental deterioration accompanies the personality alterations. The defect in memory is progressive, including loss of memory for remote as well as recent events. Important engagements are forgotten, letters go unanswered, judgment becomes defective. There is a disorientation, particularly for time, the patient frequently being unable to tell you where he was just a few minutes ago. He will get ready to go out to lunch when he has just returned or ask why his friends who have just left do not come to see him. One of the apparent characteristics of the disorder is the inability of the patient to realize the seriousness of the illness. He either becomes angry when his actions are discussed or dismisses them as inconsequential matters. The most common type is the simple demented type evidencing emotional indifference and glaring memory defects and usually resulting in death in from two to three years.

The exalted or expansive type—described much more fully in the literature—does not have as great incidence. Bizarre, grandiose delusions with no systematization characterize this type. The patient talks freely of his millions, his accomplishments, his prowess and his influence, describing them in the most absurd and expansive terms, but the delusions have no systematization and the patient is not carried away by them.

In some cases, however, a feeling of intense depression is substituted for the feeling of euphoria. Melancholic delusions and hypochondriacal ideas are characteristic of the depressed type. The patient complains that his insides are gone, his brain has become soft, his arms and legs are wasting away or his lungs have collapsed. One patient asked the writer to take an X-ray of his insides for he was certain they were gone. He claimed that he was no longer a human being, but existed merely as a spirit. During these periods of depression, suicidal attempts are not uncommon.

Cerebro-spinal syphilis. A second type of mental disorder in which syphilis plays an important part is cerebral or cerebro-spinal syphilis, an organic disease affecting the interstitial tissues of the central nervous system. It is caused by syphilitic infection, the symptoms showing an involvement of the central nervous system appearing sometimes within six months of the original infection and practically always within five years. The types are meningitis, endarteritis and gummas or soft tumors of syphilitic origin.

The physical symptoms include headache, dizziness, sleeplessness, fainting without loss of consciousness and vomiting without a feeling of nausea. Practically any of the cranial nerves may be involved. Eye symptoms of various kinds such as blurring, dimness of vision, squinting, inequality of pupils are among the early signs. The cell count and globulin reaction are practically the same as in paresis, but the colloidal gold test shows a distinctly different form with a curve in the luetic rather than the paretic zone. The mental symptoms include irritability, confusion, stupor, and loss of memory, particularly for recent events.

Tabes dorsalis with psychosis. Tabes dorsalis or locomotor ataxia is also of syphilitic origin. It is due to the degeneration of the posterior roots and neurones of the cord. A large number of the tabetic patients later develop general paralysis together with its mental symptoms.

The psychosis is frequently described as an acute hallucinatory excitement. There are persecutory ideas, agitation, fearfulness, and auditory hallucinations. The degenerative changes in the cord lead to incoördination, loss of the deep reflexes and disturbances of sensation. A certain amount of degeneration of the cerebral cortex may be found in some cases, followed by cranial nerve involvement, particularly of the ocular and optic nerves, with the result that double vision and dimness of vision occur. The patient frequently reports sharp, shooting pains in the legs, and vomiting often occurs without nausea. The ataxia shows itself in the lack of precision of leg movements, particularly with the eyes closed. The motor coördination may be well shown by the Romberg sign and the finger to nose test.

Encephalitis lethargica

Psychotic symptoms are sometimes associated with inflammation of the brain or encephalitis. The condition is also known as epidemic encephalitis and is popularly referred to as sleeping sickness. The disorder is caused by a filterable virus which attacks the brain tissue

as well as other organs of the body. The patients show a variety of symptoms accompanied by a state of lethargy. In the acute stage of the illness, the patients may be grouped according to definite syndromes into four types: Parkinsonian, hyperkinetic, hypersomnic-ophthalmoplegic and psychotic types.

The psychotic type is marked by a peculiar stupor from which the patient may be aroused for brief periods of good attention, only to slump quickly back into the stupor. In addition to the stupor the condition is marked by delirium, restlessness, disorientation, memory defects and in some instances excitement and depression.

The organic lesions associated with the disorder are found chiefly in the midbrain, basal ganglia, and the posterior portion of the pons and the medulla, though they may also occur in the cortex, cerebellum and spinal cord.

The disease is progressive and tends to spread to other parts of the brain. The mortality rate is high, and prognosis for complete recovery is unfavorable since the residual effects are widespread.

Cerebrospinal meningitis

The disease is caused by the microorganism diplococcus intracellularis, which enters the organism through the nasopharynx and attacks the meninges of the brain. Mental symptoms are almost always associated with the disorder, but compared to other diseases the incidence of psychosis associated with cerebrospinal meningitis is relatively small, less than one per cent of all first admissions to mental hospitals in the United States having been so diagnosed.

In addition to presenting a wide range of physical symptoms, the patients are apt to show delirium, stupor and coma with loss of ability to concentrate and impairment of memory.

Chorea

Acute chorea, popularly known as St. Vitus dance, has been known since the early part of the fifteenth century. However, despite the early descriptions of the disease, the nature of the offending organism is still unknown. It is generally assumed that the disease is due to an infection of the cortex and the basal ganglia in the brain, and since the disorder is sometimes seen with rheumatism and endocarditis, there appears to be some evidence that the organism responsible for chorea may be related to the organisms producing these diseases. Although adults occasionally develop chorea, the disease is primarily one of child-

hood, approximately four fifths of the cases developing in children between 5 and 15 years old. In both the childhood and adult types the majority of those affected are females.

The disease is characterized primarily by the involuntary, spasmodic, uncoördinated and jerky movements of the muscles. In most patients the choretic movements are generalized, involving most of the muscles of the body. The muscles of the hands, face and tongue are almost always affected; consequently disturbances of speech are usually in evidence. The speech may be awkward, explosive, hasty and sometimes unintelligible. The choretic children are described as being sensitive, delinquent and disobedient, but such personality disturbances are understandable in view of the uncomfortable conditions under which such children must live.

The mental symptoms are most frequently restlessness, irritability, and emotional outbursts; but sometimes more pronounced symptoms, including clouding of consciousness, delirium and hallucinations, may be in evidence. Fortunately the prognosis is generally favorable, and where the home and treatment attitudes are intelligent, recurrences are infrequent.

Many other disorders, including brain abscesses and focal infections, show mental symptoms which may be referred to bacterial infection.

CIRCULATORY OR BLOOD STREAM CONDITIONS

Senile psychoses

The psychosis of senility is one of which most individuals are somewhat cognizant. Practically everyone has noticed the mental changes that take place in the aged individuals about him. Roughly speaking, the span of life may be divided into dozens. The first dozen years may be called the period of childhood; the second dozen, adolescence; the third and fourth, maturity; and the fifth and sixth, senescence. The beginning of the decay of powers is thus placed at about 48 years, though, of course, regressive changes begin almost as soon as maturity is reached. Usually, however, we refer to the years after 60 as constituting the senile period, but even here we must recognize the fact that heredity and the trials and strains of life will make for great individual differences so that one man's tissues may become senile long before another's. With the advance of age we may expect a certain degree of deterioration both physical and mental. The psychosis, as a rule, develops gradually and is characterized chiefly by impairment of retentive ability and general

failure of memory. The memory defect, much more marked for recent than for remote events, causes the patient to recall events of his early life but to be unable to remember what happened five minutes ago. There is, in addition, a general reduction of mental capacity with a tendency toward self centering of interests. The disorientation may be accompanied by depressions, irritability, paranoid trends and confused states. Several different clinical pictures may be drawn, but there is considerable overlapping.

Simple senile deterioration. Many of the changes seen in this clinical type fall well within the range of normal. The outstanding characteristic is the retention and memory defect, particularly the loss of memory for recent events. The patient does considerable reminiscing, a condition which is probably somewhat referable to the fact that there is a narrowing of interest in current happenings. In fact, interest is so closely restricted that the affairs of the members of the immediate family are often of no concern whatever to the patient, who displays careful attention only to his own personal wants. Accompanying this limitation of interest is a considerable reduction in mental capacity which reveals itself particularly in the lack of ability to concentrate on or even to attend to present happenings, a condition which, in a sense, would explain a failure to display interest. A certain degree of irritability appears inevitably, particularly at night.

Presbyophrenic type. The general picture of presbyophrenia resembles somewhat Korsakow's disease, with retention defect and much con-fabulation. The disorder usually begins earlier than simple senile psychosis and frequently shows complete disorientation. Unlike the simple senile type the presbyophrenic appears mentally alert and able to grasp the present situation, but he is entirely unable to understand his own relationship to the situation. His forgetfulness leads to absurd fabrications and contradictions, and he shows great restlessness which prevents him from completing any task.

Other types are classified as: delirious and confused types; depressed and agitated types; or paranoid types, depending upon the principal content of the picture. In addition to these types, there are other senile psychoses such as Alzheimer's and Pick's disease, but they are less frequently seen.

Psychoses with cerebral arteriosclerosis

Cerebral arteriosclerosis occurs usually in people about 50 years of age, though it is sometimes found considerably earlier. The disease

is caused by the sclerosis of the arterial blood vessels. Often it is difficult to distinguish from a senile psychosis, particularly if the disease occurs in the senile period. However, in addition to the fact that the onset is usually earlier in cerebral arteriosclerosis, insight is more frequently present and intellectual impairment not as pronounced as in the senile psychosis. A psychosis does not always accompany the disease, although definite mental symptoms usually are present.

The disorder may be ushered in with an apoplectic or epileptic seizure. The individual then loses the ability to concentrate or to fix the attention and suffers from a realization of his decreased efficiency. An impairment of memory which progresses from recent to remote events follows. Often there is marked emotional instability resulting in alternate weeping and laughing without sufficient cause, emotional outbursts, or great irritability. In addition, there are states of cloudiness of consciousness, confused states, depressions, suspicions and occasionally paranoid trends.

The cause of the sclerosis which is responsible for the symptoms is not well known. Insufficient rest, inadequate relaxation, worry and anxiety are generally believed to be contributory factors. Pollock (742) has taken the position that syphilis and alcohol are also important contributory factors to the development of the disorder. An excellent summation of the senile and arteriosclerotic syndromes has been presented in a volume edited by Kaplan (743) entitled, *Mental Disorders in Later Life*.

TRAUMATIC PSYCHOSES

The diagnosis of traumatic psychoses is restricted to psychotic disturbances following injury to the head. The fact is, of course, recognized that mental disorders may occur subsequent to physical injuries of any nature, but the term traumatic is applied only to the psychic disorders which occur as a direct result of the injury. In all cases the direct connection between the brain injury and the psychotic symptoms cannot be shown so that in these instances the use of the term traumatic psychoses is obviously based upon an assumption.

It should also be noted that in a large percentage of the cases other etiological factors such as alcoholism, syphilis and psychopathic traits are to be found. This rare disorder constitutes not more than from 0.3 to 0.5 per cent of the first admissions to mental hospitals of this country. In some cases there is a traumatic delirium resembling the Korsakow mental syndrome. Others are characterized by a gradual post-traumatic

change in disposition. The patient becomes easily fatigued, unduly irritable, suffers from headache and vasomotor instability. This type is usually referred to as post-traumatic constitution, and frequently paranoid tendencies are evidenced, while in other cases the picture resembles more closely epilepsy or hysteria. A third type, usually referred to as post-traumatic mental enfeeblement, while evidencing little real mental disturbance, leaves the individual at a lower mental level for the rest of his life. He no longer appears to have the same judgment or organizing ability and may never be so alert mentally as formerly.

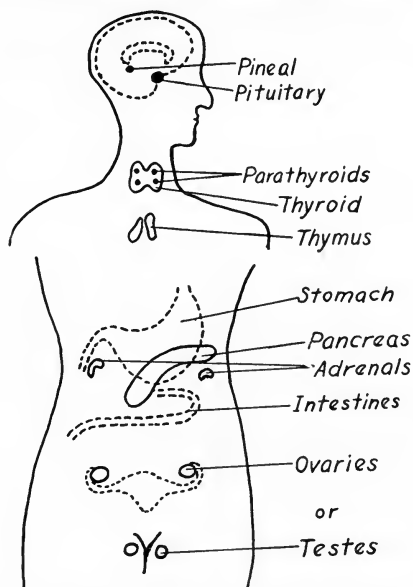
MENTAL DISORDERS ASSOCIATED WITH GLANDULAR DISTURBANCES

The importance of disorders of the endocrine system in the understanding of mental diseases is being given an increasing amount of attention by modern investigators. The secretions from the endocrine glands are known to have a far reaching effect on behavior and are referred to as determinants of both physical and mental activity. Unfortunately, due to the complexity of the glandular system, and the tendency for the secretions from one gland to influence many of the others, the knowledge of the exact functioning of the glands is limited. The fact that the glandular secretions are intimately related to conscious behavior and therefore play an important rôle in the understanding of psychological reactions has been repeatedly shown. The relation of glandular secretions to such experiences as elation, depression, anger, fear, excitability, calm, etc. is well known and we should therefore expect that the dysfunctioning of these glands would in some instances be responsible for peculiar or unusual behavior patterns. These glands are intimately related to the activity or are influenced by it, so that it is sometimes difficult to determine whether they represent cause or effect. The endocrine glands are called glands of internal secretion because they have no external outlet but pour their secretions directly into the blood stream (fig. 33). They produce complex chemical substances known as hormones or autacoids which are absorbed by the blood and carried throughout the body.

One of these glands, the thyroid, consists of two masses of tissue located on each side of the larynx and connected by a strip. The position of this gland is well known to the layman because of its enlargement in the disease of goiter. The parathyroids, four in number and particularly small, are imbedded in the thyroid, two on each side of the larynx. Other endocrine glands are the pituitary gland, a tiny organ which hangs on a thin tissue encased in a bony cup, in a well pro-

tected position at the base of the brain; the thymus, which covers a good part of the chest in the very young child but becomes relatively insignificant as one grows older; the liver and pancreas, two of the larger glands, which are situated in the abdominal cavity; the sex glands in the pelvic region; and the adrenals, glands of particular importance, which are found, one on the top of each kidney.

The synthetic production of some of the secretions, such as thyroxin and epinephrine, is possible, but as yet the knowledge of most of the sub-



10. 33. The above figure shows the location of the glands of internal secretion.

stances is not sufficient to make possible their production in the laboratory.

As we consider the abnormal states which are based on endocrine disturbances, it will become evident that in no case are the symptoms mentioned peculiar to these particular diseases, nor will we find many clear cut clinical pictures which we may definitely say are due to the dysfunctioning of a particular gland. More frequently we will find varying types of mental abnormalities associated with the same glandular disease, and in many cases no mental abnormalities at all are present. Many attempts have been made to link schizophrenia and manic-depressive psychoses with endocrine disturbances, but there is little clinical evidence to support such theories.

Cases of pituitary, thyroid, and adrenal disorders sometimes exhibit the classical symptoms of schizophrenia, but actual endocrine disorders are no more common in the population of the mental hospital than in the general community population. Many lines of research need to be followed carefully to enable us to understand how endocrine factors complicate psychotic conditions. Certain relationships between menstruation and the functions of the pituitary, thyroid, and adrenal glands and the ovaries have been established, and some menstrual disturbances can be corrected by the therapeutic use of endocrine substances. The female sex hormones in schizophrenic women showing amenorrhea during early hospitalization need to be studied particularly for any indications as to the meaning or cause of the shift back to normal in the event of recovery. Allen and Henry (744) have reported a study of 100 unselected cases in which it was found that menstruation varies considerably according to the type and stage of the illness. Hypomanic patients tended to have a flow which was more profuse and of longer duration; and in the manic phase when the patients were excessively overactive and excited, irregularities and occasional amenorrhea were observed. In the depressive states the investigators report that as the depression increases, the flow increases in amount and duration, then is tardy and of short duration, and finally there is amenorrhea. In schizophrenic women the investigators found the menstrual reactions to depend largely upon the stage of the illness. The chronic schizophrenic who had readjusted with more or less mental deterioration menstruated normally, but the acute schizophrenics were subject to irregularities in the amount and duration of the flow as well as in the intervals between periods. This was found to be particularly true in the acute catatonic states of excitement and stupor, which now and then were accompanied by several months of amenorrhea.

On the whole, the endocrine studies have been disappointing because we do not know enough of the nature of either the endocrine glands or the mental disorders. It might be possible to study the fluctuations of hormones during different phases of psychoses or to determine the actual hormone mechanism or action in so-called psychogenic amenorrhea.

There is suggestive evidence that the assay of hormones and anti-hormones in the sera of patients may furnish some information. The chemical and physiological differentiations of male and female hormones are still in the early stages of development, but with the refinement of chemical, tissue culture, and other methods, findings of value may be expected.

Thyroid disturbances

Thyroxin, the secretion of the thyroid gland, plays an important rôle in the control of the metabolism of the body. If the chemistry of the system is seriously interfered with by either the over or under secretion of this gland, we may expect the nervous material of the brain to be affected with resulting mental peculiarities. The thyroid disease may appear either as hyperfunction (exophthalmic goiter) or hypofunction (myxedema and cretinism). When the thyroid becomes overactive and secretes thyroxin in excessive amounts, the physiological processes of the body are speeded up, temperature rises, pulse becomes rapid, the skin is flushed and moist. The individual becomes extremely active, irritable and appears to be unable to relax. The emotions are easily aroused, and the motor activity may go on at such a pace that the store of energy becomes exhausted and the patient loses weight and becomes emaciated. Some feelings of unreality and vague persecutory delusions may be present, associated with rapid changes of mood. The majority of the patients evidence typical anxiety states, the sleep being much interfered with by anxiety dreams. As has already been mentioned, cause and effect are not always easily differentiated in the clinical pictures, the anxiety being sometimes explained as the result of the disease and at other times as the cause.

Hypofunction of the thyroid in later life results in myxedema, a disorder in which many of the symptoms are directly opposite to those found in exophthalmic goiter. The myxedema patient becomes dull, listless, apathetic and loses interest in his environment in general. Activity in the motor realm is rare, speech becomes slow and monotonous and thought is definitely retarded. The weight markedly increases, the skin becomes yellow, the lips thick and the face appears expressionless. The patient is always tired, and in many cases the sexual functions are greatly diminished. There is a general deterioration of intellectual ability, particularly noticeable in the inability to remember recent events.

The effects of thyroid deficiency on the personality vary widely from case to case. These patients are often depressed in mood, the depressions sometimes becoming as deep as those seen in the manic-depressive psychoses. In severe cases, delusions and hallucinations of hearing, sight, smell, and taste may occur. The patients are often confused, and much of their conduct may be bizarre enough to make it difficult to distinguish it from that of schizophrenics. Hoskins and Sleeper (745) have reported the occurrence of recognizable degrees of thyroid deficiency in about 10 per cent of a series of schizophrenic patients. In

these cases considerable degree of improvement in the mental condition was frequently seen following thyroid medication.

Adrenal disease

The disorder of the adrenal gland which is most frequently accompanied by mental symptoms was first described by Thomas Addison in 1855 and is still called Addison's disease. The disease is caused by an underfunctioning of the cortical portion of the adrenal gland. Easy fatigability is the most obvious and characteristic sign of the disease. In some instances muscular prostration occurs in patients whose muscles appear normally firm and healthy, and physicians are likely to fall into the error of assuring such patients that the trouble is "all in the mind." The patients usually have feeble circulation, suffer from headaches, vertigo, and, as might be expected, become irritable and depressed. Associated with the lack of vigor is a depression of the sex functions in both men and women. The mental sphere is characterized by restlessness and anxiety, and in some cases a depression is seen in the form of a constant apathy. In rare instances extreme dementia may result. Swingle and Pfiffner (746), working at Princeton University, have discovered an aqueous extract of the adrenal cortex which has proved valuable in the treatment of cats and the Mayo Clinic has reported remarkable success in the treatment of a few cases.

There are two types of overfunction of the adrenal glands that deserve attention. Occasionally people who are otherwise normal are subject to attacks of paroxysmal hypertension in which the blood pressure may suddenly rise to high levels and quite as suddenly drop to normal. In such cases adrenine is produced in abnormal amounts and episodically discharged into the circulation. The adrenine stimulates the sympathetic nervous system, which, in turn, stimulates the adrenals and thus sets up a vicious circle. The quiescent period occurs when the gland is depleted and waiting for another supply of adrenine to be generated.

If the adrenal cortex becomes pathologically overactive as the result of hypertrophy or the development of tumors, a condition results in which the masculine characteristics are accentuated. In the male this results in extreme virility, while in the female the picture may be that of a masculinized caricature of the former self.

Occasionally infants are born who appear to be both male and female (pseudohermaphroditism). They really begin their lives as girls but have superimposed upon the feminine construction a pseudomascularity. The internal sex structures, including uterus and ovaries, are

feminine; but the external genitalia are largely transformed to the masculine type. These cases have been assumed to be due to overactivity of the adrenal cortex before birth, but satisfactory objective evidence of this position has not been obtained.

Overactivity of the adrenal cortex arising in childhood, however, has been studied and is better understood. Hoskins (747) reports that in modern medical literature up to 1929, eighteen cases had been reported, of which fourteen were girls. Literature, however, presents many earlier accounts in which the condition can be recognized. The condition is characterized chiefly by precocious growth. A number of cases have been reported in ancient medical literature of which the following statement is a good example: "The subject was an infant, a young man, a mature man, an old man, was married and begot children and all in the space of seven years."

If the condition occurs in girls, the results are similar to those seen in boys. In addition to precocious growth, there is superimposed masculinity. The beard grows, the body hair becomes coarse, and the sex organs become transformed to imitate the male structure. The voice becomes deeper, and the rounded feminine contour gives way to masculine angularity. If the onset of the disturbance occurs after the girl has reached puberty, menstruation ceases and the breasts atrophy. In both sexes the early stage of the disease is characterized by increased strength and energy, with temporary accentuation of sexual desires. Mental and emotional aggressiveness of the masculine type are likely to accompany the early changes. In such cases extreme personality changes may be expected.

Pituitary disturbances

While the pituitary gland has long been recognized as an important regulator of physiological development, frank psychotic behavior is not so frequently seen in the pituitary diseases. The pituitary when functioning normally tends to keep the growth of the individual within normal limits, but disturbances of this functioning may result in abnormal growth, or unnatural distribution of fat. Gigantism, acromegaly, and dwarfism are the principal results of disturbances of the growth promoting function of the anterior lobe.

In true gigantism it is generally agreed that the abnormal tallness originates in childhood and is due to overactivity of the growth zones in the long bones of the body. Instead of ceasing to function relatively soon after puberty, as is ordinarily the case, in giants the growth is likely

to continue for a considerable time. The arms and legs, as well as the hands and feet, become disproportionally long. Deficiencies of the sex function are usually present, and the subjects often die young. At autopsy the anterior lobe of the pituitary always shows abnormalities. The condition is complicated by secondary changes in other endocrine glands and by different degrees of involvement of the pituitary. Quite aside from the mental changes that might follow as a result of the physiological disturbances, it should be noted that personality difficulties may be expected as a result of the difficulty encountered in making social adjustments.

Acromegaly, in contrast to gigantism, most commonly begins in early middle life. At the onset of this disease the body has matured to a point where it is not capable of further symmetrical development. The most striking feature of the condition is the enlargement of the "acral" parts, including the nose, lips, tongue, lower jaw, hands and feet. There are wide differences in the extent of the disease, some resulting in only slight changes and others in overgrowth of practically all parts of the body, the head, feet, and hands becoming larger with particular distortions of the face and head. Hallucinations of taste and smell are sometimes seen, and in the early stages of the disease the patient may become irritable, morose, absentminded, unable to concentrate and may show outbursts of anger approaching homicidal mania. As the disease progresses, mental sluggishness and depression and finally apathy and stupor may characterize the picture. Metabolic changes and varying degrees of secondary change in other endocrine glands serve further to complicate the picture.

Although dwarfism may result from other causes, there is one kind of dwarf which is a result of failure of the anterior lobe of the pituitary. Since the pituitary deficiency characteristic of the condition may vary widely in degree, the subjects may vary from slightly undersized individuals to the typical circus dwarfs. Unlike the thyroid type of dwarf, the mental development is ordinarily normal.

Another type of disorder to be considered, Fröhlich's syndrome, is believed to be due to pituitary deficiency and disturbances in the hypothalamic region of the brain. The most generally accepted position is that abnormality is due to defective functioning of the hypothalamus, but that the working efficiency of this part of the brain is somewhat dependent upon an adequate supply of pituitary hormones. The condition varies widely in its manifestations depending on the time of onset and the degree of deficiency. The subjects are obese and show depres-

sion of the sex function. The excessive fat is distributed mainly at the level of the hips and of the breasts. The large hips, together with the fact that the mammary gland regions are overloaded with fat, give the male a pseudo-feminine appearance. The skin is usually beautifully clear, and the hands and feet are small and delicate in contrast to the rest of the body. Males of this group are often described as fat, feminine, and weak; and consequently the condition offers a fertile field for the development of personality difficulties.

There is considerable evidence that the pituitary has important stimulating effects on the sex glands and plays a significant rôle in personality. Little direct evidence, however, can be presented to substantiate some of the extravagant claims that have been made to the effect that the pituitary dominates the whole personality.

Tucker (748) has described a "pituitary psychosis" resembling schizophrenia, with an unusual element of hysteria present, which he believes is due to a deficient secretion of the pituitary. Several investigators have reported a striking incidence of personality disorders in patients suffering from pituitary deficiencies.

Pancreatic disturbances

Dysfunction of the pancreas resulting in over or under secretion of insulin results in a disturbance of the blood sugar level and concomitant physical and mental symptoms. The deficiency in insulin secretion causes the disease known as diabetes. In mild dysfunction the mental symptoms include irritability and memory irregularities. In severe cases the patient may become completely disoriented, and the mental symptoms may include delirium, delusions and hallucinations. The oversecretion or overdose of insulin may also result in anxiety, confusion and delirium.

Gonadal disturbances

The fact that mental disease so often appears at pregnancy, at the menopause or shortly after puberty, as well as the preponderance of sex material in the thought content and the disturbances of sexual function of many of the psychotic patients, is suggestive of a very close relationship between the mental disorders and the gonads. The depressions, anxieties and emotional instability associated with the menopause are frequently seen following gynecological operation, and the bodily changes, particularly of the secondary sexual characters, following cas-

tration are well known. Male patients with feminine hair distribution and female patients with masculine hair distribution are not infrequently seen in the schizophrenic and manic-depressive psychoses. The importance of the psychological factors in the development of mental disorders, even where definite disease of the gonads is present, must not be considered lightly.

THE EPILEPSIES

Convulsive states comprise those disturbances of the motor system characterized by sudden, violent, more or less widely distributed discharges of muscular energy, usually preceded by loss of consciousness and followed by a period of profound relaxation, exhaustion, or stupor. Generalized convulsions appear with greatest frequency in infancy and early childhood, but they may be observed in all periods of life, and represent a clinical syndrome caused by many different factors. They may be a symptom of birth trauma, congenital cerebral defect, hypertrophy of the brain, emotional traumatism, spasmophilia, tetany, meningitis, reflex irritation, intestinal parasites, diseases of the heart and kidneys, cerebral arteriosclerosis, uremia, eclampsia, encephalitis, syphilis of the brain, and other conditions.

A typical convulsion consists of sudden loss of consciousness, muscular spasms, and severe exhaustion after the muscular activity subsides. These three elements may vary in intensity and duration and may be augmented by many other features. Thus the sudden loss of consciousness may be preceded by a sharp cry, great restlessness and irritability; the spasms may be tonic or clonic, or both; the period of exhaustion may vary in degree from that of a mild feeling of lassitude to profound stupor. While a number of disorders are characterized by convulsions, it is the purpose to discuss here only those referred to as epilepsy.

The term epilepsy means "seize upon" and is derived from an ancient belief that the patient was seized by some malignant spirit. Despite the fact that devils and evil spirits are no longer associated with the disease, the name is still used more or less indiscriminately to designate certain symptom patterns which are characterized by recurrent convulsive attacks. Since the causes of some of the clinical pictures described as epilepsy are known but no physical basis has been discovered for others, it has become more meaningful to speak of "the epilepsies," rather than of epilepsy.

The organic epilepsies¹ may be caused by head or brain injuries, focal disease of the brain, chronic alcoholic intoxication, paresis, cerebral syphilis, chronic diseases of the heart, uremia, diseases of the pituitary and parathyroid glands, etc. The terms genuine, essential, and idiopathic have been used to designate the epileptic conditions for which no physical basis is known. The essential characteristic of this disease is the episodic disturbance of consciousness rather than the recurrent convulsive seizures. The attacks may be viewed as the outward manifestations of a wide variety of conditions including the genetic makeup, life experiences, toxic states, brain tumors, abscesses, and organic disease such as paresis and cerebral syphilis. Heredity is undoubtedly a factor, but there is considerable obscurity connected with attempts to determine its probable influence in the etiology of the disease.

The rôle of vasomotor imbalance has been considered since the imbalance may produce relative oxygen deprivation. This condition may also account for the convulsions since vasomotor constriction may possibly cause cerebral anemia.

As a result of some investigations that have shown that the body secretions (especially urine) are abnormally toxic immediately after the seizure, toxicity is viewed as a possible cause. It has also been demonstrated that in some cases convulsions may be induced by injecting toxins such as absinthé, alcohol, and lead.

Experiments on animals in which epileptiform seizures have been induced by the intramuscular or intraperitoneal injection of camphor, santonin, cocaine hydrochloride, thujone (oil of wormweed) and homocamfin point to cerebral irritation as a causative agent. One experiment in which some of these convulsants were employed simultaneously with polarized light brings to the fore the observations of ancient people who insisted that there was some relation between the lunar rays and the incidence of the attacks. In this experiment, rats which were subjected to polarized light and the injection of a convulsant almost uniformly died, whereas rats subjected to an equal dosage of the con-

¹ The student should consult the following research for a more extended treatment of the organic epilepsies.

Cobb, S. Causes of epilepsy. *Arch. Neur. and Psychiat.*, 1932, 27, 1245.

Jelliffe, S. E., and White, W. A. *Diseases of the Nervous System*, 1929, Chapt. 18.

Noyes, A. P. *Modern Clinical Psychiatry*. W. B. Saunders and Co., 1939.

Taylor, James, Editor. *Selected Writings of Hughlings Jackson*. Hodden and Stoughton, 1931.

Temkin, O. *The Falling Sickness*. The Johns Hopkins Press, 1945.

Weschler, I. S. *A Textbook of Clinical Neurology*. W. B. Saunders Co., 1943.

vulsant and nonpolarized light survived. Similar evidence can be offered in support of cerebral irritation from studies of supracortical fluids, the draining off of such fluids resulting in the relief of the symptoms in some patients. Other studies point to the possibility that disease of the parathyroid, resulting in calcium deficiency in the nerve cells, may be responsible for the increased irritability.

The psychoanalysts believe that the epileptic sexuality is at the polymorph perverse level and lacks any objective sexual interest. Freud (749) sees in the convulsions a muscular sex orgasm. Others regard the epileptic seizure as momentary activity of an underlying tendency to escape from an unpleasant and disagreeable environment.

Jelliffe and White (750) have considered the attack as being due to a faulty distribution of energy which may be brought about in many ways. They point to the fact that energy distribution takes place at all levels and that the final activity is the result of the balance which has been struck among innumerable tendencies. The epileptic is seen as showing inefficiency in this regard, especially at the physiochemical, vital and psychic levels. Lennox (751) defines epilepsy as a recurrent disturbance in the chemicoelectrical activity of the brain which manifests itself in a symptom complex of which impairment of consciousness, perturbation of the autonomic nervous system, convulsive movements or psychic disturbances are the essential components. He differentiates between asymptomatic and symptomatic epilepsy and points out that in the former case the person may have a disturbance in the discharging cells which shows itself in an abnormal electroencephalographic tracing only.

In view of the findings to date, it seems wisest to think in terms of psychobiological integration and consider essential epilepsy as a manifestation of some profound biologic derangement, undoubtedly embracing psychologic and physiologic factors.

Although the epilepsies may be grouped with regard to etiology as those due to external poisons, general diseases, focal diseases and arrests of development, it is the purpose of this section to consider those cases with obscure etiology known as genuine epilepsy.

In a large percentage of the cases of genuine epilepsy certain definite personality traits may be shown to have been present before the convulsive seizures appeared, and consequently it has become customary to speak of an epileptic personality. Irritability, egocentricity, sensitiveness, persistency, and lack of control, may be demonstrated as early personality traits of a large number of the individuals who later develop epilepsy. The irritability, persistence and lack of control make the

individual appear childish and are evidence of the failure of normal development of good habit patterns. Not only is the individual with the epileptic personality likely to fly into a rage at the slightest irritation, but his bad humor persists for a long period of time and is carried over into other situations. The lack of control is quite general and shows itself in extreme emotional reactions, excesses in both play and work, and, in the very young child, in a failure to control the natural functions. The egocentricity may first appear in the manifestations of shallow interests in others, but gradually the epileptic focuses more and more upon himself, and a turning away from the environment and reality results. He pays great attention to himself, his own feelings, his state of health, his physical comforts, and his immediate surroundings. Thus the interests all tend to be concentrated in this egocentric constellation. The seizures may in some instances be viewed as attempts to escape from the unsatisfactory environment, and in this connection it is interesting to note that they not infrequently occur when the environment is particularly displeasing. Some of the seizures are peculiarly hysterical in type and probably represent the attempts of a childish personality to satisfy his desires which are being thwarted. Thus the individual has his seizure when he is likely to benefit as a result of it. In other instances, the attack appears to be the result of pent up emotions which can no longer be restrained.

A large number of investigators have reported on the personality characteristics of epileptics. Clark (752) emphasized eccentricity, supersensitiveness, emotional poverty, and rigidity and points to the fact that these characteristics are present before the onset of the seizures. Notkin (753) believed the characteristics peculiar to the group were the result of the seizures and not their cause. Dawson and Conn (754) blamed the personality disorders on the lowered mental state of the patients which causes a disintegration of control over the lower, more instinctive reactions. Diethelm (755) found personality features ordinarily associated with epilepsy among relatives of epileptic patients and consequently referred to the importance of the evaluation of the whole personality setting in the consideration of the problem. Lennox (756) gives an excellent list of the variety of opinions on the personality characteristics of epileptics and discusses the significance of these opinions. He further points out that many epileptics have agreeable personalities and occupy positions of importance. Guirdham (757) and Harrower-Erickson (758), using the Rorschach method of study, have concluded that no unique constellation of personality traits may be ascribed to those who suffer from seizure states.

Page (759) reported convulsions similar to clinical forms of epilepsy in man experimentally produced in rats and cats by electrical stimulation of the intact cortex. Attempts to condition these electrically induced seizures were unsuccessful. Repeated convulsions resulted in marked personality changes and the animals lost weight, became submissive, passive and inactive. Fear reactions were common and it is reported that some of the cats developed pronounced tremors of psychogenic origin.

The seizure

The typical major epileptic seizure, known as "grand mal" epilepsy, may be described in terms of four definite stages. The symptoms may occur in varying proportions in different patients and in the same patients at different times, though some similarities may be recognized for individual patients.

Aura. The term "aura" is a remnant from the older conceptions of the disease and means an emanation, a vapor which was supposed to inform the victim that the spirit was about to take possession of him. The term, however, is now used to indicate certain varied symptoms which precede the attack and serve the purpose of warning the victim. These preliminary signs are extremely variable in different cases, but are fairly constant in type for each individual. In some epileptics the preliminary sign is giddiness; in others, the seizures may be preceded by buzzing noises in the ear or flashes of light before the eyes, or a tingling or numbness in an extremity. The epigastric aura is quite common and consists of a wide variety of disagreeable sensations in the epigastrium. A symptom which is localized may furnish a valuable means of determining from what part of the brain the seizure arises. The attack usually begins with a sudden cry, the patient falling and suffering complete loss of consciousness.

Tonic stage. The second stage, which immediately follows, involves a tonic contraction of the body-musculature. The spasm of the strong muscles of expiration and the muscles closing the glottis results in the arrest of respiration, and sometimes extreme cyanosis occurs. This stage usually lasts from thirty seconds to a minute and a half. An observation on one patient in this stage showed that the pulse was not palpable and did not return until the beginning of the clonic stage. The total lapse of time was from about three quarters to one minute.

Clonic stage. The tonic stage is followed by a clonic convulsion or jerking of the muscles which formerly were in tonic spasm. This appears as a rhythmic contraction and relaxation of the musculature

which causes the saliva to foam and froth to appear at the lips. There is also a danger that the patient may bite his tongue or lips, and urine and faeces are passed involuntarily. The clonic stage lasts for three or four minutes.

Coma. The final stage is a period of coma, a condition resembling sleep, which varies from a period of several minutes to one of several hours, after which the patient complains of feeling tired or worn out. The return to consciousness may be accomplished slowly so that the patient may appear, for a time, somewhat bewildered. During this period he may carry out certain semi-automatic acts, such as taking off his clothes. After the coma, however, he is usually in better condition, being much more pleasant and less irritable than before the seizure.

It must not be assumed that all attacks run the same course, for many variations appear, not only during the seizure, but both before and after it. In many epileptics there is a marked disturbance of several days' duration preceding the convulsion. The patient may become more irritable, depressed and complaining, and in some cases hallucinations and hypochondriacal complaints may be noted. In such instances those who know the patient well may be able to tell that the seizure is impending. In other cases, both before and after the convulsion a condition of active excitement may occur which may reach the state of frenzy and is referred to as epileptic furor. At such times the patient may be dangerous to both himself and others.

It has already been indicated that all of the cases do not follow the course outlined for "grand mal" epilepsy, and consequently certain minor attacks are termed "petit mal" epilepsy. In these cases there is only a very brief loss of consciousness, which is probably not complete since the patient seldom falls, although he experiences some giddiness and some minor motor disturbances. Some confusion is noticeable, talk may be briefly incoherent and objects may be dropped; but in a few seconds consciousness has cleared and normal activity is resumed.

Certain other manifestations described as epilepsies because of their recurrent nature are known as epileptic equivalents. In these states consciousness is disturbed, but the individual does not become unconscious; and if the muscular movements are present they are tonic and not clonic. The outstanding characteristic of these states is the tendency to perform, apparently automatically, acts which appear entirely out of proportion to the circumstances which exist. Some individuals, for example, have recurrent spells of furor during which they may be quite dangerous. In their excitement they may commit acts of great

violence, even murder, in response to some trivial irritation. It is to be recognized that the trivial happenings which precipitate the excitement are merely the seeming causes, the real irritation being concealed and lying much deeper in the psychological mechanism. In some cases the disorder appears as a clouding of consciousness known as epileptic delirium in which the patient wanders about in a daze and may commit vicious automatic acts which appear to be entirely beyond his control and for which he usually has a complete amnesia when the delirium is over.

In addition to isolated seizures there are serial attacks in which several seizures follow each other at relatively short intervals, the attacks gradually merging into one another until in *status epilepticus*, unconsciousness becomes continuous.

Genuine or essential epilepsy has been presented here as a total life reaction involving disturbances at all levels of integration. Studies of several types of convulsive reactions, however, suggest that there are various degrees of level involvement.

The hysterical convulsion, for example, involves the higher mental processes. The seizure is psychogenic in origin, involving the conversion of psychological into physiological symptoms. By converting them into physical symptoms the patient escapes from his unpleasant ideas. In such attacks the disturbance of consciousness is relatively slight. The offending material is quite near the surface and, as has been shown in hypnosis, can with little effort be brought to conscious control.

In genuine epilepsy the complete loss of consciousness and the disorganized muscular reactions indicate the severity and seriousness of the attack. Not only are the psychological processes involved, but as is indicated by the toxicity of the secretions, the biochemical as well. From the psychoanalytic point of view, the attack may be considered as a flight into unconsciousness, an attempt to escape from an intolerable stimulus whether from within (toxin, tumor, etc.) or from without (intolerable experience). The analysts point to the epileptic's activities as he is recovering from an attack as indicating the low level to which he is reduced. As he comes out of the attack, the respiration is at first abdominal (infantile type), characteristic sucking movements of the lips are made, urine is frequently passed, and the entire activity appears to represent a regression to infantile levels. Thus the extremely ego-centric epileptic, failing to project his interests into the outer world, may retreat further from reality and revive earlier ways of finding pleasure.

In view of the frequency with which the epileptic attack is simulated

and the ease with which certain types of psychopaths develop convulsive reactions as a result of suggestion, the diagnosis of true epilepsy must be carefully made. True epilepsy is characterized by associated stages of tonic and clonic convulsions, unconsciousness, frequent nocturnal occurrences, relaxation of sphincter muscles, and the presence of the Babinski. Such attacks may occur when the patient is alone, and serious injury may result from falling. Although there are wide variations in the course of the disease, prognosis is unfavorable, the condition becoming steadily worse with considerable mental deterioration. However, the deterioration may be prevented if treatment is begun early. Kugelmass (760) and his associates have reported prevention of such deterioration in children by use of either drug or dietary therapy.

Experimentation during the last two decades has resulted in the acquisition of information on underlying pathologic physiology and the development of techniques for obtaining electroencephalograms which permit an entirely new conception of the syndrome, and make the problem of differential diagnosis considerably less acute. The idea that electricity is intimately associated with the activities of the animal body is as old as our knowledge of electricity itself, but accurate observation of animal electricity had to wait for the development of fundamental principles of electrical energy. Gradually, information on electrophysiology was acquired; and as a result, we have the development of the technique of the electrocardiogram. It was not until 1929, however, that Hans Berger (761) showed experimentally that it was possible to record significant electrical patterns from the head. The records of such electrical activities are called electroencephalograms. Berger employed needles as electrodes which he attached to the scalp after local anesthesia, and the registration was made by means of an oscillograph. On the graphic record obtained in this manner Berger differentiated waves of a frequency of from 8 to 10 per second with a maximum potential of 0.2 millivolt, designated by him as alpha waves, and the waves of a greater frequency, but a smaller amplitude, which are superimposed on the first and are designated as beta waves. The alpha waves, since they are dependent neither on the respiration nor on the pulsation, are considered as the electrical rhythm of the cortex.

Berger's work has been followed by other experimentation; and although some difficulty has been encountered in reading the results, there has been considerable agreement among the experimenters. The results indicate that although individuals differ from one another in respect to the large, smooth 10-a-second alpha waves and also in other features such as voltage, general pattern, sharpness or roundness of the

wave form, a given individual tends to reproduce his own record on successive tests. Davis (762) describes this similarity as being not so exact as finger prints but more like the individuality of voice. In following up this point Davis and Davis (763) report that in a study of the electroencephalograms of 14 pairs of identical twins, closely similar patterns were demonstrated and also that normal individuals who are related give records which bear resemblance to each other. Lennox, Gibbs and Gibbs (764) have made electrical records of 70 pairs of twins and of 262 close relatives of epileptic patients. These authors conclude that although the pattern of cortical brain waves is a fluid, and not a fixed characteristic, it is an hereditary trait.

There is abundant experimental work on the use of the electroencephalogram which corroborates the view that an attack of epilepsy is associated with the development of abnormal rhythms in the cerebral cortex and is therefore a paroxysmal cerebral dysrhythmia. The clinically observed seizure is therefore viewed as the outward manifestation of a disordered rhythm of brain potentials. Gibbs (765) and his colleagues have also pointed to the fact that in epilepsy the abnormalities of rhythm may be common to all parts of the nervous system and that in certain portions of the cortex they may be correlated with certain clinical types of epilepsy. Gibbs, Davis and Lennox (766) showed that during petit mal attacks, the abnormalities consist of a high voltage alternate wave and spike occurring at the rate of approximately three a second, the spike coinciding with the twitching of the facial muscles. They also showed that grand mal attacks are attended by an increase in the speed and voltage of waves. Later Gibbs, Gibbs and Lennox (767) observed that during psychomotor seizures, characteristic waves were also seen, these being abnormally large voltage slow waves at the rate of from 4 to 8 a second (fig. 34).

The abnormal rhythms are recognized as the causes of the symptoms of epilepsy such as the loss of consciousness and abnormal movements of the muscles. The defective control of the rhythms, rather than the abnormal rhythms themselves, are viewed as the fundamental bases of the disorder. Some patients observed during seizures, however, do not show abnormality of rhythm. The explanation offered by some investigators in such cases is that the condition of the involved portion of the brain is not being recorded. In view of the belief that the symptoms which accompany abnormal electrical activity depend on the functions of the area or areas involved, such an interpretation is plausible but has not been adequately substantiated.

Another fact of importance is the demonstration that the electro-

encephalogram sometimes reveals abnormalities of electrical activity which are not at the time detectable by subjective or objective clinical manifestations. The picture may be of the same pattern as that found during a clinical seizure, but diminished in duration and voltage. Thus grand mal and psychomotor attacks may at times be predicted before any clinical sign is manifest. The electroencephalograms of some

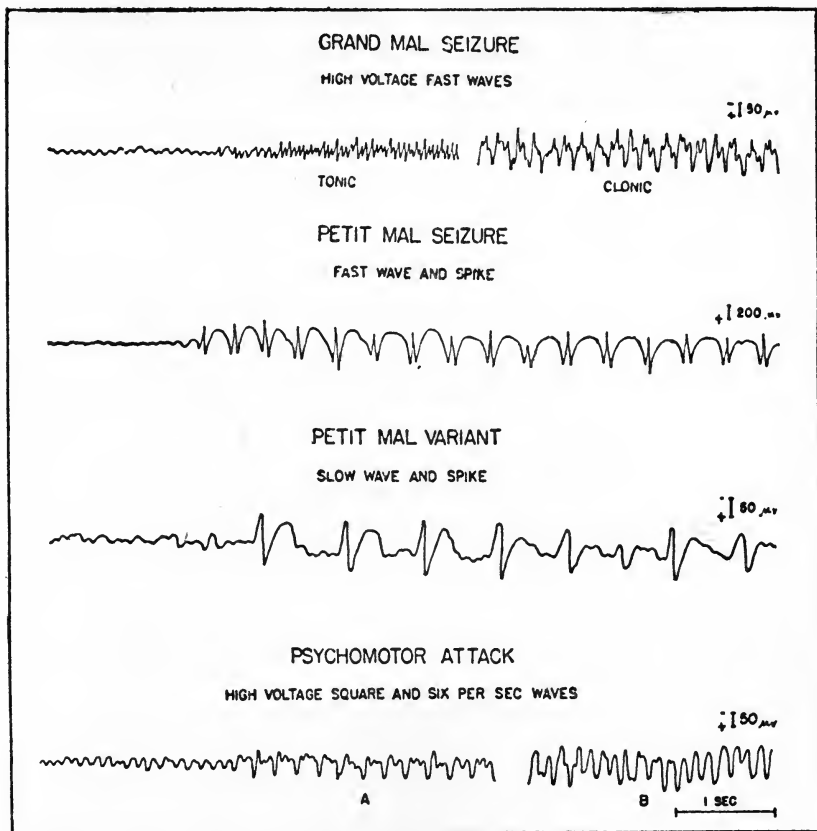


FIG. 34

normal persons show abnormalities similar to those found in patients who have a history of seizures. These persons are sometimes called asymptomatic or potential epileptics.

Gibbs (768) and his colleagues have further reported that the rate of both normal and abnormal rhythms can be altered by certain drugs and by changes in the physiologic reactions of the body. Petit mal

rhythms may be precipitated by a short period of overventilation and may disappear while the subject is breathing air containing from 3 to 7 per cent of carbon dioxide. Abnormal rhythms are also increased by insulin and decreased by dextrose, and sedative drugs have varying effects, depending on the type of abnormal rhythm. There is seen, therefore, a possibility that methods of treatment may be improved and an individualized therapy may become effective.

Pagniez, Liberson and Plichet (769) report that in their study, epileptic patients with violent or frequent attacks and those refractory to treatment showed between the attacks electrical waves of abnormal frequency, whereas those with less violent and less frequent attacks and those who were benefited by treatment did not show abnormal waves outside of the epileptic attack. They therefore concluded that the electroencephalograms appear to be the objective indication of the severity of the disorder.

The possibility that the method may prove valuable in the understanding of other disorders is indicated by studies such as that by Gibbs, Gibbs and Lennox (770) on the likeness of the cortical dysrhythmias of schizophrenia and psychomotor epilepsy. These investigators report that the electroencephalogram records obtained in patients having psychomotor seizures are similar to those seen in most patients diagnosed as having schizophrenia. Davis and Davis (771) report that many manic-depressive and schizophrenic patients have dysrhythmia, although others have records similar to those of normal individuals. Other investigators have reported abnormal records found in problem children and in adults with antisocial tendencies.

The most complete summary of the subject of electroencephalography is presented in an atlas written by Gibbs and Gibbs (772).

The frequency of seizures may be altered by a variety of methods. Seizures, particularly those of the petit mal type, tend to be inhibited by the induction of acidosis. This condition may be brought about by fasting, by use of the Ketogenic diet, by the ingestion of acids or acid forming salts, by breathing high concentrations of carbon dioxide and by strenuous muscular exercise. Alkalosis induced by overventilation or ingestion of large amounts of bicarbonate tends to increase seizures. Dehydration of body tissues tends to reduce seizures, and flooding the body with water tends to increase them. Petit mal seizures have been increased by reducing the oxygen content of the blood and have been decreased by having the patient breathe high concentrations of oxygen. An outstanding example of the utility of the experimental approach to the study of the control of the seizures will be found in the favorable

results reported by Merritt and Putnam (773) on the use of dilantin.

Studies in which the psychological performances of epileptics are compared with the performances of normal people are few in number and varied in purpose. The following summaries² indicate the variety of phenomena investigated. Sensory loss of the dermal senses has come under scrutiny. In many cases there is a definite loss of one or more of these sensory functions. In fact, it has been estimated that the frequency is as high as 70 per cent, and this contention seems to be supported by experimental findings. The sensory disturbances are quite independent of psychical disturbances, and segmental disturbances of sensation are in favor of the case's being one of epilepsy. The pain sense is the one most often involved.

An observation of one writer, while not strictly of an experimental nature, is worthy of comment since it throws some light on the importance of sensory stimulation in the production of the seizure. Both sudden tactile and auditory stimuli have been observed as immediate causal factors in epileptics generally and especially in eclamptic children. The myoclonic reflexes apparently differ from the other reflexes just prior to the attack since they are exaggerated and convulsive movements are invoked by sudden stimuli.

It is generally accepted that the more complex psychological functions such as logical memory and recognition are affected before the onset of the convulsions. The simpler motor reactions do not seem to be markedly influenced although one investigator reporting on motor profiles concluded that the movements of epileptic children could be characterized as slow, strong and rather exact, with motor endurance pathologically high. The results of another investigation suggest that the

² These summaries and a later quotation are obtained from the following sources:

Muskens, L. J. *Epilepsy: Comparative Pathogenesis, Symptoms, Treatment*, 1928.

Russel, A. E. Cessation of the pulse during the onset of epileptic fits. *Lancet*, 1906,

2, 152.

Smith, W. G. Tests on epileptic and normal subjects. *British Jour. of Psychol.*, 1905,

1, 240.

Robb, J. R. B. A study of incoördinate movement in epilepsy. *Jour. of Ment. Science*, 1930, 86.

Langdon-Down, M., and Brain, W. R. Quotation. Time of day in relation to convulsions in epilepsy. *Lancet*, 1929, 216, 1029.

Rieti, E. Ricerche sur tempi di reazione della sensibilità superficiale negli epilettici. *Riv. Psicol.*, 1936, 32, 203-218.

Petrova, A. P. The main psychological traits of epileptics. *Epilepsia*, 1937, 3, 353-399.

Makhaeva, E. A. On the condition of the motor functions in epileptic children. *Nov. Peikhonevrol. Det. Vozr.*, 1935, 167-175.

slower reaction time of the epileptics is not due to the organic lesions, but to inattention. The experimental studies show inferior performance in such tasks as card sorting, coördination, and logical memory. The inference made is that the higher integrating centers are in some way disturbed whereas those functioning for a lower order of integration are not.

The distribution of frequency of attacks also lends credence to the view that complete synthesis of the psychological and physiological mechanisms plays an important rôle in the onset of the convulsion. The results of an investigation into the influence of time of day in causing epileptic convulsions show that epileptic patients are more likely to be convulsed at certain hours than at others, and that individuals vary in this respect.

Approximately two-thirds of a group of 68 epileptics manifested a marked difference in the diurnal and the nocturnal incidence of their convulsions, and approximately three-fifths exhibited one or more "time peaks,"—that is, a concentration of their attacks at or around certain hours. Five such peaks have been recognized, two nocturnal and three diurnal. The second nocturnal peak (maximum 3-4 a.m.) is the most frequent and was found in 35 per cent of patients. The first nocturnal peak (maximum 9-10 p.m.) occurred in 18 per cent. These two peaks were found together in 13.6 per cent; the first nocturnal peak occurred alone in 4.5 per cent, and the second alone in 21.2 per cent. The principal diurnal peak, D1 (maximum 7-8 a.m.), occurred in 24.2 per cent of patients. . . . It is found that they fall into three groups—namely, those in which the attacks are mainly diurnal, mainly nocturnal, or occur indifferently by day and night. Attacks are more frequent in the last two groups than in the first. Patients of the "diurnal" and "nocturnal" groups are found to respond in an opposite manner to the onset and cessation of sleep. During the period of awakening and arising from the bed the incidence of fits in patients of the nocturnal group falls from the highest but one level of the 24 hours to the lowest. In the diurnal group it rises from almost the lowest to the highest. Five patients suffered from organic lesions of the nervous system. No distinction in respect of the time incidence of fits can be drawn between these and the 61 cases of "idiopathic" epilepsy.

These peaks correspond to the accepted times of lowered vitality and the seizures seem to prevail at these periods.

No attempt has been made in this section to offer a complete explanation of all of the organic factors that operate in the development of mental symptoms. The student should, however, understand that bacterial infections, cell deficiencies, brain injury or disease and disorders of the glandular system, etc., may be important causal agents of mental diseases. In the next section it is our plan to discuss the functional psychoses, the origin of which is psychological, and it is hoped that the reader will keep in mind the fact that in all cases, whether organic or functional, the personality must be considered as a whole and one may expect to find many factors, both organic and psychological, operating together to produce the end result.

CHAPTER XII

FUNCTIONAL PSYCHOSES

It is our purpose to discuss now the major disorders for which no organic lesions and no toxins have been consistently demonstrated. These disorders are called functional psychoses and include schizophrenia, paranoia, manic-depressive psychoses, and involuntional melancholia. While there is considerable controversy over the use of the term "functional psychoses," it should be noted that the use of such terminology is common in medical practice, where, for an example, functional heart disorders are recognized as a group for which neither drugs, toxins nor lesions are responsible.

There are a variety of complex interpretations of the psychotic conditions that are here referred to as functional. The structural view represents the traditional medical attitude and holds that the determining factors will be found in hereditary defects, toxins, infections or general metabolic disorders and undetermined lesions in the brain or other organs. The efforts of this group are, therefore, directed to the organism as a structural, physiological, and biochemical unit and are inclined to give little attention to the environmental aspects of the problems.

The psychic approach represents the point of view that organic disturbance, when present in the functional psychoses, is quite incidental and that the real disturbance is located in the semi-independent psyche. Consequently attention is focused upon desires, thoughts and dreams as parts of that psychic realm. Physicians using this approach employ largely introspective techniques and tend to reinterpret organic, social and environmental reality in terms of the psychic realm.

The biosocial approach as pointed out by Cameron (774) rejects the dualism of the other points of view and adopts the simple pragmatic stand that the world we move about in is not the only real world, but the only world and that desiring, thinking, dreaming, and doing all belong in it. In this approach man is seen as a person operating in an environmental field, and his difficulties may arise from visceral, environmental, personal or interpersonal sources. All of these approaches have contributed to the better understanding of the functional psychoses,

but it is our opinion that the biosocial approach, because of its breadth of view, affords the most profitable one for these problems.

ETIOLOGY

The etiology of the functional psychoses has been studied from a variety of positions and is a highly controversial matter. Heredity, physical constitution, pathology of the nervous system, focal infections, endocrines, biochemical and physiological changes and various psychogenic factors have all been presented by experimenters and clinicians as the chief determinants of the disorders.

The importance of heredity has generally rested on the submitted evidence that functional psychoses appear more frequently in certain families than in the general population. Such evidence has been submitted by Lewis (775), Myerson (776), Landis and Page (777) and others. It should be noted, however, that the members of such families may have been subjected to particular environmental and interpersonal relationships, the effects of which need to be evaluated. The statistical information regarding incidence in families is open to the further source of possible error of reliability of report. The disgrace of implied familial insanity may result in considerable concealment of real incidence in family histories. Kallman (778) has presented a detailed analysis of the genetics of schizophrenia. It appears possible that a predisposition to the disease is recessively inherited, but the illness appears just as likely to be the result of many factors.

The attempts to relate body types to temperament and consequently to functional psychoses have a long history. Kretschmer's (779) work on constitutional body type has been widely quoted with extreme differences of opinion. He separated individuals into what he termed asthenic, athletic, pyknic, and dysplastic types. It was claimed that these types could be differentiated from each other by their normal psychological characteristics and that when mentally ill, they would fall into rather distinct reaction groups. Those individuals with the asthenic habitus were said to be psychologically of the schizothymic, introverted type with a capacity for schizophrenic disorders. It was also pointed out that some of the athletic types and practically all of the dysplastics tended to develop schizophrenia if they became psychotic. The pyknic type was contrasted with the asthenic and was found chiefly in those who developed the manic depressive psychosis. The latter are described as the more objective, extroverted, cyclothymic type of persons. There is considerable division of opinion among scientific

workers regarding the value and reliability of Kretschmer's concepts, and conclusions will have to wait for further research. Sheldon (780) presents a detailed study of constitutional analysis with some interesting correlations between physique and temperament.

Attempts to correlate brain pathology with functional psychoses have appeared throughout the history of the efforts to understand the disorders. Lange (781), Spielmeyer (782), Steiner (783), and Lewis (784) have presented reviews and bibliographies of this work. Cobb (785) has recently summarized some of the points of view and has pointed to the paramount importance in all psychiatric disorders of changes in the brain. It is his opinion that "functional psychoses" is a misnomer and that improved technique will eventually prove the point. Dunlap (786) has pointed out the impossibility of distinguishing at autopsy the brains of schizophrenics from non-schizophrenics. Critical reviews of the evidence for and against structural pathology for schizophrenia have resulted in wide differences of opinion. Skalweit (787) remains confident that anatomical bases for the disorders will eventually be demonstrated, while Conn (788) considers the attempts to demonstrate this to have been progressively unproductive.

The last decade has witnessed numerous attempts to treat the functional psychoses by brain surgery. This form of treatment was started by Moniz (789), who believed that the best results were obtained with patients suffering with agitated depression. The technique is variously referred to as psychosurgery, lobotomy and leucotomy. The results of the work are summarized by Freeman and Watts (790), who have altered the original procedure and have performed most of the operations in this country. In these operations the frontal areas are either removed by bilateral craniotomy, or more commonly, the connections between the frontal cortical areas and the lower centers are severed by cutting the white matter in the center of the frontal lobes just anterior to the tips of the anterior horns of the ventricles. The main symptoms relieved by the operation have been depression, agitation, compulsion, suspiciousness and irritability. Symptoms produced, include emotional flattening, euphoria, poor judgment and in about 40 per cent of the cases a marked gain in weight.

Focal infections have been believed by many to be the determining cause of functional psychoses. Cotton's (791) report of spectacular therapeutic results stimulated considerable interest on the part of both experimentalists and clinicians. This interest reached its high point in the position taken by Hunter (792) that some functional psychoses

might be renamed septic psychoses. Cotton (793) was so convinced of the importance of focal infections that he recommended the subordination of everything else to a surgical attack upon the functional psychoses. Henderson (794) and others challenged the interpretations, and the last 20 years have witnessed a diminution of interest in the importance of focal infections in the functional psychoses.

One of the major tenets of physiological psychology is that alterations of the physiological state of an animal will be followed by changes in its behavior. Richter (795) has shown that the total overt behavior of an animal may be directed toward the maintenance of homeostasis when the normal process is interfered with. Shock (796) has presented a good summary of the physiological factors in behavior. The efforts to show consistent biochemical changes as important determinants in the functional psychoses have met with considerable difficulty. Physiological studies in relation to functional disorders have been reviewed by Shock (797), Knott (798), Cameron (799), Jasper (800), Liddell (801), Cameron and Harlow (802) and others. It is probable that considerable contributions to the understanding of the disorders will be made by further research in physiology and biochemistry.

The rôle played by the endocrine system has been studied by many investigators, but the results are inconclusive.

Kraepelin (803), emphasizing the tendency for the onset of the disorder to be associated with menstruation, pregnancy and the climateric, believed the disease to be one of autointoxication produced by a disordered secretion of the sex glands. He later gave up this sex intoxication theory, but always adhered to the idea of metabolic intoxication. The theory is somewhat supported by Mott, who, however, attributes great significance to the dysfunctioning of the entire endocrine system. Mott (804) describes in great detail endocrine changes particularly in the ovaries and testes but also in the pituitary and adrenal glands of schizophrenic patients. Morse (805) severely criticized Mott's findings on the basis of the difficulty of stating what the normal endocrine balance is in any histological work and also attempted to show that the appearance of endocrine disturbances in schizophrenic patients did not necessarily mean that the mental disorder was caused by the endocrine imbalance. Morse pointed to the possibility of glandular disorder being caused by something entirely unrelated to schizophrenia, and showed how degenerative changes could be shown in acute diseases such as pneumonia.

Gibbs (806) reported an abnormal hair distribution in the schizophrenics examined by him. In his female patients he found an abnormal

growth of hair on the face and body and vertical pubic hair, while in males he found a horizontal distribution of hair with a very light growth of hair on the face.

Lewis (807) carried on an extensive study of the physiological changes found in schizophrenic patients and pointed out that they not only suffered from a state of aplasia of the circulatory system but that changes took place in the thyroid, adrenals and the gonads. The findings seem to indicate that the types of schizophrenia already referred to might be markedly different. In the hebephrenic the heart is one third smaller than the normal heart and the adrenal and thyroid are atrophied, while in the paranoid type the heart weight is greater than normal and the adrenal and thyroid may show over-development. These changes are sometimes referred to the fact that hebephrenia is a regressive disorder while paranoia is compensatory. That is, the hebephrenic type accepts the failure, admits defeat and regresses to a lower level for satisfaction. The paranoid type, however, defies the existing conditions and attempts to compensate for them.

It is interesting to note that these changes which are mentioned all take place in organs such as the thyroid, adrenals, gonads, etc., all of which are closely connected with the emotional life and are under partial control of the autonomic nervous system. Both the regressions and the compensations may be considered as chiefly emotional, but whether the physical changes cause the emotional reactions or the emotional reactions cause the physical changes we are still unable to say.

A large number of studies have been made of organic changes in schizophrenic patients, but they have been more useful as leads for the study of the disorder from a physical and chemical standpoint than as etiological factors. The indications for further research in this field, as well as the findings to 1936, have been summarized by Lewis (808) in his book, "Research in Dementia Praecox."

Hutton and Steinberg (809) reported pituitary dysfunction in functional psychoses, and Clegg (810) reported gonadal deficiency in schizophrenia and pituitary deficiency in the affective group. Carmichael (811), however, points to the lack of crucial evidence for or against close relationship between the endocrines and mental disorders. Hoskins (812) also has questioned the demonstration of any real relationship between endocrines and behavior disorders and has referred to the field as important but relatively unexplored.

Psychogenic factors have been given a prominent position as etiological factors in the development of functional psychoses by both the psychoanalytic and psychosomatic groups. The psychoanalytic posi-

tion has developed from the work of Freud, but now presents a variety of opinions. Within the group, however, there is agreement in ascribing the greatest effectiveness to unconscious components of the psyche which to the analysts are more primary and causal than either conscious psychic processes or somatic conditions. The psychosomatic group ascribes the greater reality to the soma, but regards the psyche as a potential and powerful influence. Both groups find themselves involved in a dualistic concept that is resistive to solution.

Many clinicians and experimentalists who believe that psychogenic factors lie at the basis of the functional psychoses are inclined to follow the point of view first expressed by Meyer (813), who saw the functional psychoses as reactions of the personality in terms of social environment and personal organization. This point of view as explained by Cameron (814) lies farthest from theories of mental causation and closest to pragmatism and instrumentalism. He has pointed out the fact that instead of searching for first causes, this approach attempts to determine the conditions under which functional disorders arise and progress or disappear. Conflict, disappointment, fantasy, physiopathology, trauma in interpersonal relationships, social, economic and other environmental circumstances may all be part of these conditions. Thus, for this point of view the functional psychoses are major disorders in which the direct effects of structural, physiological and biochemical pathology are minimal or absent, while personal or social factors are maximal.

With the fact clearly in mind that the total personality must always be considered, that personal, social and environmental factors are operative in preparing the ground, and that in many instances the cases will be complicated by the appearance of organic concomitants, the functional psychoses are here considered as primarily of psychogenic origin. There appears, however, to be increasingly more reason to believe that the diagnosis of schizophrenia, for an example, as it is now used includes many types of illness, and that the etiological factors are not the same for all individuals placed in the diagnostic group. The reaction types which we encounter here show striking failures to function normally, principally as a result of a clash between the individual and the environment. The schizophrenic, for example, facing unbearable circumstances in his environment, escapes from reality into a fanciful world of his own. The mechanisms involved in the functional psychoses, will be understood more clearly by observing in some detail the three outstanding clinical types—schizophrenia, paranoia, and manic-depressive psychoses.

SCHIZOPHRENIA

Not in the whole field of mental phenomena do we encounter reactions that are more difficult to comprehend than those termed schizophrenic reactions. These reaction types were for many years, following Kraepelin's (815) classification, referred to as "dementia praecox." Such a term suggested that the disorder was one in which the patient became demented early in life, particularly in the adolescent period. This title, however, for obvious reasons, is not very descriptive of the conditions of the disorder. Many of the cases of so-called "dementia praecox" develop later than the adolescent period, and in a large number of these cases there is no permanent dementia. There has also been a tendency to view these cases as being rather hopeless, but in the light of recent findings we are inclined to consider the prognosis a bit more favorably.

The term "schizophrenia" was introduced by Bleuler (816) in 1911 and since that time has had a wide usage. Literally, the term means a splitting of the personality, and although it is not particularly descriptive of the various types of reactions found in the disease, it does not have the obvious defects of the term "dementia praecox."

Symptoms

In considering symptomatology the student must keep in mind the fact that what is being presented is the typical clinical picture and that all of the symptoms described below are not found in every patient.

One interesting characteristic of schizophrenia is the marked change in the emotional field. The patient exhibits striking indifference or apathy in his emotional reactions. He loses all interest in friends, relatives, loved ones and shows extreme indifference to matters which formerly would have been of the greatest concern to him. Situations which ordinarily would arouse him to fear, anger, or sorrow are now met by complete indifference. If he is told that he has lost his fortune, or his mother is dead, he often calmly remarks that that is too bad and goes on with whatever activity he happens to be engaged in.

Along with this emotional blunting there is found some trace of a flight from reality. The patient seems to have become lost in his dreams and now evidences difficulty in distinguishing fact from fancy. The normal individual does considerable day-dreaming, but he is able to return to the perceptual present. The schizophrenic merely evidences the reaction in a greater degree and loses his contact with reality.

Another distinguishing symptom of the schizophrenic disorder is the

apparent lack of harmony between the emotional and intellectual reactions. Ideas which in the average individual are closely associated with fear, anger, rage, and love are experienced by the schizophrenic patient without any apparent accompaniment of emotion. Such a lack of harmony between the affect and the ideation is apparent in the patient who tells you without any show of emotion that everyone including his own family is against him or that the members of the hospital staff have perfected plans to torture him by sending electricity through his bed in the evening. The writer had a patient who told him quite convincingly two or three times a week that today would be her last day alive and then in the next breath asked about the radio program for the week.

The schizophrenic patient has generally been described as gradually undergoing mental deterioration. It is true that in a large number of cases, especially in the hebephrenic type, such a deterioration does take place and frequently becomes the outstanding feature of the picture. There are some instances, however, when a patient goes through a long and pronounced schizophrenic episode without showing a deterioration of the intellect.

The personality change is usually widespread, the patient frequently losing all pride in his appearance and behavior. The most immaculate individuals become untidy in dress, slovenly in manner, and dirty in habit.

The case histories of most schizophrenic patients include elaborate accounts of ideas of reference. The patient is usually a self-centered individual who infers that the activity of everyone and everything is directed toward him. Cartoons and articles in newspapers and magazines, as well as remarks of actors on the stage, are interpreted as referring to him. One patient told the writer that he had to leave the theater because the comedian was directing his remarks to him. Another brought in a newspaper cartoon which showed a young man who was throwing away his chance to succeed, and stated that the drawing was meant to depict him. Such a patient then often infers that he is a great personage or an object of persecution.

Auditory hallucinations are present in a large number of cases. The patient hears voices calling him names or directing his behavior or making remarks about his life. Many of the violent acts of the schizophrenic patient are directly due to his decision to act on the commands of the voices that speak to him. Hallucinations of taste, smell and vision are not uncommon, but they do not occur nearly so frequently as those of hearing. One patient continually asked for new clothes to be sent from home, saying the ones he had were not fit to wear, and it took consid-

erable time and effort to discover that these ideas were due to olfactory hallucinations.

Delusions are frequently present, although they are not so permanent or so well systematized as those found in paranoia. They are usually transitory and more or less fantastic in nature. The delusions are varied in nature but are more frequently persecutory. Ideas of influence are often associated with these delusions. The patient believes that he is being influenced by the radio, wireless, or that his thoughts are being read.

Types of schizophrenia

It is probably more meaningful to refer to the schizophrenias rather than to schizophrenia because of the widely different types of pictures that may be presented through a study of the cases. While it is practically impossible to fit any of the cases definitely within a rigid classification, it is quite helpful for obvious reasons to have some scheme that will allow us to see the similarities of some cases. Following Kraepelin, then, we are able to distinguish four types of schizophrenia; simple, hebephrenic, paranoid and catatonic, fully recognizing the fact that most cases will be mixed in type.

Simple schizophrenic reaction. The outstanding characteristic of the simple schizophrenic is indifference or lack of interest. There is a decided lack of ambition, and such patients are ordinarily described as drifters. They are idle most of the time, shifting from one activity to another and never exhibiting enthusiasm.

The disorders not infrequently begin to show in early adolescence in an increasing tendency toward seclusiveness, an unusual amount of day dreaming and inability to concentrate. The individual appears to be withdrawing his interest in the things of the world. He becomes careless of his personal appearance and takes little interest in his work and play.

As the disorder becomes more pronounced, he withdraws himself more completely from his environment and is decidedly asocial. Although the thinking may become disorganized, there is seldom much loss of memory. The difficulty seems, rather, to be more definitely in the emotional realm with apathy or emotional dulling as the chief clinical symptom. Such people are often said to have regressed, but it is probably more nearly correct to say that they have failed to progress and have never been anything but a child, at least in personality development.

The hospital statistics undoubtedly do not indicate the prevalence of

this disorder. Many of these people are able to take care of themselves outside of the mental hospital, and consequently a large number of the cases are not recorded. Many tramps, prostitutes, and criminals probably belong in this group, as well as the idle, shiftless individuals who remain unemployed most of the time.

The following case shows a rather typical simple schizophrenic reaction with emotional apathy, ideas of reference, hallucinations and considerable mental deterioration. The regressive features, which are well marked in this case, however, appear more often in the hebephrenic type.

Case 1. (Diagnosis: Schizophrenia, simple type.) J. S., male, single, aged 28, high school education; Protestant, no occupation.

Main facts. The patient had a fairly normal and uneventful childhood. He seemed to progress with average success through grammar school, but did not finish high school after six years of effort, though he held many athletic, social and campus honors. His inadequacy in occupational adjustment became manifest, and he began to express ideas of reference and to hear voices. There has been considerable worry over masturbation and homosexual activity. His course has been steadily downhill.

Onset and symptoms of the present psychosis. After spending six years at high school, the patient enrolled for a special course in a university, but was sent home as unprepared. Shortly after this he showed his father a cartoon, depicting a young man who was wasting his life. The patient was convinced that the drawing was a reference made to him. Thereafter, he frequently expressed ideas of reference, often with sexual content. He tried various jobs, but was never able to adjust to them, and his whole disposition seemed to change. He became irritable, listless, disinterested in everything, and physically run-down. He spoke of his inferiority, unworthiness and guilt. Finally, he became actively suicidal and had to be taken to the hospital.

Course in the hospital. In the hospital he was friendly and talkative. His speech was incoherent and his thought processes were, on the whole, loosely connected. Emotionally, he seems quiet and contented, though occasionally he cries and says that he is not worthy of the good treatment which he receives. His mental content has apparently been largely occupied with ideas of reference for some time. He has had auditory hallucinations and feels that everyone knows of his sexual experiences and calls him vile names. There is considerable evidence of regression, his behavior being for the most part typically childish. The patient enjoys talking about his childhood friends and the family's old cook who used to make cookies for him, but he changes the subject when his friends of later years are mentioned. On most occasions, he talks with a speech impediment which was present in his childhood. He has taken such interest in the athletic program that when thoroughly engrossed in a game most of his childishness disappears, with excellent judgment and much initiative resulting. Together with the regression has come a lack of response to emotional stimuli and rambling talk that at times is impossible to follow. An idea of the confusion and diversity of topics he covers may be gained by the following list of general headings which he covered in the order given.

"I give you my word of honor that I am the same boy that came here. My word of honor is not worth a damn. (Here, he tells a very confused story of some trouble he was involved in once over an examination at school)—electric lights in my home—lighting candles—matches 'I am sure they only used one match a day'—smoking—I used to smoke be-

fore I came here, but I don't any more. I don't think I should have given it up—trip to Atlantic City—meals—shooting gallery—I never shot a gun in my life—cold water—Cathedral Street—(Here he debated whether or not Baltimore and Atlantic City were the same place and finally decided that they were not)—tells of buying a shirt—tells of seeing a certain picture in Atlantic City—I have been separated from my father for four years now—tells of someone giving him a piece of cake—worry about food! 'My father wrote me not to worry about food. What shall I do about that?'—says he talked disrespectfully about food—played baseball—I saw a man so near death that a breeze would give you a cold—I have nothing to complain of except an extra large stomach and a swelled head over it."

The emotional dilapidation may be clearly shown by citing another example. The patient had been described by the informants as being quite closely attached to his mother, and the following is an account of his reaction to her death. The patient's mother died while he was in the hospital, and he was called into the office and acquainted with the fact. He replied, "Is that so? That's too bad. She was a fine woman. Say, doctor, isn't there some way you can excuse me from going to the dining room? I am eating too much and getting too fat." He then began to talk about the baseball game he had just participated in and never once mentioned going home to his mother's funeral.

The next case is one of a pre-schizophrenic episode and will be presented in more detail and from a different point of view.

Case 2. (Diagnosis: Pre-schizophrenic episode.)

The case is that of a fourteen-year-old single girl of somewhat more than average intelligence, a well defined shut-in personality, who in the face of the stresses of puberty developed dissociative phenomena. Material will be presented from both objective and subjective (i.e., from the patient's standpoint) sources both limited and incomplete, but sufficient to indicate the main trend of the reaction and something of its dynamics. Factual material only will be used, avoiding speculation. As nearly as possible the suggestion of Dr. Meyer's for the formulation of a psycho-biological problem will be used in the organization and presentation of this material, that is, (1) a definition of the reaction, (2) a determination of the situation, (3) a determination of the factors that enter into it, (4) the effects, and (5) the modifiability.

The most interesting feature in this case is not the immediate reaction, but the evolution of the patient's personality, especially in terms of pre-psychotic development. There is a tendency among psychiatrists to say too often, "If we had just seen this patient at the beginning of her difficulties, we would have been able to do something for her but now the illness is too well crystallized." In this case there seems to be a very definite challenge to be up and doing. Here we deal with a young girl just at the outset of what forebodes being a serious mental illness. The case seems further to offer excellent possibilities for studying the early trends in that far reaching group of schizophrenic reactions.

The patient's complaint is: "Recently things have lost their reality, lost their charm and interest. I seem out of touch with things. I wonder about it, but don't know what to think. Perhaps I have changed in a good many ways. I have gone through so much in the last few months—I have changed altogether—an entirely different person. I feel like I am a lot older than I really am. I think and do things like an older person."

Personal history. The patient is now 14 years old. At the time of her birth her mother was about 40 and her father 23. As far as our information reveals, her birth and early de-

velopment were entirely normal. She was not considered a very healthy child, but there is no definite history of mental illness. There was no difficulty in habit training and no history of unusual habits or tendencies. She early showed a tendency to be shy, sensitive and secretive, did not get along well with other children and preferred to play alone. She has been particularly unfriendly with her younger sister whom she considers "rough and unladylike." The patient entered the public school at 7 and has done unusually well being at the head of her class most of the time. At the onset of her present difficulties she was in the second half of the first year of high school. She has been devoted to her work, took pride in her standing and seemed to learn easily. She has never been interested in athletics or group or social activities but has spent her time reading and sewing. She has shown some interest in the Girl Scouts and in clubs connected with the Baptist church of which she is a member. Her chief aim has been to do things to help others, and she recently expressed a desire to become a nurse. She has shown some ability and interest in writing and on several occasions has had stories accepted in newspaper contests. Her friends have been few, but she usually has had one very close girl friend. For the last few years her closest friend has been a cousin, D., a girl of her own age but of a very different make-up. This cousin is said to be out-going, rough, sensual, and wild. During the last two years the patient has been very friendly with an aunt, P. T., who was one of the informants. In the home group she is quite devoted to her father, who in turn idolizes her. She showed no particular reaction when her mother died nor when her father remarried a year later. At first she was quite friendly with her stepmother, but she has gradually become hostile, recently having threatened to kill her if she had more children. She has been unfriendly with her little half brothers. In addition to the usual childhood diseases she has had typhoid, scarlet fever, an appendectomy followed by pneumonia.

Present illness. The first changes in the patient's personality were noted in her thirteenth year, while she was visiting an aunt in another city. At that time she was very quiet, seemed worried and preoccupied, and complained of severe headache. Upon questioning her, the aunt discovered that she was greatly concerned over the fact that she had not started to menstruate, while some of her younger girl friends already had. Her aunt tried to reassure her and gave her some instruction in sex matters. She, however continued uninterested and withdrawn and on returning home wrote daily to her aunt, expressing her concern over her failure to menstruate, her problems and her dissatisfaction with things at home. She also mentioned that she had not told her aunt the whole truth, explaining that she had committed a great sin by letting a boy kiss her and was concerned lest she become pregnant. At Christmas when her aunt saw her, she said she had many things to talk over with her but appeared unable to do so. She said her aunt was the only person she could confide in, her only friend and the only one she could care for. While sleeping with her the patient kissed and fondled her in a most affectionate manner. Finally in the latter part of January she wrote in a most elated manner that she had had her first period. Early in the next month while visiting her cousin, she fell and cut her knee so badly that she had to be taken to the hospital for treatment. There she met an interne, Dr. M., to whom she became very much attached. Even after her knee healed she continued to return to the hospital to have the doctor look at it, even remaining out of school to do so. When he refused to see her, she wrote him very affectionate letters. Once about the first of March, while waiting to see him, she had what was described as a fainting attack. She was examined by another physician, who advised that she come to the hospital for observation. Her father flatly refused to allow her to go to the hospital, saying that they would turn her over to the students to experiment on. She showed considerable

resentment to this decision and a week later, in the presence of her stepmother she took small quantity of lysol with the admitted purpose of getting what she wanted. She was taken to the hospital and placed under psychiatric observation. The patient appeared quite happy, was interested in helping the nurses with their work but was very reticent in discussing her difficulties. The studies there revealed that she had been absorbed in vivid day dreams since she was about six and had frequently wished that she might have a baby of her own. She entertained very naïve notions regarding sex and was unduly concerned about her menstruation. She was resentful of her home situation, longed for a confidant, and was worried about her school work. In a gynecological consultation it was felt that that she had a hypoplastic uterus and possibly some endocrine disorder. By X ray it was noted that the sella turcica was small and irregular. She was given a course of polyglandular therapy by hypodermic but only became more tense. They gave her a job taking care of an old lady, and this was a source of great pleasure to her. She was discharged from the hospital about the middle of March, and at home was described as being listless, preoccupied, uninterested and resentful. She tried to work some in her father's store but did not do so well. In view of her unsatisfactory adjustment and increasing tenseness, hospitalization was advised, and she was brought to us. On her trip to the hospital, while waiting for her aunt in the station, she had another of her "fainting attacks" but recovered as soon as her aunt arrived.

Factors in the situation primarily from the standpoint of the patient. General attitude and reaction to the hospital. The patient came to the hospital willingly, feeling that she was escaping a rather intolerable situation. In the hospital she has, on the whole, maintained a cheerful and coöperative attitude. At first she was tearful, at times feeling vaguely sad, lonesome and homesick. She rapidly responded to the friendly approaches of everyone and has frequently quite frankly said that she likes the hospital and that "things are looking brighter." Although she is usually friendly and sociable with selected patients, she is often rather listless, preoccupied and seclusive. She has shown some tendency to form rather close attachments with some of the younger patients, interestingly enough those who show a somewhat opposite reaction to her own, i.e., active and out-going. She is neat and tidy in her personal appearance and habits, and is rather docile and meek in attitude, rarely making any requests. On the whole, the patient takes disappointments rather stoically and although she occasionally will protest against doing something, she, as a rule, does it without comment. In general her stream of talk is relevant and coherent, carefully formulated and somewhat better in grammar and phraseology than might be expected of a girl of her age and circumstances. Although usually attentive she not infrequently sits gazing into space with a far away, dreamy look—giving the general impression of preoccupation. Although she answers most questions with perfect frankness, there are some topics on which she is evasive, defensive, vague and indefinite.

Physical status. The patient has never been very robust, but there is no evidence that she has not enjoyed average health. However, she considers herself physically inferior and feeble, somewhat addicted to ill health, and takes some pride in the fact that she was considered a delicate baby and needed more than usual care. In childhood she had measles, mumps, whooping cough, tonsillitis and bronchitis. At 12 she had typhoid fever and at 13 scarlet fever. Shortly after this she had an attack of acute appendicitis with operation, and this was followed by a rather stormy convalescence complicated by pneumonia. She recalls little of her feelings towards the operation and there appears to be no fear or anxiety associated with it. For several years, she has had chronic right otitis media. Physical examination reveals a relatively well developed girl of 14 showing nascent normal second-

ary sexual characteristics. She has asthenic habitus, a slender face, long tapering fingers, cold moist hands and feet, and general pallor. Blood pressure is rather low, 95/65; urine and blood Wassermann are negative. She eats and sleeps well and has gained some weight in the hospital.

Cognitive processes. The patient enjoys routine, regularity and system and feels that she does not have to study much but learns easily and quickly. She feels that she has a good memory and an average store of general intelligence. Objective testing shows that her memory is good for both remote and recent events, and her intelligence quotient of 98 would probably be higher with greater attention and application. She is in the second half of the first year of high school and is leading her class. She has from time to time written stories for newspaper contests but refused to divulge their nature beyond that they were taken from real life and were not fantastic.

General survey and social relations. The patient is not altogether consistent in relating what she feels to be the characteristics of her personality, but her prevailing and most reliable trends will be presented.

She has always been a shy, sensitive, seclusive person, tending to spend much time alone. It has been difficult for her to make friends and she has never had many although she feels that people like her. She likes girls better than boys, finding little place for the latter in her life. She says that she does not like fast girls but interestingly enough several of her closest friends are of this type. In the course of the discussion she remarked that she believed herself to be an "old little girl." There has been a tendency to find very little time for social things in her scheme of life. She resents very much that her activities have to be supervised and approved by older people.

There has been little in the way of recreation in her life, though she enjoys reading and walking. She does not like athletics, has no hobbies, goes to movies occasionally but does not feel the need of amusement. She does not think she has a very good temperament or disposition, admits reluctantly that she is in-growing and passive, that she devotes more time to thinking than to action. Her ideals are very high—too high, she remarks, to live up to. Unfortunately she is unwilling to discuss these in detail. Her interests and ambitions run along the lines of being a nurse, and failing that, an interior decorator, stenographer or librarian, in each of which she feels she has some ability.

She feels she is very selfish, tries to get ahead of every one else, wants to do as well as possible and is proud of her accomplishments. There is evidence of much determination, some difficulty in making decisions and some impulsive behavior which she later regrets. There is not much evidence of initiative or originality.

It has been most difficult to obtain any sort of adequate account of the patient's inner life. Her statements about day dreaming and her fancy life are conflicting. It would seem, however, that she has had a rather active and vivid imagination and has lived largely out of contact with reality. In her fancies she would study mail order catalogues, furnishing houses and peopling them. She could easily imagine her dolls alive. More recently she has entertained fancies of being a nurse, waiting on patients and assisting at operations. Her night dreams are described as confused, vivid, and alarming. These night dreams do not awaken her although in them she is frequently injured or relives past unpleasant events. At times she feels she has some difficulty in distinguishing the real and the unreal and has depended upon her imagination to create unreal impressions in her mind. On the whole, it would seem that imagination and fancy have played a large part in her life.

Affective reactions. The patient considers her usual mood reaction one of cheerfulness and contentment, but believes herself to be moody. She does not recognize states of

apathy or lack of interest. At times, especially recently, she has noted that she becomes rather discouraged, depressed and irritable. Of other mood states, she explains that she is of a very jealous disposition. Thus she feels jealous if at home the younger children receive more attention than she or if her aunt goes out without her. She has no particular fears or feelings of anxiety.

Happiness is to her an abstract notion, depending on the self, having nothing to do with pleasure. To her the greatest source of happiness lies in being independent. Here in the hospital the patient has been for the most part cheerful and happy, although she gives one the impression at times of being listless, apathetic and preoccupied.

Sex topics. This is the most difficult topic for the patient to discuss. She is very reticent and vague, responds poorly to questions and offers little spontaneously. She wonders why everyone is so interested in the topic and why conversations so very frequently lead to some aspect of it. However, she believes that it has played a dominant rôle in her illness and admits considerable preoccupation along these lines.

So far it has not been possible to learn what her early sex ideas, experience and curiosities were. Her early idea about babies was that they were left on the doorstep. Now she says that she has the right idea of pregnancy but will not say what this is. She admits having had day dreams of having a baby of her own for some time, but claims she has never imagined herself pregnant. She has no clear idea as to how women become pregnant and has not considered the relation of man to this state. There are no fancies connecting her father with the proposed child. She has never fancied being a boy and is quite antagonistic to them, resenting the implication that they might play a part in her life. There are evidences of very vague and idealistic ideas about love. She explains that she expects to marry some day and says that she has been kissed by a boy but against her wishes. Her earliest definite memory of interest in sex matters was when she was nine or ten at which time she heard older girls talking of menstruation and sex. She and her cousin, D, also talked about it and looked up words in the dictionary. This was discovered and they were severely scolded both by their teacher and the patient's stepmother. They were told that nice girls never talked of such things and this increased their interest and created a tremendous sense of guilt. The patient feels that it is very probable that the difficulty she finds in talking of sex and the guilt goes back to this experience.

In her thirteenth year the patient began to worry about her own menstruation. Her cousin, D, younger than herself, had already begun to menstruate while she had not. This led her to believe that there might be something wrong with her. While visiting her aunt, P. T., she was much concerned about the problem and though her aunt tried to give her some advice and information it did not satisfy her confusion. Once her step-mother tried to talk with her about the matter but she refused to listen. Her first period finally appeared in the latter part of January at which time she wrote her aunt a very happy letter advising her of the event. In discussing this event she remarks she was both disappointed and disgusted at the time. At this time she had a pain in her right side just like the one she now has in her dream states. Since that time she has been rather concerned over the irregularity of her periods. She expressed the notion that the hypodermic injections she received were to correct this condition and feels that she does not menstruate now because she is not getting the treatment.

Patient's conception of her illness. The patient was able to tell a very good, coherent story of the development of her illness along much the same lines as has been recorded here. She dates the onset of her illness at the time that she injured her knee and was taken to the hospital where she met Dr. M. At this point she remarked that if she had never met him,

her whole life would have been different. She states that something seemed to draw her to the hospital and that she felt that she had to go. This worried her since it interfered with her school work and injured her pride. Now she rather vaguely feels that there is something wrong somewhere, just what she does not know. She says that she has many problems which she feels are related to her illness and which she thinks it would be well to straighten out, but about which she finds much difficulty in talking. "I am afraid to face the facts. I am worried over this growing up business."

There is no evidence of hallucinatory experiences, ideas of reference, influence, persecution, suspicion, poisoning, unusual meanings or related distortions of thinking. At times there is some evidence of a feeling of hostility in the environment—"something wrong in the atmosphere." There are also some feelings of unreality. The most prominent manifestation of her reaction is a dissociated state which, for lack of a better name, will be referred to descriptively as a "dream state."

Dream states. The first occurrence of this sort took place when the patient had gone to the hospital to have Dr. M. look at her knee. After the doctor had seen her she says she fainted. In a few minutes she regained consciousness to find Dr. M. examining her. It was at this time she was first questioned about her menstruation and sex preoccupations. On this same afternoon while relating these events to her cousin, D., at school she again fainted. The third attack took place in the railroad station while waiting for her aunt, P. T., en route to the mental hospital. She immediately awoke when her aunt arrived.

Here at the mental hospital the patient has had 17 of these attacks. Interestingly enough, she feels that the ones here and those before she came were quite different and entirely separate conditions. Just what this difference is she cannot say beyond that they did not last so long and that she feels different following the ones taking place here. The attacks last anywhere from an hour to over twenty-four, averaging between four and six hours. They vary greatly in depth and occur both when she is alone and when she is with groups. There is no injury, she lets herself down easily and limply, no convulsion, frothing, tongue biting or signs of a convulsive state. She usually has some warning that an attack is coming on for varying periods ahead. Sometimes she will go to bed but she usually lies down where she is. The complaints preceding the attacks are, aching pain in the right side, feeling of cold, generally not feeling well, premonition, faintness, dizziness, tiredness, headache, need for air and a strange feeling of lonesomeness. While persistent efforts have been made to discover what trends of thinking initiate these episodes, nothing very definite has been discovered beyond the fact that she is often, if not always, absorbed with her menstrual function and sex topics.

Her description of the actual onset of the attack varies. She frequently insists that it comes on suddenly and overwhelms her so that she does not observe the actual feelings. One she describes as follows: She was thinking of sex and her side was hurting. The room began to move around, at first slowly, but gradually more rapidly until it seemed to be going in all directions. Sounds and lights seemed to get farther and farther away. Suddenly all the motion ceased, and she felt as if she were falling endlessly. Things grew dark and she gradually slipped into unconsciousness.

In the attack, she usually resembles a sleeping person, is relaxed, breathes normally, color is good, pulse good. She resists efforts to open her eyes and there is no response to painful stimuli. Her pupils are dilated and do not react to light. The eyes are usually rolled upward. At times she seems to pay attention to what is going on around her; once while being carried to bed, the nurse dropped her feet; she momentarily opened her eyes and smiled. About the only spontaneous activity during the attack is mumbling to herself

and calling for individuals. On awakening, which she usually does spontaneously but occasionally in response to suggestion, she is, as a rule, somewhat confused for a while and complains of being tired. She is amnesic for all that has gone on during the attack but realizes she has had one. As to what goes on in her thinking during the attack only an incomplete account can be given. She frequently will say that her mind was a blank, that she thought of nothing. Once she had a dream which corresponded closely to events which actually took place while she was in the attack but under settings which seemed strange to her, i.e., she was carried to a large strange hospital on a hill, placed in a strange room, nurses and doctors seemed to be around and they were presumably planning to operate. Her thoughts are usually concerned with a confused jumble of notions regarding her sex and menstrual preoccupations, a reliving of past conversations with various people about these, an effort to establish the connection between her illness, her menstrual difficulties, the aching in her side and the hypodermic treatments she has received. Once it seemed to her that a strange person told her that the attacks came from the pain in her side. Dr. M. figures frequently in the dream states. In one of the attacks she remarked that she felt very tired and wished she would pass into oblivion. In a later attack an interesting fancy was obtained somewhat more in detail. It was obtained piecemeal due to the patient's reluctance to discuss it at all. In this dream she was about 18 years old and a nurse in training. She was not married but was going to have a baby. It seemed that a medical student was the father. She had the baby and was very unhappy. She awoke amid the scolding of her stepmother who seemed to be telling her that if she had just listened to her, it would not have happened.

The patient is rather reluctant to discuss what she feels to be the cause of these dream states. She does not associate them with any past experience. Her appendix operation was taken up in detail, but it did not suggest to her any association between the anesthetic and the dream state. She does feel there is some connection between ovarian deficiency and the treatment she received, her menstrual irregularity and the attacks. She says she once knew a woman who had fainting attacks, but they were not like hers.

Summary. Considering the data and facts in this case one finds ample evidence of psychobiological dysfunction. We have first to consider the unusually distorted family factors,¹ not only the psychopathic trends and developments in the immediate ancestors and collaterals, but the unhealthy set and environment in which the patient has lived. Physically, anatomically and physiologically, there is evidence of not only a well recognized constitutional type but also of defective development, organization, and functions. In personality makeup, the patient early gave evidence of and has maintained a definite type: shy, seclusive, sensitive and shut in, absorbed in fancy with few and inadequate contacts with reality. The lines along which the break occurred are instructive; that is preoccupations with sex at the time of puberty; and, finally the inadequate manner with which

¹ These family factors are discussed in some detail in the case history reported in the chapter on mental deficiency.

she has dealt with these latter, bizarre, confused ruminations on sex, resistance to the instructions along more helpful lines, ambivalent feelings, suspiciously autistic love affairs and an episodic state of dissociation.

It would seem that in the light of these features the prospect of modifying the reaction is at best doubtful. The personality liabilities would seem to outweigh seriously the assets. The most hopeful line of approach seems to lie in the gradual working out of a more helpful and frank attitude towards the preoccupations, at the same time promoting as much as possible contact with reality. It is hoped that in this way we may modify to some extent the personality set. In a word it will be a process of helping the patient to organize and integrate the personality.

Hebephrenic reaction. The hebephrenic classification has long been the dump pile for schizophrenics that are difficult to place in one of the other three groups. There are many symptoms in the hebephrenic picture that appear also in the catatonic and paranoid reactions, but the distinguishing characteristic of the disorder is silliness of behavior and marked incoherence of thought, speech and action. Hallucinations, particularly of hearing, are also prominent. The symptoms are of an unstable character, the delusions are transient and superficial. The behavior is fantastic and bizarre, in keeping with the silliness of thought, and there is considerable gesturing and posturing. The talk is often completely incoherent and seemingly without meaning.

The onset of the disorders usually occurs at an earlier age than in the paranoid and catatonic reactions, and there is often much emotional excitement. In most cases there is an early history of shallow emotional response and considerable childish behavior. The emotional deterioration is much more pronounced than in the simple type, and the individual is indifferent to things that might arouse the normal individual to emotional extremes.

The hallucinations, appearing most frequently in the auditory and cutaneous fields, are usually disagreeable. The patient hears voices accusing him of various things and calling him vile names, or he reports unusual cutaneous sensations. The delusions are silly, transient, and often no attempt is made to support them with logic.

This is the type of schizophrenia in which many clinicians believe we see real regression. Such clinicians claim that the hebephrenic progresses to a certain level and then when mental conflict makes it impossible for him to go on in personality development, he regresses to a level at which he was happy or able to cope with the situation. Many

other clinicians, however, claim that the silly behavior of the hebephrenic bears no resemblance to that of a child.

Case 3. (Diagnosis: Schizophrenia, hebephrenic type.) B. K. R., aged 28, female single, college education, Episcopalian, art student.

Family history. There is nothing of importance in the family history with the exception of an "hereditary deafness" on the maternal side. The patient's mother and maternal grandmother were deaf, and the patient began to experience difficulty in hearing at the age of eight.

Personal history. The patient is the youngest of six children of an Episcopal clergyman. She was brought up by a nurse who was extremely indulgent toward her. As a young girl she was cheerful, lively and generous, and had many friends. Her father described her as being pure and very religious in adolescence. She was meticulous about keeping promises and very fastidious about personal cleanliness. She was always stubborn and exhibited much quickness of temper. From eight to thirteen she attended private school, and from thirteen to twenty-one she went to three fashionable boarding schools where she is said to have done well. Following her graduation she had a successful debut and traveled extensively with her parents. She would have nothing to do with men, would not even let them touch her hand, but had a good time with girls. She had a tremendous dislike for cats and flies and would touch nothing that they had touched. She began to experience difficulty in hearing at the age of eight, and this condition has grown progressively worse. During the three years previous to her breakdown she is said to have become increasingly more irritable, impatient and difficult to get along with. About nine months before her hospitalization she was in an automobile accident and received an extensive scalp injury. She fainted and was unconscious for ten minutes. Her mother was also injured in this accident, and the patient was greatly shocked about this and believed that her mother had been killed. After the accident, while the patient was spending her summer vacation with the family, it was noticed that she was acting rather queerly. She did not want to go out among people because they always talked about her head. She was irritable, stayed up late at night, got up early in the morning and took long solitary walks. At this time her sister's child had an operation for strabismus; the patient became rather attached to the idea and later decided that she too had strabismus. She often went walking with her nurse, an elderly woman who has looked after her since childhood. On several of these occasions she sat down on the curb and refused to move. On one occasion she insisted upon leaving the hotel at 11.30 at night to go for a walk. She came in considerably later and announced that it was cool and dark and she was by herself. She became increasingly more irritable and demanding, and at one time hid her father's purple robe because he was slow in granting a request. In this way she hoped to prevent him from going to church. There were periods of storms in which she would slam doors, break locks or any moveable article she happened to lay her hands on. She became interested in art, particularly the life class and spent much time drawing nude women. She broke forth in tirades against her parents, called them old hypocrites and said she never wanted to see them again. She eventually became so wild that it was necessary to hold her down for a time, on which occasion she burst forth to her father, "You ought to be ashamed to touch my knee. Why did you make so many men seduce me? You have mistreated me since I was six. I am already deaf—I am going blind—everything and everybody is against me."

Within the hospital she behaved in a silly, excited manner with much grimacing and silly

laughter. Her talk was incoherent, irrelevant and difficult to follow. She talked a great deal about people being against her, mentioned the power of the "subjective mind" and her ability to influence others. She repeatedly read absurd meanings into the things going on about her and at times believed that her mother was trying to kill her.

She talked at great length about holding hands with strange men in moving picture theatres and about several minor flirtations with married men and was particularly amorous toward the physicians in the hospital. She felt that in the ward she was influenced by the homosexual feelings of the women about her saying "They get ideas into my mind—the idea they get across is like in 'The Captive' (a play) most of them have trouble with their eyes." This condition of the eyes she has definitely tied up with sexual tension, and she considers it to hold for her fellow patients. On one occasion she remarked, "Yesterday I was dancing with another patient and I got her all hot. I didn't know I could do anything for her eyesight."

The patient rapidly deteriorated, her speech became increasingly more incoherent and disconnected and her behavior typically impulsive and childlike. She perpetrated many childish pranks and spent considerable time in silly laughter with no paralleling humorous content. Anything that came to mind was blurted out, "That woman's painted like an Indian on war parade. I want some candy. I wore my shirt inside out for two days and none has come yet. Yes I have been to England four times—I saw the King and Queen. I would know them if I saw them again because they have blue hair now. I was a baby but I don't know where I came from." She became increasingly more silly and spent much time standing on a bench going through manneristic performances.

Case 4. (Control case showing the value of early treatment.) R. B., aged 14, male, Baptist, student.

The patient was brought to the clinic with statements from the mother and teacher that he was continually day-dreaming and thinking people talked about him. He was becoming increasingly more unpopular with his classmates and refused to go out to parties or athletic events. Practically all of his time was spent in reading and indulging in fanciful experiences. He imagined that the teachers were against him and that the physical director made comments to the other boys about his lack of ability in the gymnasium. He had recently expressed the belief that he had tuberculosis and had begun to stammer a bit.

Careful examination revealed the following facts. Three years ago the boy had been greatly shocked at the death of a young man of 22 whom he had admired and identified himself with in his fancies. It was discovered that the boy had a defect in hearing which to some extent accounted for his belief that his companions were discussing him in low tones. His lack of ability in games had led him to believe that he was inferior and different from other boys and then that he had tuberculosis and would suffer the fate of his friend. He was given the facts leading to his preoccupations and made to realize that he was not different from others. He was found to have some ability in art and was given instruction in golf which he learned to enjoy and also to play rather well. Two years later he appeared to be particularly well adjusted and happy.

Catatonic reaction. Superficially, at least, the catatonic reaction types are more easily distinguishable than are the other schizophrenic pictures. The cases are sometimes separated into two classes, the first characterized by stupor and the second, by excitement. They are probably more

accurately described, however, as alternating states of depression, excitement and stupor.

The onset of the disorder has been described by some authors as gradual, but in comparison with the other reaction types it is much more acute, the patient going into a deep state of depression and then alternating irregularly between states of stupors and excitement.

The case history of development of symptoms is somewhat like that of other schizophrenic types. The patient gradually becomes more and more apathetic, losing interest in the various things about him and retiring into his dreams. This gradual withdrawal from the environment then becomes so complete that the patient refuses to take his food, becomes mute, and makes no attempt to change his position. Such patients frequently go for months at a time without speaking a word, and refuse to make any movement so that it is necessary to tube feed them as well as move them from place to place. Perseverations and mannerisms are common characteristics of the picture.

Two kinds of stupors are sometimes distinguished as benign and malignant, some authorities restricting the diagnosis of schizophrenia to those cases where there is a malignant stupor. The benign stupors are said by such authorities to be manic-depressive episodes.

There is much about the stupor that is artificial. Despite the fact that the patient remains rigid, mute and apparently takes no interest in his environment, he is conscious of what goes on around him and frequently amazes those about him by coming out of the stupor to relate in minute detail things that one never dreamed came within the sphere of his attention.

Some of these patients appear to be highly suggestible, obeying automatically every command, while others are so negativistic that they intensely resist any attempt to change them. *Cerea flexibilitas* (waxy flexibility) is not uncommon, the patient offering little or no resistance to any change in the position of his body and limbs. Such patients may maintain the most uncomfortable and awkward positions for indefinite periods of time. Other patients may assume a definite bodily attitude and resist vigorously any attempt to change it.

The behavior of the catatonic during the excited phase appears senseless and unmotivated. The patient will make fantastic movements, swing his arms wildly, walk rapidly back and forth, shout the same thing over and over again. In this phase of increased psychomotor activity the patient may become quite dangerous. In the frenzy of excitement he might attack attendants, doctors or other patients although the assault appears to be unmotivated. Such patients need to be carefully

attended because of the dangers that may result from the suddenness of the attack.

It is to be noted that the catatonic stupor found in schizophrenia is not like the stupor that occurs in the manic depressive psychoses. In the circular psychoses the patient alternates between fighting his difficulties and giving up or submitting to defeat. The catatonic, on the other hand, has fled from his difficulties.

Case 5. (Diagnosis: Schizophrenia, catatonic type.) J. R. V., aged 30, male, married, Catholic, college graduate.

Main facts. The patient has been hospitalized four times in the last six years. The first of these episodes followed considerable worry on his part lest he inherit his mother's mental weakness.

Family history. The mother has been psychotic for several years and is now in a state hospital diagnosed paranoid schizophrenia. There is no other history of mental illnesses in the family.

Personal history. The patient is said to have been a normal, healthy, agreeable child with no history of temper tantrums. His scholastic work was above the average and he was much interested and quite successful in athletics. There is some history of masturbation with much preoccupation regarding the possible result of these practices. From early childhood the patient attended school and social events with a young girl and the families have long felt that they would eventually marry. This event did materialize following the patient's second hospitalization.

In the fourth year of college the patient became greatly interested in medical books and one day asked his father, "Do you think I will inherit my mother's weakness? Do you believe insanity is hereditary?" A few days later he called a physician who is a close friend of the family and asked the same question. Despite the reassurance given him by both his father and his friend he continued to be much preoccupied with the possibility of inheriting his mother's weakness. He became elated, overactive and adopted a commanding attitude. Finally he ran from the house, clad in his pajamas, waving a crucifix and shouting "You do not believe in this. You are no good." When he came to the hospital he was much preoccupied with thoughts of insanity being hereditary, of his intentions to marry, coupled with his fear of passing on his mother's disease. He was hallucinated, particularly in the olfactory field, and was for a time mute and did considerable posturing. The patient was discharged in apparently good condition, after five months' stay in the hospital. At this time he stated that he was aware of the fact that he had a number of peculiar ideas, that he was ill at ease in the company of others, his hands perspired profusely, he was emotionally unstable, and that he noticed that his pupils were widely dilated all of the time. He had had many notions about the loss of his sexual abilities, which he, however, referred to his irregularities.

He returned home, finished his school work, and took a position at which he was quite successful for a year and a half. At this time he told his father that he felt his old illness returning. He was preoccupied, fearful and anxious and was readmitted to the hospital. In the hospital, he held postures, felt that the doctors were talking to him in symbols, misidentified those around him, was hallucinated in the olfactory and auditory fields and was usually mute. He gradually became coöperative, was given parole and after about an eight month period was again discharged.

A few months later he was married, and six months after his marriage he visited the

hospital to see the dedication of a new building. On this occasion he left his wife sitting in the car, entered the building and three hours later was found lying on a bed in one of the wards, mute. He was mute for two days, refused to eat and was preoccupied for about six weeks. He at times expressed ideas that his mind was being read. He gradually began to take interest in the activities and was discharged after a six months stay.

He spent the following year and a half in a leisurely manner with considerable success. He began to complain of feeling tired, of not sleeping well, and lost his appetite. He became preoccupied and finally maintained a fixed position for several minutes. The following day he became confused, indecisive and was brought to the hospital. For several weeks after admission the patient was mute, resisted feeding, assumed fixed positions for long periods of time and appeared confused and out of contact. He gradually came out of his stupor and was again discharged after six months hospitalization. At the time of his discharge he showed no deterioration or signs of having been mentally ill.

Paranoid reaction. The literature regarding the classification of paranoid types is particularly confusing. This condition is primarily due to the attempts of the various writers to distinguish between true paranoia, paranoid types of schizophrenia and paranoid states. When the delusional system stands out prominently and there are no other distinct symptoms, the disorder is called "true paranoia," but if the delusions appear to be incidental to other symptoms, the condition may be called "paranoid." Many patients do seem to fall definitely within the schizophrenic classification and yet show considerable evidence of being deluded. These delusions, however, are unsystematized, fantastic and transitory in contradistinction to the fixed delusions of true paranoia. They are also associated with hallucinations, persecutory and grandiose ideas. In addition the condition is characterized by the emotional apathy of the schizophrenic, although this may not show up until the later stages of the disorder along with silly mannerisms and dementia. The condition shows a gradual deterioration after a slow onset, which occurs later in life than the other forms.

The paranoid trends and transitory delusional content are particularly well marked in the next case, which is one of long standing and in which there is considerable deterioration.

Case 6. (Diagnosis: Schizophrenia, paranoid type.) W. P., aged 38, male, single, college education, manufacturer.

Family history. Although the paternal history is essentially negative, one maternal aunt died in a mental hospital, the mother was neurasthenic and a sister is in a mental hospital.

Personal history. The patient's early history, according to the information, was uneventful. He stood high in his class at Yale and was quite athletically inclined. While at college he won the inter-collegiate tennis championship and displayed fair prowess in other athletic events. After leaving college he was very successful for five years as the manager

of a wire nail factory during which time he had considerable luck in playing the stock market.

The onset of the patient's difficulties appears to coincide with the beginning of his sister's mental illness. When the sister became ill, the patient and his brother took her West to a sanatorium. Upon their return the patient grew depressed and melancholy and lost his position with the nail company. The patient's father had, in the meantime, died and left him a large sum of money. A nurse was secured for him, and he travelled extensively, spending money freely. The family had great difficulty in breaking the patient's attachment to this nurse who, they believe, had a rather bad influence over him. It is stated that they always took communicating apartments wherever they stopped and had been on very intimate relations. The patient became increasingly irritable and excitable and developed exaggerated ideas of his personal prowess. He began to speculate in stocks and, interestingly enough, made fifty thousand dollars in these activities. Then he bought four automobiles at one time despite the fact that he had no use for them. He developed ideas of persecution, purchased a revolver and on several occasions fired this weapon in the air.

The patient's expansiveness steadily continued, but his delusional content evidenced no systematization. He declared that his name was Astor, that he had wrestled with the champion and defeated him, that he had knocked out the heavyweight boxing champion, and that he had pitched a game against the Cleveland Americans and defeated them. He is now markedly suggestible and will declare that he is almost any celebrated personage that can be named such as John D. Rockefeller, or the President of the United States. He even frequently exposes himself in order to exhibit his imagined wonderful physique. Often he appears with several cuffs on one hand, his pockets loaded with wet towels and all sorts of things that he picks up and stuffs in them. He explains this by saying that he is trying to strengthen his side, that his left side is stronger than his right and that he is very anxious to make the latter stronger. All of his clothes are about four sizes too large for him in order, he says, to give the muscles a chance to expand. At one period of time he had a habit of darkening his eye brows with either shoe polish or ink and he occasionally washed his head in ink because, he states, all of the pugilists and ball players of the country stain themselves. He entertains all sorts of delusions, claims that spiders and snakes come into his room at night and bite his eye glasses, a fact which explains their being chipped. If he loses a pin or a collar button, he will say that magnets pass through the air and take the pins out of his necktie. He rides horseback several times a week, and upon his return, tells the most outlandish tales with reference to his experiences with his horse, when as a matter of fact, the horse which he rides is perfectly gentle. At a baseball game he is under the impression that he is the center of attention, that the players, when they look at the grandstand, are looking at him. He also claims that he knows all of the players and cites several games when he pitched against them. In dancing he pays little attention to other couples on the floor and therefore is frequently running into them. He has undergone considerable mental deterioration, and his emotional apathy is well evidenced by his indifferent attitude to distressing facts that have been presented to him.

In the following case there is evidence of the development of persecutory paranoid trends along with emotional apathy, ideas of reference and hallucinations.

Case 7. (Diagnosis: Schizophrenia, paranoid type.) M. S. A., aged 36, female, divorced, Episcopalian, secondary education, no occupation.

Family history. There is no history of mental disease in the family.

Personal history. The patient was born at full term, and her early development was normal so far as is known. She is described as having been a shy and retiring child with little intellectual interest. Menstruation began at thirteen and has been quite normal. Her first marriage, which took place at 19, she described as having been entered into in order to get away from her mother. There were no children by this marriage. Her husband was killed in an accident when she was 22 years old, and two years later she remarried. By this second marriage she has one child, a girl who is now nine years old. This marriage was an unhappy one, full of domestic stress. The patient says her husband took large quantities of alcohol and dope and was unfaithful to her. She describes one period when he sat up in bed for three days playing cards with imaginary partners. In the patient herself, there is considerable history of alcoholism which includes several hospitalizations for treatment.

For the past three years she has felt that there were various groups of people annoying her. In addition, she thought that she was infected, that she had worms under her skin, that she was receiving electric vibrations and that her mother was trying to kill her. While developing these persecutory ideas, she ran up a great many unnecessary bills. She shows a definite loss of affectivity with practically no emotional display. Although the patient evidences much delusional content of a persecutory nature, there is no systematization of the events, and her content is frequently rambling and disconnected. The following quotation is an example of her talk: "There are vibrations in the room all the time. They have no purpose and I don't know where they come from. That girl interests me and reminds me of Syrian men. The vibrations have annoyed a number of people in Atlanta also. The floors at home echoed when I walked on them, and they do sometimes here. The vibrations seem to work around me. For instance, in Harper's *Bazaar* there is a picture of Eva Le Gallienne. This business has gone on for six months. My sister had to move twice because of it. I think father's money had something to do with it. What about the woman who had an affair with her negro chauffeur." She then went on to tell about a group of newspaper writers and telephone operators who, she said, were interested in her and who arranged to have trashy stories printed about her. On another occasion she said that the vibrations came from a house across the street by means of a music box arrangement. These vibrations coming in layers translated words to her which formed foolish questions. At one time her delusional trend centered so firmly around a secret alliance between Germany and Russia that she was anxious to join the Red Cross. Lately, she has concerned herself primarily with the belief that her mother was trying to kill her so as to secure her property and child. The older idea of bugs and worms under her skin has returned, although they are now in her umbilicus as well. There has been considerable evidence of emotional leveling, and she has no insight into her condition.

Attempts to understand schizophrenic behavior have developed around a number of conceptions, only a few of which may be considered here. Some investigators have claimed that schizophrenia represents a regression to the level of a child or of a primitive man. The psychoanalytic group has given a prominent position to regression, and following Freud (817), has presented it as taking place in the psyche. Many have accepted the position of Piaget (818), who placed the thinking of the schizophrenic midway between the autistic thinking of

the child and the logical thinking of the normal adult. In some instances the claim is made that the regression goes back to primitive forms of behavior, and the contention is that the regression hypothesis is fundamental to the understanding of schizophrenia. Study of the language and thinking of schizophrenics has presented some evidence in favor of the point of view, but in general fails to substantiate it. The appearance of schizophrenic disorders in adults living in primitive civilizations and in children in highly civilized technological civilizations is frequently presented to contradict the regression hypothesis. The points of view of a number of the leaders in the field are presented in a collection of papers edited by Kasanin (819).

Intellectual deterioration that was progressive was claimed by practically all of the early students of dementia praecox, and many implied that this meant also progressive brain degeneration. The literature of the last forty years is full of controversy with regard to this point. Kendig and Richmond (820) have provided an historical and critical evaluation of the problem. They studied performance on the Stanford-Binet test of 500 schizophrenic cases, 460 non-schizophrenic hospital cases, 217 nurses and 119 other hospital employees. They report that although their schizophrenic patients tested considerably below normal, and showed appreciable loss according to the Babcock test, there was no evidence of genuine intellectual deterioration and no selective impairment of particular functions of intelligence. Their schizophrenic patients failed most conspicuously in tests demanding sustained effort and attention. The variety of opinions on psychological deficit based upon experimental results have been well summarized by Hunt and Cofer (821).

The point of view which is held in the highest esteem today is that taken by Adolf Meyer, (822) that schizophrenia is the result of the failure of an individual to make an adequate adjustment to his environment. It is the end result of gradually accumulating faulty habit reactions. That the reactions may be conditioned or influenced by heredity, failures of the endocrine system to function properly or any other factors is not denied, but the foundation of the disorder is the formation of vicious mental habits.

When difficulties arise in the environment as the result of a thwarting of the satisfaction of desires, the normal and healthy attitude to take is the direct attack upon the difficulties and an attempt to secure real satisfaction. The individual does not, however, always use this method of solving his problems. He may decide that the difficulties are too great

to overcome and that he may as well submit to defeat, give up and admit the superiority of the conditions or people who stand in his way. This does not mean that the problem is solved. The desire does not cease now, but becomes more insistent; and the individual is doubly uncomfortable because he not only fails to secure satisfaction but also suffers from feelings of inferiority. Or, failing to secure satisfaction in reality he may attempt to substitute imaginary satisfaction. That is, he may turn inward and indulge in day dreams and fanciful satisfactions. Such reactions are not in themselves abnormal but they become so when used in an extreme degree. The danger lies in the substitution of fancy for fact so that the individual, unable to face the responsibilities of marriage, indulges in sex ruminations or auto-erotic habits. He continues to use faulty habits for the solution of his problems and gets further and further away from reality. No attempt is now made to combat failures by a normal, healthy increase of effort. Instead, failures are said to be due to poor health, to the influence of others or to the fact that everyone has turned against him. Ideas of suspicion, persecution, religious fanaticism, hypochondriacal trends then find fertile soil for development. With the gradual acquisition of faulty habits the individual reaches a point where his reactions to his environment become so unusual that he must be termed abnormal.

CHAPTER XIII

FUNCTIONAL PSYCHOSES (*Continued*)

PARANOIA

Since the term paranoia has been loosely used to describe various conditions, it will be well for the reader to keep in mind that it is our intention to discuss "true" paranoia, despite the fact that the dividing line between the various states is not marked with a high degree of accuracy. True paranoia constitutes a very small percentage of the patients of mental hospitals, it being estimated by Landis and Page (823) that only about 2 per cent of the patients fall in this group.

The controversy over the disorder dates back to Heinroth (824) who in 1818 divided mental disturbances into disorders of the intellect, of the will, and of the feelings. He gave greater attention to the disturbances of intellect which he called paranoia, and which he further divided into disorders of simple confusion, general confusion, and confusion with furor. He used the term paranoia ectasia for disturbances of the feelings. Griesinger (825), in 1845, believed that the delusional content was largely based on affective disturbance. These early opposing views of affect and ideation as the basic elements were followed by many studies which will not be reviewed.

The term paranoia is now generally used to describe those disorders in which the chief characteristic is the highly systematized and fixed delusion. There is no striking tendency toward general personality disorganization. The outlook for complete recovery is poor, and while the course is usually chronic, the development is not necessarily progressive. The disorder is one that usually develops in the forties, although it may appear either earlier or later. Most early authorities reported a preponderance of males over females, stating that 70 per cent of their patients were men, but recent studies in this country show only a negligible preponderance of male over female paranoiacs among first admissions to mental hospitals.

Meyer (826) views the paranoiac states as transformations of the personality; the reason, though appearing preserved, is sidetracked and does not fit into the natural world of the individual. He believes the

paranoid individual to be one who is asocial and suspicious. Such persons, he states, are always wondering what others think and attributing deliberate intentions to the indifferent actions of others.

Meyer recognizes several grades in the development of the paranoid reactions:

- a. Uneasy, brooding, sensitive type, with an inability to correct notions and to make concessions.
- b. Appearance of dominant notions, suspicions, or ill-balanced aims.
- c. False interpretations, with self-reference and a tendency to systematization without or within.
- d. Retrospective or hallucinatory falsifications.
- e. Megalomaniac developments or deterioration, or intercurrent acute episodes.
- f. At any period antisocial and dangerous reactions may result from the lack of adaptability and excessive assertion of the aberrant personality.

Freud (827), on the other hand, believed that the basis of the paranoiac's difficulties could be found in repressed homosexual trends. The symptoms, he explained, as projections resulting from the mental conflicts centering around the repression of homosexual tendencies.

Stoddard's (828) brief sketch of the Freudian viewpoint is as follows:

The paranoiac always starts with the unconscious premise "I love the man" (for convenience I am assuming the patient to be male).

Persecuted paranoia.—"I love the man"—an intolerable idea, therefore becoming repressed and replaced in consciousness by "I do not love him; I hate him." This by projection becomes "He hates me," "I am persecuted by him."

Exalted paranoia.—"I love him"—again an intolerable idea, therefore "I do not love him, I love myself." This by projection becomes "Everybody loves me," "I am a great person."

Religious paranoia.—"I love him" being intolerable, becomes "I love Him" (spelt with a capital H) meaning "I love God." This by projection becomes "God loves me," "I am the chosen one of God."

Amorous paranoia.—The intolerable "I love him" becomes "I do not love him, I love her." This by projection becomes "She loves me."

Jealous paranoia.—"I love him," as usual, is replaced by "I do not love him; she loves him."

Hypochondriacal paranoia is somewhat like exalted paranoia, "I love myself" becoming "I must take care of myself."

Since the outstanding characteristic of paranoia is the delusional system, it will be well for us to give careful attention to the nature of belief in general and the formation of delusions. Unless we analyze the situation carefully we are likely to assume that our beliefs are purely intellectual processes, the result of our perceptions and reasoning about

the factors involved. We are, in short, likely to fail to see the important rôle played by emotions and desires in the development of beliefs. A careful examination of the problem will show that emotion and desire are often the determiners of conviction.

The extremely close connection between feeling and belief is nowhere shown better than in our tendency in conversation to substitute the one word for the other or to use them interchangeably. For instance, we frequently use the word "feel" when we mean to say believe. As a matter of fact, in most instances, the word "believe," as used by us, has little or nothing to do with evidence or proof, but merely means that we accept something because it stirs us emotionally, or, as will be brought out later, we want to accept it.

There are, however, some beliefs which seem to be entirely indifferent, that is, not charged with any affect. So one may believe that London is the largest city in the world, a fact which he has learned and is entirely unconcerned or indifferent about. But we may seriously question the possibility that there was no concern or feeling at the time that the belief was acquired. We need only to reflect on the pleasure that usually accompanies the acquisition of knowledge, and we become aware of the important part played by the feeling. The rôle played by emotion in the distortion of perception has long been an object of psychological examination. We know that when frightened, we may perceive the whistle of the wind as a shrill cry, or a tree trunk as the body of a man. In much the same way we know that the proverbial blindness of the lover is merely a failure in accuracy of perception based upon the presence of emotion. Since many of our judgments and beliefs are dependent upon perceptions, we must naturally conclude that distorted perceptions will bring about distorted judgments or beliefs.

Likewise careful analysis of any belief will indicate the prominence of desire in the process of formation. The desire may have either a positive or a negative aspect and consequently may affect judgment in either direction, that is, in desire for or repugnance to acceptance of a belief. Thus, one believes because he wants to believe or disbelieves because he has an aversion to such a belief. The human mind seems to be capable of believing anything it wants to believe; as a matter of fact beliefs are formed and held to because they satisfy desires. In scientific observations one must constantly guard against the possibility of one's hopes and desires affecting the final judgment. In the field of advertising we have learned that belief is rarely the result of reasoning. Lund (829) in some experimental work in this field, found the correlation between

belief and desire to be $+ .88$ while that between belief and evidence was only $+ .42$. Such experimental work shows that one's beliefs depend much more upon what one wants or desires than upon evidence, where one would logically expect beliefs to rest.

If we consider all beliefs which cannot be sustained by evidence as delusions, then we must certainly agree that we all have many delusions. We remark from time to time, that certain individuals are laboring under the delusion that they are superior to everyone in a specific trait or that their children are superior ones. Almost everyone has recognized the mass of evidence that is necessary to convince a mother that her child is inferior and the correspondingly meagre amount that is necessary to convince her of his superiority.

The important thing to recognize in our attempts to understand the development of paranoia is that the disorder begins in an attempt on the part of the victim to make an adjustment to some difficult situation. There is extreme mental conflict as a result of a failure to satisfy certain dominant impulses, the conflict frequently becoming so unbearable that some attempt is made to repress some of the factors of the situation.

In many instances the real difficulty may begin when the individual blames or condemns himself for some act or idea which conflicts with his ideals, and consequently he may persecute himself because his self-respecting sentiment demands it. It is now only a step further to project this persecution on to others just as the tennis player subconsciously projects his failure on to his racquet. Thus his repression of the unacceptable acts or ideas leaves him with a feeling of self-condemnation which he in turn projects on others whom he now considers to be persecuting him. The activities and statements of those about him are now interpreted in terms of his feeling, and he misinterprets them as being directed toward him. He is constantly looking for hidden meanings in the statements and activities of those about him; and since his desire for condemnation and persecution is so strong, he has little difficulty in finding them. Gradually he may come to believe that large organizations are attempting to ruin him, and even those who claim to be his nearest friends are secretly planning his downfall. It may, however, occur to him that an individual who is given so much attention and is persecuted to such a degree must, therefore, be a very important or outstanding individual. In such cases the paranoid may develop delusions of grandeur. If he chances to come upon the name of some great individual, it is not unlikely that the name will become associated with his delusional content; and since he misinterprets most things as having refer-

ence to him, he may gradually develop the belief that he is this great person.

A careful study of a large number of paranoid individuals shows clearly that the disorder cannot be explained as the result of any single factor. While repressed homosexuality may be the basis of some cases, there are many others in which homosexuality has absolutely no part. The Freudian explanation may be helpful in the understanding of some cases, but it cannot be viewed as the key to the understanding of paranoia.

In most instances paranoia develops in individuals who are unduly suspicious of the motives of others. The personality is usually described as jealous, suspicious, sensitive and selfish, but we find cases of paranoia where there is nothing in the personality of the individuals that could be considered as suggestive of later abnormality. There is usually present some factor which is highly disturbing to the affect and which serves as the basis for the development of a false premise upon which the later delusional system rests. Feelings of inferiority and guilt are greatly in evidence. The inferiority feelings probably deserve the greatest attention, for they seem to be more often the core of the difficulty. They may result from the failure to satisfy great ambitions, and they may be the patient's way of accounting for his failures and disappointments, or as in a number of cases, they may be definitely tied up with the guilt feelings. The delusion serves as a compensation or defense against the feelings of inferiority or guilt, and by means of partial repression and projection, the patient believes others, rather than himself, are condemning and persecuting him. In the same way he may compensate for feelings of inadequacy and incompetency by considering himself a superior being.

We see, then, in the paranoid a suspicious individual who, faced with factors highly disturbing to the affect, develops feelings of guilt and inferiority which are unbearable and which he compensates for by projecting the condemnation and persecution so that it appears to come from others. He possibly then develops grandiose ideas as a result of marked attention that he believes is paid to him. The delusions of persecution usually appear before the delusions of grandeur though the two trends may develop together.

A recent position taken by Cameron (830) may shed considerable light on the understanding of paranoid thinking. He has ascribed the genesis of both the sensitive asocial personality and the paranoid delusions to a defective development of rôle taking in the individual, and to the relative inadequacy in social perspective that results. The position taken by Cameron is extremely logical and deserves careful attention.

It has already been stated that true paranoia is not frequently seen, but it should be noted that a large number of persons evidence a paranoid type of behavior. If general personality disorganization is present, the case is placed in the paranoid-schizophrenic group. Paranoid ingredients may be present in other psychotic groups and also in large numbers of odd or eccentric individuals never seen by psychiatrists. The latter are frequently referred to as being in a paranoid condition or state. A large group of sensitive, rigid persons with strong tendencies to self-reference may actually be potentially paranoid.

The meaning of the grandiose and persecutory delusions and their relationship to each other has given rise to a number of points of view. Freud (831) believed the delusions of persecution to be fundamental and presented the opinion that the delusions of grandeur were intended to provide for the patient acceptable explanations of the persecution. Brown (832) has taken the position that the persecutory and grandiose trends represent balancing sets of delusions and serve the purpose of stabilizing the disease and slowing its progress. Diethelm (833) has presented the grandiose delusions as compensatory and related to wish-fulfillment. Most clinicians present a large number of cases in which the persecutory delusions precede the grandiose, but the development of the two systems concurrently appears not infrequently. There appears also a difference of opinion with regard to the functional interdependence of the two types of delusions.

While the importance of sexual conflict in the development of paranoia is generally recognized, the restriction of its genesis to homosexuality cannot be substantiated. Page and Warkentin (834) have presented some interesting results of a study in which the Terman-Miles Masculinity-Femininity test was given to paranoid patients, and the scores compared with those made by active inverts, passive inverts and a group supposed to be representative of the general male population. They concluded that their data favored the hypothesis that paranoia is in some way related to passive homoeroticism. Homosexuality undoubtedly produces in many instances feelings of inferiority and guilt, but this fact may be equally contended for a large number of other disappointments. Personal incapacities and situational frustrations of all types may be seen as important factors, and the experience of many clinicians bears out the fact that extreme manifestations of the mechanism are seen in many cases where homosexuality is not a factor. The mechanism involved is seen by many as a compensatory one. The individual suffers from feelings of inferiority which become unbearable, and he is forced to seek a way out of his dilemma. This sense of

inferiority may develop from the failure to satisfy any urgent desire. The defective development of rôle taking and the consequent inadequacy of social perspective, along with the tendencies to project inadequacies, appear to be a sufficient explanation for the development of paranoid attitudes.

MANIC-DEPRESSIVE PSYCHOSES

The manic-depressive psychoses constitute a group of mental disorders characterized by conditions which appear to be the opposite of each other, elation and depression. In some cases there may be only depression; in others, only elation, but in the circular cases the disorder runs through a course which involves the alternation between these extreme mental states. Recognition of some relationship between excitements and depressions goes back into antiquity; by the first century A.D. they were already regarded by many physicians as parts of one illness. It is undoubtedly true, however, that until relatively recent times a large number of other psychotic and neurotic disorders were loosely grouped under mania and melancholia. While some earlier writers united the two names to cover a single syndrome, it was Kraepelin who crystallized the attitudes and described the manic-depressive psychosis as a single disease process characterized by the extreme affective states of elation and depression. The prognosis is generally good for the individual attack, but there is a tendency toward recurrence. Kraepelin recognized this tendency but pointed out that although attacks might occur throughout the life of the individual, they would never lead to profound dementia. He described the deterioration in these people as a shallowness of mood, an acceptance of the situation and therefore a willingness to be guided. The disorder constitutes about 15 per cent of the first admissions to hospitals, but this is not an adequate measure of the number of cases or of the importance of the disorder. The fact that the patient usually suffers recurring attacks indicates that the same patient may return to the hospital several times. Statistics show that more women than men are affected, about 60 to 70 per cent of the patients being female.

The manic-depressive psychosis is classified as a functional one and the origin is therefore said to be psychogenic. The type of personality that develops this psychosis has been discussed from many angles, but it is doubtful if we have anything very definite to point to. Kretschmer (835), who has devised an elaborate classification of man into four fundamental types, the pyknic, asthenic, dysplastic and athletic, points to the fact that the manic-depressive is usually associated with the pyknic type

(short, stocky people with thick necks). Others have attempted to classify mankind into two groups, extroverts and introverts and have pointed out that the extroverts develop the manic-depressive psychoses, while the introverts who become mentally ill are more likely to develop schizophrenia. In a large number of cases we find we are dealing with what might be called the optimistic, aggressive type, the individual who considers life lightly. Many, however, are described as having been gloomy always, never having seen anything but the distressing side of affairs, and having had a tendency to consider insignificant events as being most serious. Frequently one finds a personality in which these moods are combined, and, consequently, emotional instability results.

In some of the disorders it is possible to point definitely to the precipitating causes, that is, some experiences highly displeasing. Such cases are referred to as reactive excitements or depressions, and the prognosis is usually considered to be better for such cases than for those known as constitutional or endogenous where no precipitating factor is evidenced.

The consideration of the elation or depression as pathological is usually based on the fact that there is nothing present in the external circumstances to justify the emotions. A strong wish or desire, which for some reason the individual is not able to accept, is repressed; that is, denied expression. If now the repression is partly removed, the individual may behave as if the desire had been gratified. The psychoanalytic literature is full of examples of this kind. The wish is usually described as having developed in childhood with external circumstances precipitating the psychoses. For example, the death of the father precipitates the psychosis in the son. The son has from childhood had an abnormally strong liking for the mother and has wished the father dead (the Oedipus complex). The wish has been repressed, but with the father out of the way, the adult son now has exclusive possession of the mother's affection. The son then becomes elated, but the elation appears pathological, that is, without cause. There is, however, no conscious formulation of the fulfillment of the desire, a condition which the psychoanalytic school explains as being due to the fact that the conscious formulation of the unconscious wishes is a difficult task, or due to the fact that the repression partially continues. With the presence of the wish and the repression of it we have no reason to disagree, but the later failure at conscious formulation of the fulfillment is not explained adequately by the psychoanalysts.

Many investigators in the field have mentioned the importance of heredity as an etiological factor, the conclusions being based on the

fact that mental illness is present in other members of the family, principally the father or mother. We must, however, not be too prone to consider a history of mental illness in the family as an evidence of hereditary predisposition. We know entirely too little about the heredity of the so called normals who never become hospitalized and who may also have some history of mental illness in the family. We must also recognize that that patient has had to live in many of these instances with people who were mentally ill.

Glandular disturbances have recently been given considerable attention as possible causes, since relationship between mood and certain glandular changes has long been recognized. But although the presence of ovarian and thyroid disturbances in these psychoses is not uncommon, no glandular basis has been established for the development of the disorder. Cotton (836) has pointed to the importance of focal infections as causal agents and claims to have had considerable success in the treatment of manic-depressive patients by removing focal infections. The possibility that physical changes may have important bearings on the cases should not be dismissed without careful consideration in each instance, but clinical experience seems to indicate that the causes are of psychogenic origin. The reactions, themselves, may be considered as defense reactions, that is they are the patient's way of defending himself against the difficulties which face him. The schizophrenic patient escapes from his troubles by retiring into a fanciful world or by projecting his inadequacies; the hysteric attempts to turn the attention of both himself and others away from the real difficulty by getting them to focus on some fancied physical illness. The manic-depressive individual, however, either gives up, admits defeat and becomes depressed or furiously attacks the disturbing factors and becomes elated. We deal here with a person who has restrained himself for a long period of time, and now lets his pent up emotions burst forth. In the manic attack the individual derives some satisfaction, whether he wins or not, from the fact that he has at least put up a fight. If, however, in the fight he becomes more cognizant of his own weakness, he may then go into a depression. Even in the depression the patient gets some relief from the trying situations. He is relieved somewhat by giving up, admitting defeat, so the struggle may, at least temporarily, cease. Prognosis is good for individual attacks, both the manic and depressive reactions being temporary states during which the patient recuperates and prepares for the next struggle.

It is well to note again that the behavior of the manic-depressive differs from the behavior of the normal essentially not in kind, but in

degree. That is, the difference is quantitative rather than qualitative. Careful observation convinces us of the fact that the affect of most people is variable. In simple language, our moods swing or change from one degree to another. Such changes, however, may be described as being transitory in nature, that is they do not remain for long periods of time. They do not interfere to any great extent with our regular activities, and they cannot be described as being out of proportion to the stimulating circumstances. On the other hand, normal people do experience

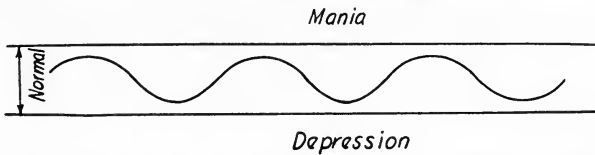


FIG. 35. Diagram showing swings of mood within normal limits. The curved line shows how the emotions may swing over a period of time without passing over the arbitrary boundaries of normality. Modified from J. J. B. Morgan, *The Psychology of Abnormal People*. Longmans, Green and Co.

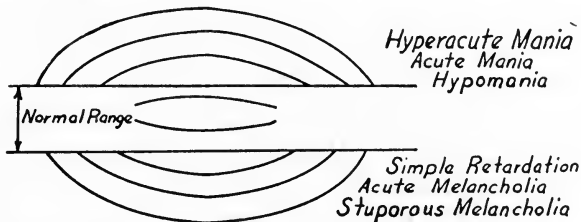


FIG. 36. Diagram illustrating degrees of emotional swings. The space between the two horizontal lines represents the normal range of emotional swings, the degree of the abnormal swings being shown by the lines above and below the normal range. Hypomania is the mildest degree of elation, acute mania next and hyperacute mania represents the extreme degree of elation. Below the normal range the three degrees of depression are shown in order from simple to extreme; simple retardation, acute melancholia, stuporous melancholia. Modified from J. J. B. Morgan, *The Psychology of Abnormal People*. Longmans, Green and Co.

elations or depressions which they recognize as conditions not entirely merited by circumstances. We often find it impossible to explain why we are especially gay or particularly sad. The disorders we have just discussed manifest these forms of behavior in the extreme.

Symptomatology

In considering symptomatology we should remember that while we may speak of different types of the disorder as hypomania, acute mania, delirious mania, simple retardation, acute melancholia and stuporous melancholia, there is no distinct dividing line between them. We need

also to recognize that some patients will experience only elation, others only depression, while still others may alternate between these two states.

Swings of mood are not, then, abnormal since we know that they take place in the average individual. It is only when these swings become exaggerated that they are viewed with any alarm. If we let the two horizontal lines in figure 35 represent the boundaries of the normal range of the swings of emotions, the curved lines within these boundaries may adequately show the swings of mood within normal limits. Any line that would break across these lines would indicate abnormality, a break at the top showing elation and one at the bottom depression.

The disorders may be further classified according to the severity of the elation or depression, and this is shown diagrammatically in figure 36.

MANIC STATES

Three varieties of mania will be discussed as hypomania, acute mania and hyperacute mania in an attempt to show the different degrees in which the mania may be manifest, though the boundaries between the states may not always be clear. The outstanding characteristic of the manic stage is excitement, which shows itself in overactivity and flight of ideas. The manic simply can not sit still, but must be doing something every minute. Superficially, the picture is one of a self-satisfied individual who is having a glorious time, flitting from one form of activity to another. The manics' reactions are speeded up to an unusual degree and if it were not for their easy distractability they might be capable of accomplishing a great amount of work. Their attention, however, is difficult to catch and almost impossible to hold for any considerable length of time, since they respond actively to each new stimulus that presents itself. Their conversation may appear incoherent because of the rush of ideas which follows each new stimulus, but they are generally in good contact with reality. They are inclined to show off, especially before strangers, and do not hesitate to butt into the affairs of others. They are frequently found clowning for those about them and are likely to address pointed remarks to anyone who appears before them. The manics' thought processes are speeded up so that they become witty talkers who have a quick answer for every question, and in a group they monopolize the conversation and insist on being the center of attention. In the hospital the manics sometimes insist on helping the nurses and occupational therapy aides in looking after the patients or performing other duties since they feel that they must be active. In sum, the manic

may be considered as one who has let down the bars of inhibitions and is giving free reign to emotions that have long been bottled up.

Hypomania. The outstanding characteristic of hypomania is a restlessness which shows itself in all types of incessant activity without natural fatigue. At first the patient may merely be considered as an aggressive, witty, social and competent individual. He, however, tends to monopolize the conversation, giving freely his views on all topics and heartily resenting any disagreement with them. He is likely to be excessively dogmatic and intolerant of any criticism. Although he always has numerous schemes which are all calculated to be successful, the details are seldom worked out. He is of the opinion that he can do everything better than anyone else, that his knowledge is unlimited, and he is likely to be sarcastic and rude to anyone who fails to agree with him. The restlessness and overactivity are at times put to some definite use, but frequently they are entirely worthless. The hypomaniac often evidences a lack of moral control which shows itself in excessive sex indulgence and intoxication, and he eventually becomes irritable, domineering and so unduly overactive that his health and reputation may be endangered. While some mild cases may be cared for without hospitalization the risk may be great.

Acute mania. Although it is difficult to draw a dividing line between hypomania and acute mania, the distinguishing difference is the marked excitement that appears in the latter. The acute stage may develop without any noticeable stage of hypomania. In acute mania the patient may become disoriented, and there may be considerable clouding of consciousness with transitory hallucinations of the wish fulfillment type. In the marked excitement it is impossible to do a routine mental examination, but the intelligence does not appear to be greatly interfered with despite the fact that judgment and insight are usually very poor. The patient states that he never felt better in his life, that the world is wonderful and may even go into great detail in his attempt to explain why he is so happy. He may, however, become irritable and angered and in such a state must be carefully attended, for he is likely to make a dangerous assault upon those about him. He may break the chairs and windows, tear pictures from the wall and completely disrupt a ward if not carefully watched. The flight of ideas, which is characteristic of all of the manic types, may reach a state of incoherence in acute mania. Such a patient may be poorly oriented for time and place, not knowing where he is and losing all account of time. People are frequently misidentified by the patient, perfect strangers being taken for old friends. It is not uncommon for the same physician to be identified as two or

three different individuals in the same day by a patient in the acute stage.

Hyperacute mania. Hyperacute mania is the extreme manic state in which the patient becomes very violent. Some patients reach the hyperacute stage after passing through the hypomanic and acute manic phases of the disorder, while others appear to develop the extreme degree without experiencing the minor stages. In this stage the patient has reached the extreme degree of excitement and is very difficult to restrain. He may become unduly destructive and combative, and his activity is so

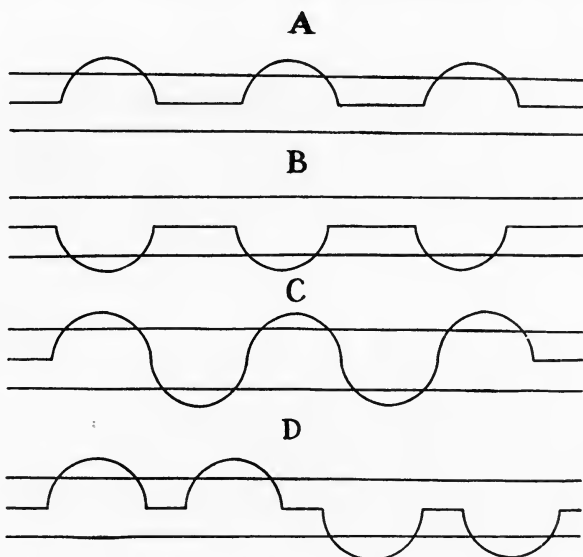


FIG. 37. Diagram indicating various sequences of emotional swings from the normal. *A*, Recurrent mania. *B*, Recurrent depression. *C*, Circular type. *D*, Two periods of mania followed by two periods of depression with normal states intervening. Modified from J. J. B. Morgan, *The Psychology of Abnormal People*. Longmans, Green and Co.

incessant and vigorous that he rapidly becomes exhausted. In this phase he may not even take time to eat, and food that is presented to him will be thrown about as are other objects. The patient is not only dangerous to those about him, but may seriously injure himself. He appears to have passed into a delirium; is completely disoriented for time, place and person; has auditory and visual hallucinations; ceases to take any pride in appearance; and appears to have no insight into the seriousness of his condition.

There is a growing tendency to disregard these clinical subdivisions since they shade almost imperceptibly into each other.

DEPRESSED STATES

In the depressed states, which will be discussed as simple retardation, acute melancholia and depressive stupor, the behavior will be found to be the reverse of that seen in mania. There is a diminution in activity. Thought processes are retarded, with varying degrees of depression. Many of the patients in this group are suicidal and must be guarded carefully to prevent them from taking their lives.

Simple retardation. The simplest of the depressed states is characterized by a slowing down of both mental and physical activity. The patient complains of great misfortunes or believes himself guilty of many wrongs and usually bemoans the fact that nothing can be done about the situation. He is dejected, says he has disgraced himself and his family, he is a failure and his case is hopeless. He sits about and refuses to participate in any activity. Not only is there a slowing down of the motor activity, but thinking is also interfered with. He says he is not fit to live, wishes he were dead and sometimes begs those about him to take his life. He speaks in a monotone, and questions must be put to him several times before he answers. The picture presented by these patients is a marked contrast to the behavior seen in the manics. Instead of ceaseless activity, we deal with such complete inactivity that even the very simplest needs must be cared for by others. These patients have to be continually urged to move about, and those movements that do take place are slow and deliberate and seem to require extreme effort. In spite of all of this, there appears to be no loss of intelligence or clouding of consciousness, the patient's memory and orientation remaining intact.

Acute melancholia. In acute melancholia the retardation and emotional depression are more pronounced, the patient withdrawing himself entirely from the group and refraining from any spontaneous activity. If spoken to, he sits motionless as if he did not hear. Any answer that is given requires great effort and considerable time, and then the answer is mumbled so that it is almost impossible to hear it. The patient views himself as a great sinner who is responsible for the unhappiness of many others. There is much talk of having committed the unpardonable sin, a sin which apparently has wide variations, and there is a tendency to make much out of trivial incidents. There is much mumbling of "O my God, why did I ever do it," "God have mercy on me," "I can never be forgiven," and talk of being unfaithful. The patient often believes that early sex practices have undermined his health and that nothing

can save him. Many other hypochondriacal signs are present such as, "My bowels are stopped up," "My insides are gone," or "My brain is getting smaller." Sometimes the patient begs to be sent to prison or even to be killed to pay for his sins. There are occasionally feelings of unreality, hallucinations and delusions, particularly of disease, poverty and sin. The intellectual powers, however, suffer no deterioration and frequently there is much insight, the patient realizing that he is ill and needs help. In his depressed condition he gives little attention to the ordinary affairs about him, and consequently there may be some disorientation. The danger of suicide is very great in both acute melancholia and simple retardation.

Depressive stupor. In the extreme state the patient becomes totally unresponsive and stuporous, and his every need must be cared for. He refuses to speak or act and must be tube-fed to receive any nourishment and his bowels and bladder must be cared for. Consciousness is extremely clouded, and no attention is given to anything but his delusions of sin and punishment. Obviously, during this stage the patient's physical health is greatly impaired.

Different combinations of manias and depressions appear in the various cases, and at the present time it is impossible to predict what the course of a given case will be. Types are recognized as recurrent mania, recurrent depression, circular type, and other variations and these are shown diagrammatically in figure 37. Cameron (837) has recently taken the position that elation and depression are not fundamentally opposed metabolic processes. In the absence of any demonstrations of biological polarity, so frequently accepted for these states, he has made a good case for the opinion that the manic attacks are not mere supplements of depressions, but are coördinate affective disorders.

The various manifestations of the manic-depressive psychoses are apparent in the three following cases. A more thorough discussion of the factors involved in such cases will be given in a later chapter on psychotherapy.

Case 8. (Diagnosis: Manic-depressive psychosis, manic.) C. M., female, aged 23, single, Presbyterian, university graduate, Phi Beta Kappa, interested in writing.

Main facts. The patient is a well educated girl of 23, who, following overwork, lost 20 pounds, shortly thereafter became overactive and over productive in speech, which resulted in hospitalization.

Family history. The paternal grandfather died at about the time the patient began to show signs of mental illness. He had been in a hospital for the mentally ill for 25 years. The father, living at 48, had been drinking excessively after working hours for 15 or 20 years but was quite productive economically. He has been away from the family the

greater part of the time, devoted his life to business, and left the guidance of the children almost entirely to his wife. The mother is apparently average, said to be good natured, meticulous, very feminine, extremely sociable, and always on the go. Siblings: the patient is the second in a fraternity of four girls. The third girl, aged 14, is very much overweight, and although very intelligent, is backward, compared to the other children. The children have shown no jealousy of each other. The patient is quite fond of the youngest sister, who is 12 years old. According to the father (who has been there little in 25 years), the home has been happy and the children have been reared in luxury.

Personal history. *Birth and early development* were considered normal. The patient always got along well with children and adults, but has never been aggressive socially. She was more intellectually inclined than her older sister, has made a brilliant school record, was an honor student every year, a university graduate, and was elected to Phi Beta Kappa, finishing college at 21.

Sexual development. Nothing of significance is noted in early life. There is no history of auto-erotic practices. Her menstrual history is not known, except that at times she was apparently mildly depressed during her period of flow. The patient has always met men easily and has had a great amount of attention from them, but was apparently never very much attached to one. She was practically engaged to one man, but broke it off on the grounds that she did not love him. Since her illness, there has been a considerable amount of talk from her concerning sex.

Personality. Most of the patient's interests have been intellectual. She has shown great interest in art, literature, and dramatics, and has done some newspaper writing as a critic. She mixes well with people, enjoys various social functions, but has never been extremely enthusiastic about them. She is usually quite cheerful and friendly, strong-willed and dominating, quite idealistic, though she is not considered a day dreamer. The only mood swings apparent are mild depressions during menses.

Present illness. For some time prior to her present illness, the patient had been working extremely hard on an amateur play, in which she had the leading rôle. She often rehearsed until 3 or 4 o'clock in the morning. She also dieted in order to have a more acceptable figure, and lost 20 pounds, in a comparatively short period. The play was given in the latter part of October, was a success, and the patient is said to have carried out an excellent performance. Three days later, at a social function in honor of the players, the patient fainted, became upset and wept. She was at this time engaged to be married. Two days after this, she was given the information that her grandfather had died in a state hospital for the insane. He had been there 25 years, although the patient understood that he was well. This caused her so much concern that she scolded her father for not having told her. She was considered "nervous" and placed in a hospital. A mental hospital was then recommended and she was brought by her father and nurse. On the way she talked incessantly, was irritable, and diffusely overactive. Much of her content was about sex, repression, etc.

Physical examination. General physical condition good. Slight enlargement of thyroid.

Mental examination. Patient was diffusely overactive. She moved about practically all the time; tore off her clothing; upset ward furniture; threw food about; and at times annoyed other patients and nurses. She was very dramatic, even indulging in dancing, and posing. For a time, she showed no interest in work of any kind. The patient became so overproductive in speech that complete irrelevancy often resulted. In fact, when questions were asked of her, she sometimes closed her eyes maintaining silence or walked away

without answering. Objectively, she appeared to be quite cheerful the greater part of the time, although she frequently became so angry that she denounced patients, and nurses. *Content:* The patient showed quite a religious trend in her content. She said that by giving the other patients her unselfish love they could be cured. To this end she spent much time pleading with patients to have faith in God. There was also considerable spontaneous talk concerning sex (especially of having lived nine years of repression) and of one's physical needs for gratification. She misidentified nurses—calling them various proper names.

Course in hospital. After 48 hours in the hospital, the patient had become much more actively destructive to clothing, much more overtalkative, and upset emotionally. This activity and destructiveness made it necessary to transfer her to a disturbed ward, where for some time she remained practically unchanged. Her physical condition was reasonably good.

After three months in the hospital the patient became much more accessible and the possibility of going deeply into her problems presented itself. It was then discovered that her father had been greatly disappointed at not having a son and the patient had, in a sense, attempted to fill this position. She started to work in her father's business in the hope that she might some day take it over, but she lost interest and turned her attention to social activities. She fell in love with a man ten years her senior who was visiting from the north. In the spring he returned to his home and the patient became downcast and discouraged. They had talked over marital relationships and she said that he was a bachelor at heart who felt "that marriage is one-sided, the man gets nothing from it, the woman everything." She felt that "it would be a shame to change his attitude" although she would have liked a proposal from him and thought that marriage with him would have been successful. She was worried and decided to take a trip to Europe. On her way she stopped to visit friends of hers in the same city where this man was living. She had now decided to "forget it all and to have a good time." She met a number of other boys and saw only once the man whom she had liked. Some of her affairs she took rather seriously and almost became engaged to another man. However, she continued her trip and while in Europe met a Catholic boy. They became very much interested in each other, but the affair did not progress to marriage, although the reasons for this, the patient did not make quite clear.

Speaking of her childhood, she said that she was her father's favorite, but that she feared him. She seldom saw men when little and she recalled that at 3 or 4 years, when she saw her father, she would run to her mother crying. There were a number of nightmares during early childhood, several of which recurred and she recalled some of them vividly.

About the time of the onset of her illness she felt that she was greatly worried by her inability to arrive at any satisfactory occupational outlet or career. Also, she realized that she was trying to find some solution to her sex problems. She did not think the latter was as important as the former, but she recognized during the early part of her illness a marked sexual drive. She said she has had intercourse but once in her life and that this experience occurred on the night before she came to the mental hospital; that is, when she was in the first hospital. The memory is not very clear excepting for certain fragments. The experience seems to her to be a real one, but it is impossible to decide with the present data since she had been narcotized with morphine that day. She was advised that it was not particularly important whether the experience were real or imaginary and that for the time being, if the experience had all of the qualities of reality to her, she should accept it as such.

During her stay in the hospital, the patient completed a written account of the evolution

of her illness. Outstanding in this account is the objective evidence of a profound drive to get married. In interviews with the patient the following elaboration of the problem developed. The patient felt that her father had been badly cheated in his married life. She recalled particularly the incompatibility between himself and wife and the fact that he had always wanted to have a son. The patient admitted that she had more or less desired to fill this rôle for him, in the sense that she had a strong drive to learn his business and be in a position to take it over.

It is of interest that this attempt on her part constituted the first failure she experienced in life. It would seem that the failure was motivated by the fact that to have succeeded would have practically excluded her from any chance of marrying and having a family. In view of her marked femininity, both physically and psychologically, she found herself unable to give up the desire for marriage, a home and children of her own. The solution through marriage was not easy to her, however, for the reason that she was so emotionally attached to her father and his disappointment was always an obstacle to her success in this direction.

Moreover, outstanding among her early memories is an experience that occurred when she was between six or eight years of age. She and her sister slept on a porch just outside the parents' bedroom. She recalled lying awake listening to her father making sexual advances to her mother who, very much upset by them, was crying and refusing to participate. She said that she had a clear knowledge at the time of what was going on, although she did not recall any earlier experience on which to base such knowledge. She did not recall very clearly her emotional reactions to the situation nor did she remember any sexual tension in herself at the time. However, she remembered a dream that occurred subsequent to this experience in which she saw a man crawl through the bedroom window and beat her mother who was protecting the patient in some way from the assault. She does not identify the man, but views the assault as sexual and wondered if there was some connection between this and the experience noted above. She also recalled that she had, up until the last few years, always sided with her father in the controversies between the parents.

The patient was able to recognize that perhaps there had been a sexual component in her attachment to her father, although she considers such an incestuous relationship as psychologically and ethically the most abhorrent of all possible sex acts. In comparing this to such things as homosexual relationships, incest appeared to her far worse.

She was eventually able to understand the over-evaluation on her part of her emotional attachment to the man from the north. She did not recognize that she was so deeply involved with him until he told her that he was not the marrying type and thereby became inaccessible. The moment that she was threatened with his loss, he became for her an excellent father substitute and the emotional attachment was re-enforced enormously by this. Moreover, as long as she was emotionally attached to him and therefore could not marry, she had some excuse for remaining single. This, however, was inadequate in view of her failure to solve either the problem of her business failure with her father or her desire for marriage. There began the series of abortive attempts at marriage, all of which were blocked by the conflicting desires of the patient. When she eventually became engaged, although she decided not to go through with the marriage, she was unable to break off the agreement because the marriage represented to her an escape from the father's domination of which she was not wholly conscious.

Ever since her menstruation began, the patient has been subject to backache of intense degree. The occurrence of this symptom has led to a great deal of attention from the

mother, and the patient has been allowed to remain in bed for a day or so and be waited upon hand and foot. At the time of the reception, at which she finally broke down, the need for taking a decisive step in regard to her marriage was becoming fairly acute as the wedding date was approaching. She had successfully submerged the problem by her intense plunge into her activities, but following the actual carrying out of the play, there was considerable let-down and the problem was unchanged. Thus, at the reception she developed a backache and went upstairs to lie on the bed and cry. She was found there by her mother and was taken home, feeling very faint. It is not surprising that she should utilize such a mechanism which had been successful previously and served so admirably as an escape from the major problem confronting her.

Two days later when she was informed of her grandfather's death in a mental hospital, she was confronted first of all with the fact of insanity in the family and secondly with a more adequate escape from the situation. The development of a psychosis seems to have been unavoidable in these circumstances.

The patient has been discharged from the hospital with the intention of organizing her activities along the following lines. She was advised to diversify her contacts with males, attempting to go with a variety of individuals rather than confining her interests to one, trying at the same time not to become too seriously involved emotionally with any of them. It has been suggested that she postpone any consideration of marriage for 18 months or two years with a view to determining the stability of her recovery and her ability to carry added burdens. To this she is willing to conform. The patient is to obtain some sort of occupational outlet away from her father and in a situation where she is not dependent upon him. These requirements are considered advantageous to her making an adjustment outside of the hospital for the reason that her choice of a love object has, in the past, been dominated too much by her parent and her contacts with more appropriate males have been curtailed. Hence, it would seem advisable for her to have a wider experience with varying male personalities before choosing a life mate. It is also highly desirable that some evidence of permanence, in the stabilization she has obtained, be secured before any thought of marriage is undertaken. Her separation from her father, on the other hand, is necessary because of her former over-dependence upon him.

Case 9. (Diagnosis: Manic-depressive psychosis, depression.) J. R., aged 21, male, single, student.

Family history. Two of the patient's maternal uncles committed suicide and his father made two unsuccessful attempts during a depression.

Personal history. The patient was described as a quiet, shy young man who three years ago had gone through a four week period of depression following a recovery from influenza. He is said to have done fairly well at school but had had to study particularly hard. His father and one uncle were successful physicians and he had set his heart on finishing medicine. At the time of his second breakdown he was in the third year of college and was experiencing great difficulty in the science courses. He returned home from the physics laboratory one evening and went immediately to his room and drank a large quantity of iodine. He was rushed to a general hospital for treatment, was so morose and dejected that he was transferred to the mental hospital. When he was admitted he was in a dull, depressed state, feeling hopeless and much concerned that he had not been learning as he should. It was difficult to get him to talk or answer questions and if he responded at all it was usually in monosyllables. He stated that he was melancholy, that his mind was occupied with morbid things and that he would be better off dead. His general physical

condition was good and his intellectual faculties were not impaired. There was very little response to things about him and he refused to participate in any activity. For the most part he sat in the ward rubbing his head and eyes, beating his fist on the chair and occasionally moaning, "My God, please let me die." He said that he was not as efficient as others, that he could not hold his own and would never be successful. There was much talk about being a burden on others and there was one attempt at suicide within the hospital.

After about three weeks in the hospital the patient gradually began to discuss his problems more easily. It was learned that he had never wanted to study medicine, always had found science difficult, but was attempting to satisfy his father who wanted him to be a physician. He had never done well in science and had begun to believe himself inferior and doomed to failure. An attempt had been made to secure approval in athletics, but he had recently been dropped from the school basketball team. A thorough study of the patient's intellectual and personality traits was attempted and it was discovered that he was above average intelligence, had an unusual facility in language, was a fair tennis player and was greatly interested in finance. Through careful supervision of his activities and discussion of his problems he gradually became more interested in his environment. After four months stay in the hospital he was discharged with good insight into his problems and definite plans for the future.

He has since graduated in law with honors, won the third place on the tennis team of the school and appears to be very well adjusted. A good bit of his leisure time is spent in modeling, an activity which he began at the hospital.

The circular type of disorder running from acute mania to depression with an intervening period of normalcy is well evidenced in the following case. In the depressed phase one sees emotional depression, poverty of ideas, psychomotor retardation and some evidence of somatic delusional formations, while in the manic phase there is a speeding up of both motor and mental processes, considerable overactivity and exhibitionism.

Case 10. (Diagnosis: Manic-depressive psychosis, circular type.) J. M., female, aged 44, married, housewife.

Family history is negative.

Personal history. The patient was a healthy, active child, who was described as being bright and quick-tempered. She was outgoing, fond of social affairs and much interested in sports and put a great deal of zest in everything she did. The patient was married at the age of 20 and for several years was happy and well adjusted. At 28 she gave birth to a child and went through a serious and prolonged labor. One year later she developed a thyroid difficulty and although the operation was successful she was depressed for several months. Several years later her husband suffered some financial reverses and the patient was greatly upset for two months. The husband's business, however, recovered and became better than ever and the patient seemed again happy and satisfied. Two years later the patient became excessively "blue" at her monthly period, cried and said she wished she were dead. She continued to manifest these symptoms in an exaggerated degree and for a longer period of each month for a year. At these periods she expressed the belief that her husband had lost all of his money and that they were penniless. Following this episode she became excited, overactive, and expansive. She spent money recklessly, gave parties and indulged in several flirtations.

She was finally brought to the hospital and since that time has gone through two depressions and two periods of excitement. During the depressed periods she is sad, dejected,

engages in no activity and speaks almost entirely in monosyllables. She frequently takes a minute or two to answer a simple question and then replies in a dismal tone with a single word. She gives the appearance of one who has the weight of the world on her shoulders. Usually she sits with head bowed, brow wrinkled and hands clasped in her lap. Even the simplest request appears to require too much activity and when she does speak it is only to say that she is very sick. She complains that her bowels won't move, that her head is heavy and that she would be better off dead. There has been, however, no mention of self-accusation during these phases.

In the manic phase we would not recognize her as the same individual. It appears to be impossible for her to remain still for an instant. She is all over the ward, dancing, singing, slapping patients and nurses on the back, pulling off her clothes and throwing things about with absolute abandon. She writes poetry and insists on reciting it to everyone near her, monopolizes the conversation and has a flippant reply for every remark that is made by anyone else. In these phases she becomes unusually demanding, and when repulsed is abusive both in language and activity. She hurls, not only remarks, but anything she can lay her hands on at those who refuse her requests. Her ideas are grandiose and she has plans that can't fail to solve the situation. A good bit of her behavior at this time is erotic. She tears off all of her clothing, talks of her sex appeal and of men trying to seduce her and throws her arms about any man who happens to appear. She writes page after page of material, the content of which rapidly shifts from one subject to another and underscores and capitalizes at random.

Up to the present time this patient has been completely unapproachable and practically nothing has been done for her. The therapeutic measures in such cases will be discussed in another chapter.

Involucional melancholia

The wide range of individual differences makes it impossible to state exactly when the involucional period begins and when it ends. It appears, characteristically, earlier in women than in men and roughly may be placed at forty to fifty-five in women and fifty to sixty-five in men.

The disorder must be viewed as a physiological epoch associated with certain failures in the functioning of the glands of internal secretion and resulting in a lowering in bodily health and disorganization of the mental faculties. The characteristic picture is that of a depressed individual who is worried about the past and sees nothing in the future. He or she is concerned with what "might have been" and as a consequence is fearful, anxious and indecisive. The symptoms that are usually present in the involucional psychoses are feelings of unreality and hypochondriacal or nihilistic delusions, anxiety and depression without retardation. While it is true that none of these symptoms are peculiar to the involucional period, their appearance together is usually common at this stage. The appearance of the patient is usually one of agitation and anxiety with a tense and drawn expression. The motor activity varies from mere restlessness to extreme agitation in which the patient paces the floor wringing the hands, pulling the hair, biting the lips while moan-

ing and lamenting about the state of affairs. Such patients appear to be in utmost despair while they cry, "Why did I do it?" "What is going to become of me?" "I can never be forgiven." "Why don't you kill me?" They not infrequently refuse to take food, impulsively attack those near them, refuse to talk and become resistive, destructive and violent. The delusional content often centers about sin and poverty, and suicidal attempts are particularly frequent. The content of thought is usually self-accusatory and self-deprecatory and there is much concern over the unpardonable sin. The patient's apprehensions are not only related to the self but also relatives, friends, the entire hospital and sometimes the whole universe. Although occasionally rich delusional content is elicited, there is more often poverty of thought with much repetition in speech.

MacCurdy's (838) attempt to explain the mental content of the involuntional patients is illuminating. There is an increasing egoism which is equivalent to restriction of external interest. Since pure egoism finds no satisfaction in this life, there follows preoccupation with death. Along with the desire for death, there is, frequently however, revulsion against it since egoism implies resistance to death. The presence, in the same patient, of apprehensions of death together with suicidal attempts clearly shows these two tendencies. Insomnia in these patients may then be accounted for on the basis of the fact that sleep is the symbol of death. Nihilistic delusions appear when the loss of interest in the world is projected. Since things are no longer desired, their existence is denied. The failure of adequate sex hormone production is considered by many to lie at the basis of the disorder, but it should be noted that the involuntional period of life is accompanied by many difficulties in addition to endocrine imbalance. The gradual decline in health and vigor, the increase of chronic illness in family and friends, as well as in oneself, coupled with the realization that time is passing swiftly and that new adventures and the attainment of ambitions are not likely to occur, must all have their influence on the individual. Diethelm (839) and Noyes (840), among others, have given considerable weight to these factors.

The following case illustrates well the general symptomatology of the involuntional psychoses. The patient has marked feelings of unreality, nihilistic delusions, and is depressed, anxious and apprehensive. These symptoms are coupled with a definite regression to an infant level.

Case 11. (Diagnosis: Involuntional melancholia.) F. F., female, aged 50, married, Jewish.

Main facts. The patient is a tense, meticulous person who has been treated for fifteen years for indigestion. At the menopause she became worried and censured herself about

the acquirement of property which was later disposed of at a sacrifice. She was restless, depressed, discontented and went from hospital to resort without improvement. She finally refused food, denied the existence of her family and thought she was "a stone."

Family history. While a number of the members of the family are neurotic no frank mental illness is admitted.

Personal history. The patient was born in Germany, and came to the United States at the age of 16. She had pleurisy, neuritis, and an ovariectomy and appendectomy. She had been treated for indigestion for 15 years. Puberty was established at 15 and was irregular with dysmenorrhea. There was an artificial menopause with flushes following an ovarian operation. The patient was married to a traveling salesman at the age of 17 and has two sons. She was active, tense, enjoyed cards and loved her home. She was rather moody with swings of elation and withdrawal from friends, rather than depression.

Two years ago she bought an apartment house and was somewhat elated over her purchase, but when her husband did not approve she became worried. She was emotional, anxious and began to have a feeling that it must be disposed of. This was finally done at a considerable loss. Several months later she complained of depression, anxiety, and felt that she must leave home. At a health resort there was some improvement but a mild accident accentuated her gastrointestinal symptoms. She could not sleep, was dreamy, had no interest and changed hotels in one city several times. Then she complained of being heavy, dazed and fearful of impending disaster. She became listless and indifferent, denied the existence of things and refused to accept her sisters as her family.

In the first month of her hospitalization she answered all questions with "yes" and "no," "I don't know—don't remember," and was preoccupied, depressed and tearful. Occasionally she would say, "I am too heavy. I can't read or move. I can't do anything. I am a stone." At other times she asked the nurse, "Are you me? I am not me. I don't know why—I am nothing. I weigh only ten pounds. I am little and dirty—it is just like a baby crying." In answer to questions she said, she was "supposed" to have had a husband and "supposed" to have had a family. She thought that every one was against her and that she was the only one left and believed that all those about her were ghosts. She said she had no stomach, called the hospital a prison, misinterpreted the ward activities and denied the existence of everything. She continually talked about her unworthiness and remarked that everything was lost and she would never recover. Her movements indicated retardation and difficulty in execution of activity while her facial expression was one of distress, apprehensiveness and depression. She said she had been a liar and deserved to be punished, that she has had unpleasant thoughts about her family and has treated them badly. Later the feelings of unreality became accentuated and she refused to eat, saying she had no stomach and had turned to stone.

The patient gradually became more childish in behavior and was frequently seen weeping, "me can't—me can't do it—me too little—me too dirty." She crawled about on the floor, refused her food and cried, "Oh my—me so little—you so big." She became increasingly untidy in her habits and resistive to any care, refused to go to the toilet saying, "me don't have to go to the toilet—me don't have to have bowels moved." She had to be bathed, dressed and tube fed and became more and more resistive and abusive. She talked like a baby, muttered to herself and dribbled saliva like an infant.

The patient slowly but gradually improved and began to speak of learning to walk and talk and slowly developed an interest in adult things. Her interests and abilities in occupational and recreation classes were carefully watched and fostered and she began to show a more adult attitude. She was allowed to visit home periodically and slowly began to take over her duties at home. At the present time she has been out of the hospital for 7 years and is doing well.

CHAPTER XIV

PSYCHONEUROSES

It is impossible to overemphasize the fact that there is no definite dividing line between the normal, the psychoneurotic and the psychotic reactions. The normal reactions shade imperceptibly into the neurotic, and the neurotic, into the psychotic. There will obviously, therefore, be many reactions which will be difficult to assign to any particular group. The greatest difficulty here is the deplorable lack of knowledge of what is normal. Despite the fact that we use the term "normal" quite glibly, there has as yet been no extensive and satisfactory study of what is normal. The ignorance regarding the social history of the average individual is astounding. We know practically nothing about the average family, the questions of petty thievery, and sex play among children. These occurrences and many others are thought to be of grave importance in maladjusted individuals, but the foundations for such beliefs are totally unknown.

It is entirely conceivable, therefore, that what is thought to be abnormal by one investigator may be considered quite within the range of normal by another. There is, however, considerable difference between the well-developed psychoneuroses and the normal and between full-fledged psychoses and the neuroses.

The outstanding distinction between the psychoneuroses and the psychoses is that in the former only a part of the personality is affected, while in the latter the change involves the whole personality. Meyer (841) describes it by saying that the psychoneurosis is a part reaction, while the psychosis is a whole one. In our study of the functional psychoses, we found marked disturbances of the mood or affect such as elations, depressions and apathies. While the psychoneurotic may be distinguishable from the normal in respect to affect, the marked disturbances characteristic of the psychotic are not in evidence. The deterioration of intellect and the persistent distortion of reality so prominent in the psychoses are also not present in the neuroses. In psychotic patients, in general, insight is incomplete, whereas the psychoneurotic is apt to recognize that his behavior is irrational even when he is unable to do much about it. The failure of the psychoneurotic to

adapt is a partial failure, and he is consequently nearer to the hypothetical normal than is the psychotic.

Usually the psychoneurotic evidences a bodily or a mental disturbance which is not the result of any structural lesion. The bodily disturbances may be varied in type involving both the sensory and motor fields. Such disorders as tics, paralyses, tremors, anesthetics, paresthesias, palpitations, breathlessness, tachycardia, constipation, diarrhea, vomiting are frequently found. These disorders, as was clearly shown to be the case in the war neuroses, are real, not imaginary. The patient really suffers all of the disagreeable experiences just as if the structural lesion were present. Fear is the outstanding mental sign, and it is frequently accompanied by anxiety states, obsessions and compulsions. The mental causes for the disorder are unknown to the patient, although he often recognizes them as abnormal.

ETIOLOGY

Numerous theories dating back to the time of Hippocrates have been expounded to explain the causes for the development of the psychoneuroses, but we are still a long way from a complete understanding of these factors. At the time of Hippocrates, hysteria, supposed to exist only in women, was said to result from the wandering of the womb to other parts of the body. Charcot (842) found in his patients an inherited taint and therefore considered hysteria a disease of degeneration. Bernheim (843) believed hysteria to be the result of suggestion. Freud (844) traced the hysterical symptoms of his patients back to sex experience of early childhood which had involved psychic trauma. Dejerine (845) offered the theory that emotion and faulty habits of thought were responsible for the formation of the symptoms, and Ross (846) attempted to make Dejerine's theory more complete by applying Pavlov's explanation of the conditioned reflex to the theory of emotional origin of neurotic symptoms. In addition to these theorists there are many who still hold the psychoneuroses to be of physical origin. The experiences with the neurotics in the world war, however, have had the effect of greatly diminishing the proponents of this theory. It is likely that only a careful and painstaking study, of original make-up, of all the forces and stresses of the environment, and of the personal meaning of these stresses, will enable us to understand the causes and development of neurotic behavior.

The importance of heredity has often been referred to, but this importance has usually been based on the frequency with which neurotic behavior appears in the family history of the individual in question. It is obvious that such evidence does not adequately distinguish between

hereditary and acquired traits. Largely because of this difficulty there has developed a tendency to refer to the importance of constitutional factors. The term "constitution" has been used in a variety of ways, and the controversy is clearly presented by Sheldon (847). Malamud (848) has pointed to the importance of constitutional factors and has suggested that the presence of similar traits in a large number of the family antecedents, their early appearance and consistent manifestation in an individual, and the appearance of such traits under conditions which would not cause their appearance in the average person, be accepted as a basis for using the term. In this way he finds it possible to consider individuals as being constitutionally sensitive, obsessive, etc. While this method makes clearer the use of the term "constitutional," it still retains the disadvantage of naming traits rather than explaining them. The possibility that abnormal behavior tendencies may be related to constitutional physical types has been systematically described by Kretschmer (849) and more recently by Sheldon (850).

The development of the individual's personality structure is a very complex problem involving many intricate interactions. The basic biological needs of the organism must be adjusted to the environment in which the organism lives. The organism is, however, a growing one, and adjustments satisfactory at one level of development may be highly unsatisfactory at a later time. At the same time new needs appear, and a changing environment presents new situations. The individual is thus forced to adjust to himself as a changing organism as well as to the environment as a whole. Methods of dealing with conflict situations are developed through trial and error, and their attendant satisfaction and dissatisfaction. The conflict is further complicated, however, by the fact that methods individually satisfying and socially approved at one stage of development bring neither satisfaction nor approval at a later stage. The required emancipation from forms of behavior that have been personally gratifying and socially approved is difficult for many to attain. The new adjustments necessary at the beginning of school, the onset of puberty, the beginning of economic independence or the acceptance of the responsibility of marriage and parenthood are fraught with danger for many.

Early in the process of development the individual derives varying degrees of satisfaction from his trial adjustments. If satisfaction is obtained through compensatory adjustments, resort to ailment, or other methods, these reactions are apt to appear in situations where other adjustments are more appropriate. In the study of case histories

it will be noted that patterns of behavior develop in relation to the group in which the individual lives. The established standards and demands of the group determine to some extent the desires that may be gratified and also condition the methods of gratification. The comfortable and well adjusted individual is able to meet satisfactorily the most radical changes in social organization, but many less fortunate persons do not possess sufficient flexibility to meet the demand. Rigidity of standards within the family or a larger social group may so condition some individuals as to make difficult anything but neurotic reactions to social changes. Religious differences, types of education, gaps in ideologies, and various other interests may present situations difficult to adjust to.

The tendency for the psychoneuroses, especially the hysterias, to manifest themselves in somatic complaints points to the need for an understanding of the organic factors. A consideration of the etiology of the disorders does not seem to reveal any consistent and relevant organic pathology. This, however, does not preclude the possibility of organic disease as an important situational factor. The disease process, quite aside from its organic effects, may be an occurrence of great importance in the life of the individual. From the psychological point of view the disease process may threaten the individual's security and may seriously interfere with his ability to gratify his desires and attain his goals.

The possibility of the use of the experimental method for a study of psychopathology has steadily increased as a result of the valuable research on the experimental neuroses. The observation that stimulated this experimental work was made in connection with the studies of conditioned reflexes in Pavlov's laboratory. A dog was conditioned to secrete saliva when a circle of light was thrown on a screen and was then trained not to salivate to an ellipse with a ratio of semi-axes 2:1. As a test of fineness of discrimination, a series of ellipses was then used with shapes that gradually approached that of the circle. The dog succeeded in making the discriminative response between the circle and the ellipse until an ellipse with semi-axes 9:8 was used. At this point the dog failed to make the discrimination, and its discriminative ability deteriorated to a point where even the easy discriminations of the early part of the experiment were lost. At the same time the whole behavior of the animal underwent a marked change. While formerly a quiet dog, he now whined, barked, tore off the mechanical apparatus and bit through the tubes connecting the animal's room with the observer.

The condition of the animal was then referred to by Pavlov (851) as an experimental neurosis. Investigations of experimentally produced neuroses have been continued by a number of workers in this country. Gantt (852) has shown experimentally induced abnormalities in respiratory, circulatory, urinary, sexual and muscular activity in addition to social relationships.

Liddell (853) has taken exception to Pavlov's position that the cause of the abnormal behavior is a clash between intense cortical excitations and inhibitions. He points out that animals allowed to run at will in a maze attempting to solve difficult problems do not develop disturbances but will become neurotic when confined in the laboratory. The experimental neurosis is viewed by him as being caused by the equivalent of a human conflict situation, and considerable attention is given to the loss of neuromuscular freedom. This position has been verified by Curtis (854) using the pig, Demmick, Ludlow and Whiteman (855) with the cat and by Cook (856) and Witkin (857) in the rat.

Maier (858) has reported the production of abnormal behavior in the rat under conditions of frustration. Morgan (859) has challenged Maier's conclusions, claiming that the abnormal behavior in the latter's animals was not obtained in the absence of an acoustic stimulus. Morgan further reports that he was able to produce the abnormal behavior in rats as frequently with auditory stimuli alone as with auditory stimuli accompanied by conflict.

A large number of careful observations have been made by Anderson and Liddell (860), Anderson and Parmenter (861), Dworken (862), Gantt (863), Masserman (864), Liddell, James and Anderson (865), but the variety of phenomena observed is too extensive to be reported here. Liddell (866) has recently presented a very adequate summary of the experimental work in this field along with some theoretical considerations. Finger (867) has presented a good summary of the experimental behavior disorders in the rat. Practically all of the investigators caution against the attempts to apply directly the results of animal experimentation to human behavior. It would be a mistake to identify the experimental neurosis of animals with the human psychoneurosis, but the similarities in objective manifestations cannot be disregarded. The origin of the abnormal behavior in the animals suggests similarity to the human situation where difficulties arise under social pressure.

Experimental productions of behavior disorders in the human have, of necessity, been somewhat limited. Krasnogorski (868), using the conditioned reflex techniques of Pavlov, has produced behavior dis-

turbances in children by difficult differentiations and delayed reactions. Under the experimental conditions, the children showed reactions similar to those of Pavlov's dogs. These symptoms included loss of the conditioned reflex, restlessness, irritability, asocial behavior and refusal to return to the laboratory. Luria (869) and others have experimented with artificial emotional complexes produced in subjects under deep hypnosis, and Miller (870) has presented an excellent survey of various experimental studies of conflict.

The experimental method has opened a valuable testing ground for the hypotheses of psychopathology which becomes a useful adjunct to the historical and analytical approaches to the subject.

The classification of the psychoneuroses into various types is a particularly difficult matter and one on which one finds little agreement. Many clinicians see no reason for differentiating neurasthenia from psychasthenia, and the status of the compulsion and anxiety neuroses is quite uncertain. Some attempt will be made in this section to classify the main types, merely for purposes of explanation, but it is hoped that the reader will recognize that there is considerable overlapping and that the matter of classification is not of prime importance.

NEURASTHENIA—THE FATIGUE SYNDROME

Neurasthenia is frequently designated as the fatigue neurosis in which both physical and mental fatigue are apparent. Since the fatigue complaint may be apparent in the hypochondriac, the hysteric, the compulsive, and in the anxiety state, the authenticity of neurasthenia as a specific syndrome has frequently been questioned. There are, however, a large number of psychoneurotic people whose complaints center primarily about fatigue and for whom neurasthenia is the preferred diagnosis. Historically neurasthenia has been used to describe those who constantly complained of being worn out, exhausted and weak or those who had to avoid even mild exertion in order to avoid fatigue. In addition, such patients usually complain of not being able to sleep, of being hypersensitive to light, to sound and to what are minor annoyances for most people. The symptoms usually include headaches or pressures on the head and difficulties in remembering and concentrating. There are usually hypochondriacal complaints directed to specific organs, but these are incidental. The characteristic fatigue reactions are unlocalized and nonspecific and thus distinguish the syndrome from hypochondria or hysteria.

The fatigue syndrome, or "nervous exhaustion," was for a long time

considered to be the result of an actual depletion of essential biochemical materials that resulted in a weakening of the whole nervous system. The Weir Mitchell treatment was aimed at the correction of this nervous system exhaustion and provided for complete bed rest. The treatment came to be known as "rest cure" and protected the patient from lights, sounds, and unnecessary movements. Massage and mild electric stimulations were given, and a special diet, rich in the ingredients supposedly drained off by their exhausting activity, was provided.

The failure to demonstrate any actual nerve cell depletion in such cases, coupled with as good or better results in the absence of such treatments, finally eliminated the method of treatment and the conception of the illness. The attempt to explain the fatigue syndrome in organic terms was then carried on by shifting the blame from the nerves to other organic structures. Thus some clinicians took the position that the heart and blood vessels were constitutionally incompetent, and consequently easy fatigability, accompanied by rapid heart beat or palpitation following mild exertion, was diagnosed as "neuro-circulatory asthenia." This position, however, appears to have no better foundation in physiology than the older nerve exhaustion theory.

The neurasthenic shows considerable irritability, the smallest setbacks in the environment having the tendency to upset him completely. Hypochondriases, anesthetics and paresthesias are frequently present. Sometimes the emotional irritability is displaced by emotional exhaustion which results in varying degrees of depression. The patient is much preoccupied with his discomfort and finds it exceedingly difficult to center his attention on anything not definitely related to it. There is easy distractibility, the motor activity is slow as is the flow of ideas, and there is marked lack of spontaneity. The above picture may adequately describe experiences more or less common to all of us in periods of emotional stress. The point to be noted is that in the neurasthenic the reaction to the situation is excessive. The reactions manifested by these people are not essentially different from the normal in kind but in degree. In other words the difference is quantitative rather than qualitative. This may suggest that recovery may correspond roughly to the proportion of change in the situation.

The question of etiology is a much involved one. Heredity has long been mentioned as an important factor since mental disorders have been numerous in the ancestry of neurasthenic patients, but we must keep in mind the fact that we know practically nothing about the comparison with the ancestry of the so called normals. We must also con-

sider the fact that the patients have had to live with these unhealthy relatives, and their conflicts with this environment may be of greater importance than the inherited constitution.

Since fatigue has been mentioned as the outstanding characteristic of the clinical picture, it is natural that many theorists should allude to overwork as the principal causative factor. It is interesting to note, however, that the histories of the neurasthenics seldom show a record of excessive work, and there is an increasing amount of evidence which points to the substantiation of at least one old adage, "It is not work but worry that kills a man."

Freud (871) early considered neurasthenia to be the direct result of excessive masturbation, but other members of the psychoanalytic school consider the reaction to follow some conflict over masturbation, or some conflict plus the discarding of the habit.

A theory which has much evidence to substantiate it, is that the immediate cause is the prolonged emotional strain over difficulties which seem unable to find expression. It is, indeed, a common experience to find profound emotional disturbances exhausting. One needs only to call to mind the feelings of complete exhaustion that he has experienced following any extreme emotional incident. For example, it is a well known fact that the coach of a team is frequently much more completely exhausted after an important and closely contested game than are any of his players who have actively participated. If this situation of excitement, anxiety, anticipation and competition were to continue for a long period of time, the exhaustion might be expected to continue, and it may be upon the continuance of this emotional state that the neurasthenia depends.

The conditions under which normals complain of fatigue furnish a good starting point for the understanding of the pathological fatigue complaint. The average person suffers from fatigue when he has not had sufficient rest or sleep, when he has overexercised or overworked, or after prolonged anxiety or frustration. At such a time the normal person avoids new or continued activity. If one is fatigued, one is excused from further participation. The fatigue of normal persons as a result of monotonous or distasteful work, listening to boring conversations or experiencing situations fraught with frustration and anxiety, differs only in degree from the pathological fatigue syndrome. What remains to be understood is why some individuals evidence pathological fatigue. Since the verbal complaint of fatigue is a learned one, much will depend upon the early family training. If weakness and

fatigue complaints earn privileges and bring satisfactions, they may be expected to become habitual. If adults in the environment are constantly complaining of fatigue, they may be expected to be imitated. Over anxious and solicitous parents may also foster the adoption of the fatigue complaint in their children. In questioning young boys about their activities in groups, one frequently discovers that many youngsters avoid vigorous games with such statements as "My mother says that I am underweight or I am not strong enough." Such a child has accepted his mother's opinion of himself and is now over attentive to all signs of fatigue. The situation is further complicated by the fact that such a child now expects special consideration and is upset when the outside environment does not adopt the expected parental attitude.

The individual must be considered as having developed his way of reacting to present situations out of the complex experiences of his own life. Each person experiments with a wide variety of adjustive techniques and develops some more or less habitual response patterns on the basis of the success attained in their use. Since some environments offer unusual opportunities for the use of the fatigue complaint, both as a means of relieving individuals from unpleasant situations and as an excuse to others and to the self for real or imagined failures, it is not surprising that for some, this should become a habitual adjustive technique. The fatigue reactions may persist and spread until they form the central theme around which life is organized. It is important to recognize that fantasy such as erotic day dreaming involves one in skeletal and visceral reactions which may have far-reaching fatigue effect. The conflict between need and ethical standards or between desire and opportunity results in fatigue, and unfortunately the life of relative seclusion which the frightened, fatigued patient may adopt provides a favorable setting for continued emotional conflict and the exaggeration of the fatigue complaint.

The prolonged emotional strain due to the inability to find expression and the resulting symptoms of exhaustion may be clearly seen in the following case.

Case 12. (Diagnosis: Neurasthenia.) J. R., aged 24, female, single, stenographer, Methodist.

Family history is essentially negative.

Personal history. The patient was a shy, sensitive child who early gave evidence of a desire for solitude. She was unusually tall and gawky, and as a consequence was frequently teased and shunned by her playmates. When a young girl, the patient was particularly fond of games, but her extreme size and poor motor coordination led to so much raillery from the other children that she gradually refused to play. Most of her time was

spent in reading and taking long walks in the country alone. At school she was better than the average student, but had great difficulty with her teachers who complained that she did not take kindly to criticism and was unusually irritable.

The home situation was a rather unwholesome one. The only other child was an attractive, outgoing girl, three years younger than the patient. This younger sister had always been favored by the family and was popular with her classmates as well as teachers. The father was a stern task master and unsympathetic toward the patient's difficulties. In addition, her mother showed open disappointment in the patient, especially in adolescence when many young men came to see the younger sister, but no one called on the patient. The only other member of the household was a paternal aunt who, while she was sympathetic to the patient, was fearful of the father.

About a year before hospitalization, the patient began to complain of exhaustion, loss of appetite, indigestion and insomnia. She said that she was too weak to get out of bed, was unable to go to the office where she was employed as a stenographer and even refused to read, saying that she had "no energy." She also spoke of a numbness in her left side and became increasingly irritable and demanding. Her condition grew steadily worse and she was brought to the hospital.

Here, she was preoccupied with her emotional life and physical symptoms. She seemed unable to concentrate and continually told the physicians that she was suffering from exhaustion, indigestion, constipation and a numbness in the left side. It became evident that she was spending much of her time in fanciful experiences, and although she said that she was too tired to get out of bed, she frequently got up and wrote in a diary when she thought that she was not being observed. On several such occasions she was seen dancing about the room.

The sensation of numbness in her left side, it was discovered, had accompanied her earlier menstrual periods and had been the cause of much alarm to her aunt who gave her considerable attention when these appeared. The return to these symptoms at the time when she was in need of consideration appeared to be an obvious appeal for sympathy. The girl had never been able to compete with her sister or her friends and, when her mother made the situation so unpleasant for her only admirer that he ceased coming, she turned to physical ailments as her only way out. The prolonged emotional strain, which was unable to find expression, left her no other alternative. The patient was gradually given an understanding of these facts and developed considerable insight into her condition. After four months' stay in the hospital she was dismissed and at the present time seems to have made a good adjustment. She is living in a city, at some distance from her family, where she is working successfully on a large newspaper.

ANXIETY STATES

From the beginning of life, all individuals are subjected to situations which are threatening and for which adequate and satisfactory adjustments cannot be attained. Frequent emotional excitants in the absence of opportunity for emotional satisfaction result in anxious tensions that are common to all people. Anyone may recall in his own life numerous incidents which will give an understanding of the normal anxiety experience. In the presence of any threatening situation for which there is no adequate and satisfying adjustment, the individual

is left in a tense, apprehensive state of readiness for direct action that is impossible to take. Such an emotional reaction is slow to die, diffuse and acquires very easily new excitants. Consequently, the anxiety is likely to spread to new situations and to result in exaggerated and inappropriate responses to stimuli ordinarily given little attention.

The normal anxiety reaction may be biologically useful and, like pain and fear, may be helpful to the individual in enabling him to protect himself from dangers and to be more prompt and vigorous in threatening situations.

The protective and preparation advantage of anxiety may, however, be greatly overdone and result in pathological and disabling anxiety. Anxious adults may set the pattern for development of exaggerated anxiety in children. Overprotective parents may set up so many guards about their children that all situations may be viewed as potentially dangerous. Uneasy anticipations may thus become attached to any new experience. Perfectionistic training or the presenting of adult problems and adult uncertainties before the child may provide additional soil for the development of anxiety that may become pathological.

While the insecure child is more likely to be the anxious adult, it must not be assumed that such a background is necessary for the appearance of exaggerated anxiety in adult life. Prolonged stress or strain in those who have earlier been quite secure may eventually result in pathological anxiety at any age. Indeed in middle and old age the loss of ability, charm and vigor, coupled with the realization that time is running out, provides the setting for considerable anxiety in individuals who have formerly been quite secure.

Freud (872) and some of his followers distinguish two separate states referred to as "anxiety neuroses" and "anxiety hysteria," but it is believed by the writers that all such cases may be classified as anxiety states. Anxiety components may be present in many types of mental illness, but seldom if ever do we see the pure form of anxiety neuroses as described by Freud. The type, however, described by him as "anxiety hysteria" is very common, but it is believed that the term "anxiety state" more adequately describes it.

Any somatic symptom may be found in the anxiety states, while the mental symptoms are principally apprehension and fear. The most frequent fears are those of death, and insanity and these are accompanied by an inability to concentrate, tendencies toward irritability and excitability and depression.

Freud claims that the basis of the anxiety neuroses is always in the

sexual life and always in the present. Thus, according to him they differ from the hysteric or obsessive-compulsive states in that the latter are supposed to depend on repressed sexual experiences in very early childhood. The morbid anxiety exhibited by the patients is supposed to depend upon the differences between sexual excitation and sexual satisfaction. In cases where the satisfaction is not sufficient, the surplus excitation appears in bodily symptoms such as palpitations and in mental experience it displays itself as fears and anxieties which may be either definite or vague.

Adler (873), on the other hand, believes that anxiety states appear when the strivings for self assertion cannot be satisfied.

The opinion that anxiety states may arise from many sources other than sexual needs is clearly stated in the following quotation taken from Henderson and Gillespie¹ (874):

It may be said with confidence derived from clinical experience that the origin of anxiety states may be found in all the types of conflict of individual needs with reality, and not simply of his sexual needs. It may be contended by Freudians that anxiety arising from ordinary every day conflicts does not give rise to a pathological condition. The anxiety remains consciously attached to its exciting cause, whereas in morbid conditions, the anxiety is displaced from its excitant (usually an "unconscious wish" which is said to alarm the ego) to some idea which is indifferent to consciousness. This displacement, the Freudians would add, is peculiar to sexual excitants, since they tend to be socially and individually tabooed, while business worries are not. But clinical observation shows clearly that when anxiety arises from whatsoever cause it diffuses itself generally throughout the mind, that in the course of its diffusion it becomes concentrated again in a manner determined by the individual's mental history to some special topic in itself apparently of indifferent emotional value, and that a state of morbid anxiety results. And this occurs whether the original cause of the anxiety was of a financial, domestic, or sexual kind. That a patient who superficially bears the marks of an anxiety neurosis in the limited Freudian sense may on closer examination be discovered to be suffering from an anxiety state dependent on many factors, and not only on sexual ones, was apparent in the case of:

Case 62. A man of 39 who complained that he had fear of open spaces, of large rooms and of meeting people. The reason he gave was that such situations produced "panics" in which he felt giddy, trembled, had curious sensations in his legs and saw everything as if through a mist. The panic lasted sometimes for many minutes, and in the intervals he was more or less always apprehensive of them. He had been subject to occasional panics in open spaces or large buildings since later childhood, but this had not interfered with his work until four months before he came for advice. They had increased in frequency until he was entirely disabled. The first panic of any kind had occurred in a school room when he was eleven years of age, when there was an epidemic of mumps in the school and the patient feared he might be infected. Suddenly he felt a lump in his throat, and

¹Reproduced by permission from Henderson and Gillespie, *Textbook of Psychiatry*. Oxford Univ. Press.

wondered if it meant mumps. A schoolmate said, "You look pale—are you ill?" and the patient promptly became very much afraid and had a panic similar in all respects to those from which he suffered in later life. The patient was a married man, with one child. For some years he had suffered from premature ejaculations and his wife in the last eighteen months had seemed very cold towards him. He had a feeling of guilt with regard to her, because he had flirted a good deal about a year ago. He had a recurring dream of missing a train, sometimes accompanied by an emission. In addition to this, he gave in response to inquiry the information that he was in business or partnership with his father-in-law. Business had not been going well for two years past. He was in some awe of his father-in-law, feeling that he was inferior to him, and was afraid to discuss business with him. Another relative was in the same business and the patient did not get on well with her. His financial affairs were in a serious muddle. Speaking of his family and financial affairs, and not the specifically sexual ones, he said—"I never talked to anyone like this before. . . . They were subconscious. . . . I had always shelved these things."

It is sufficiently clear that to have confined the investigation and the aetiological responsibility to the unsatisfactory nature of his marital relations would have been to blind oneself to the majority of the causative factors, and so to repeat the error made by the patient himself.

The experience of the authors is wholly in accord with the point of view presented above.

PSYCHASTHENIA

The disorders to be discussed under the term "psychasthenia" are characterized chiefly by obsessive and compulsive behavior, and are therefore sometimes referred to as the obsession or compulsion neuroses or, in some schools of thought, as the "obsessive-ruminative" and "obsessive-compulsive" states. According to the latter classification, the clinical difference is that in the "obsessive-ruminating" types, the preoccupation or ruminations do not appear as compulsive acts.

The most prominent symptoms in psychasthenia include phobias, obsessions, compulsions and feelings of inadequacy.

The phobias are abnormal or morbid fears. They are intense and paralyzing, despite the fact that the individual may realize that there is no rational basis for such fears. Notwithstanding this recognition, the patient appears to have no control over them. The fears, or phobias, may occur in regard to any situation, but the more prevalent ones are fear of closed places or fear of high places.

A partial list of the phobias follows:

- Claustrophobia: fear of closed places.
- Acrophobia: fear of high places.
- Agaraphobia: fear of open places.
- Hematophobia: fear of blood.

Misophobia: fear of contamination.

Achlophobia: fear of crowds.

Zoöphobia: fear of animals or of some particular animal.

The obsession may be defined as a constantly recurring idea which the individual recognizes as irrational, but of which he is unable to rid himself. A mild degree of the behavior is well within the realm of normal experience. Practically everyone has had the experience of having a tune persistently running in his head. The abnormal obsessions are of a much more aggravated nature and usually concern peculiar things.

The compulsion may be defined as an irresistible act which the individual recognizes as irrational but is compelled to carry out. The more extreme compulsions are irrational impulses to steal (kleptomania), or to drink (dipsomania), or to set fire to things (pyromania). Sometimes the patient feels the compulsion to touch something, to step on all of the lines of a cement walk, to count or touch all of the posts that are passed, or to wash the hands. The terms, "obsession," "compulsion," and "phobia" have not always been clearly used in the literature. The following statement of Morgan's (875) will clear up the question:

We believe it would make for clearness if the term "phobia" were used exclusively for the persistent fear, "compulsion," for the irresistible act, and "obsession" for the persistent association. . . . To be sure they often go together. For example, suppose the person had the idea persistently that the hands were dirty. If, in spite of repeated washings, the idea kept recurring to the extent that it interfered with his work and annoyed him, it would be an obsession. If he had the fear that they were dirty and constantly guarded them against contamination, this would be a phobia, a fear of contamination. Now, a person might have all three, but the three terms describe three aspects of his condition, and it is possible to have one or more in different combinations.

The term "psychasthenia" was introduced by Janet (876) and means literally a diminution of psychic energy. Janet believed the condition was a partial disintegration of the personality brought about by a lack of the energy necessary to maintain normal integration.

Freud (877) explained the genesis of the obsessive-compulsive states in the following way. There is present in the patient's mind an idea which is in itself indifferent. In the ruminative states there would be the substitution of an idea, and in the compulsive states, the substitution of an act. Later Freud stated that the obsessive or compulsive state could occur only where the patient had had an early experience of sexual seduction (the patient playing the passive rôle), followed by

an act of sexual aggression. These memories are repressed, and the ego defends itself by means of obsessive thoughts and compulsive acts.

The desire to keep some unpleasant thought out of one's mind by continually thinking of something else exemplifies the obsessive thinking in its simplest form. In many instances the obsessive idea remains as a habit even after the necessity for repressing the unpleasant thought is past. Freud recounts the case of a woman who was constantly brooding over such a question as "Why must I breathe?" It developed that she feared that she might become insane, and in order to reassure herself and become free of the thought she had begun to interrogate herself on many problems. At first this relieved her, but eventually this habit of speculation completely replaced her fear and persisted for years.

It seems logical to assume that the psychasthenic reaction is a special defense against prolonged states of anxious tension. In its simplest forms it is often manifested as a compulsion to avoid certain sets of stimuli to which the patient has characteristic sensitivity, and in its more elaborate forms it interposes between the subject and the noxious situations, activities in the form of obsessive thinking and compulsive acting. In these conditions the patient is properly oriented to objective reality and understands his behavior as abnormal.

The principal types of experience which have been considered in the literature as important sources of anxiety and fear reactions are (1) the perception of the presence of an actual external threat; (2) the induction of fear by example or instruction; and (3) the continued frustration or threat of frustration of biological drives.

The dangerous and morbid situations encountered in modern warfare constitute a serious external threat to which some react by developing obsessive and compulsive behavior. A wide variety of such external threats may form the soil out of which compulsive behavior develops. A good example of this type of reaction is given by Woolley (878) in the case of a young man who had shown no abnormal fears but initiated a phobic compulsive syndrome with fear of thunder storms after being struck by lightning.

The appearance of the psychasthenic syndrome induced by example or instruction occurs often following a severe illness or some other situation in which the patient is the object of great anxiety and over-concern. Often the parents have been told by the physician not to oppose the child's wishes in order to prevent the child from becoming nervous and anxious, and the child becomes the object of great solicitude. The child's ability to dominate the environment is greatly enhanced, and adjustment to a normal level is difficult. In other cases the child

may pattern his behavior after that of some psychasthenic adult close to him.

The third source of origin is the one most frequently discussed. The fact that unsatisfied biological needs may leave the organism in a state of unresolved tension which gives rise to anxiety cannot be denied, and it makes little difference whether we refer the source of this situation to the frustration of biological drives or to a conflict between desire and fear.

The desire-fear antagonism, or the threat of frustration of biological drives, may develop in a number of ways, all resulting in the appearance of anxiety and tension states. In some instances adequate opportunities for satisfaction may be available in reality, but unattainable because of limitations of capacity or because of more or less permanent opposition between biological drives. The tension may also develop from the presence of an external threat that prevents satisfaction in the face of satisfying possibilities otherwise available. Finally, tension and anxiety may develop from the fear of danger to the organism in a situation in which adequate satisfying possibilities are unavailable.

The threat of frustration and the presence of desires antagonistic to each other are not unusual situations; they occur almost constantly in the lives of all people. Usually, however, these conditions merely postpone the satisfaction of drives and are not productive of states of abnormal tension. It is only in situations in which the satisfaction of one drive constantly prevents the satisfaction of another that abnormal tension states result.

It is not advisable here to go into a long discussion of the relative importance of drives and the possibilities of distinguishing between native and acquired ones. It is sufficient for us to note that some, especially those in which there is a direct physiological demand for satisfaction to the organism, are relatively strong and without social restriction would discharge themselves directly whenever the need arose. The organization of society is such, however, that the satisfaction of desires must frequently be delayed or inhibited because social approval is lacking. Indeed, one of the conditions of survival may be the giving up of modes of satisfaction which do not meet with the approval of others. This situation itself will make for conflict, since many opportunities for direct satisfaction will occur, which if utilized, immediately violate or threaten the need for social approval. Thus the pattern of social acceptance set by the environment becomes important.

In some instances the desire is for something which is unacceptable

to the individual because it conflicts with his moral code or ideals. In its clearest form a young man fears that he will take part in perverted sexual acts but is certain that he has no desire and, as a matter of fact, feels marked repulsion toward the idea. More frequently the fear is transferred from its original source to some associated object. This is exemplified in the case of the young man who had such a persistent fear of handkerchiefs that for three years he was unable to use one unless he supervised the washing and ironing of it. The handkerchiefs were associated with an affair he had had three years before with a young woman, at which time he had been overwhelmed with both desire and fear.

The development of obsessional thinking occasioned by a conflict between a desire and a fear is evidenced in the following example. A young man came to the author complaining that he was afraid that he would kill his aged father. He was obsessed with the idea that he should drop some poison in his father's coffee cup. It was discovered that he had been failed recently in an examination by a young instructor and that his failure prevented his continuance of study in his chosen field. Shortly after this event, the president of the university had proposed that he be completely dropped. He had entertained many ideas of what he would like to do to both of these gentlemen and had had a disagreeable scene with them at which time he felt that he might faint. He was so enraged that he struck a man who happened to bump into him on the way home. He was arrested for this offense and began to feel that he might be going crazy. He then feared that he might kill his father. The desire, or wish, followed by fear was obvious in this patient, and the transference of this fear to his father was further shown by the fact that at his death the patient would be relieved of all responsibility and free to do as he pleased.

The Freudian view that the basis of obsessions lies in the attempt of the ego to keep intolerable ideas out of consciousness by substituting other indifferent ideas is merely a restatement of the desire-fear antagonism. In the compulsive forms of the disorder the patient substitutes an act, instead of an idea, for the original idea. A young boy interested in athletics developed a compulsion to touch every tree that came into view and felt impelled to retrace his steps if he missed one. The genesis of this act was found in the fear that he would not be selected for the group to give the gymnastic exhibition at a national meet. He formed the habit of touching every tree he passed in the hope that this would bring him luck, and the compulsion remained after the exhibition was over.

The attempts of the Freudians to explain obsessive behavior entirely on the basis of repressed sexual ideas or acts is far from adequate. In many obsessive patients there exist, along with the different obsessive ideas, memories of sexual misdeeds of the type claimed by Freud to be always the foundation of the obsessive illness. Repression and dissociation are undoubtedly primarily involved in the psychasthenic's difficulties, but the contention that the repression is always sexual in nature is not demonstrable. The methods used in arriving at such conclusions, while ingenious, are entirely unsatisfactory.

A much more satisfactory point of view is to consider that external threats, continued frustrations, and instruction in example by fearful individuals constitute the soil in which anxiety and tension flourish and psychasthenia results. In a large number of patients it is likely that all three of these conditions will be present to some degree, though the prominence of one may almost completely shade the others.

In view of the fact that a state of anxiety or fear in an individual leads to an exaggeration of the fear response to a new stimulus, and since prolonged insecurity appears to be the basic requirement in the development of most pathological fear states, it may be well to note the part played by inconsistent discipline during childhood in the etiology of the disorders.

That the discipline imposed upon the child has an important bearing on his later responses no one can deny. It is not contended here that irregularities of discipline are entirely responsible for psychasthenia or even that they are always present in the development of such disorders, but merely that their importance has been neglected. The erratic discipline may be seen as preparing the ground by furthering underlying insecurity. In the same category may be placed the over-severe disciplines usually administered by withdrawal of parental affection, maternal tears and pleadings, and other emotional stresses, rather than by physical punishment. The best treatment of this topic is presented by Woolley (879) who states that erratic discipline as exhibited in his reported cases comprises the following points:

(1) There is no consistent adherence to any rules. The child may frequently indulge in unapproved or unapprovable behavior without any attempt at correction whatever. On the other hand, he may frequently be punished for behavior that is insignificant or at other times approvable.

(2) The criteria for correction appear to reside in the emotional state of the adult rather than in the conduct of the child or any social implications of his behavior.

(3) The discipline for similar behavior may range from nothing at all to the most severe physical punishment, and punishment of any grade of severity may follow in quick succession punishment of any other grade.

(4) When punishment is inflicted, it tends to be over severe.

In other words, the disciplinary setup is totally erratic and inconsistent, lacks pattern and tends to be severe in contradistinction to strict.

While indecisive and erratic behavior may be influenced by the cultural level, it is particularly influenced by and related to parental insecurities. The insecure parent imposes his insecurity upon the child. Not only does the child have no solution to the problems, but no one else has either. It is also important here to consider the ambivalent attitude of the parent to the child which results in the development of a similar attitude of the child toward the parent. Emotional tensions must certainly arise when both unbearable punishment and overwhelming love are inflicted on the child. In a setting of this kind it is impossible for the child to form any habits of behavior that will uniformly protect him from sudden punishment. It is difficult to learn any rules of conduct since any acts, even those formerly given approval, may result in extreme unpleasantness. He approaches his contacts with reality with a degree of apprehension and doubt, and decisions become peculiarly difficult for him. No matter how correct or moral or proper his conduct may be, as he sees it, it may still meet with disapproval and criticism on the part of his primary point of reference, the parental authority. If that authority is secure, there may be little danger, but when it is vacillating, emotionally governed, and insecure, there is little possibility of security for the child. Thus he builds up continuous anxiety and tension with undue apprehension and tries to make his behavior conform to a strict framework that may result in a minimum of difficulty.

Since the form of discipline imposed upon a child is something that usually can be ascertained and established as an objective fact, it therefore offers a tangible approach from the standpoint of treatment as well as prevention. In a family where one discovers children suffering from night terrors, stammering and other indications of developing anxieties, it might be well to go into the question of the disciplinary management of the children.

Numerous involved explanations have been offered for the development of the phobias, but a perusal of clinical cases offers considerable evidence for the theory that the disturbances are the results of faulty habit formation which may be explained by association in exactly the same way that learning takes place in the normal process. The attitude toward features of an environment depends primarily on past

experiences, and these experiences affect our behavior by means of association or by conditioning processes. The significance of these conditioned stimuli is that they themselves may set off the conditioned fear response and become meaningful stimuli, though they derive their force from the fear that was a part of the original fear situation.

The position may be made somewhat clearer by noting that anxiety and fear are emotions which have to do with the preparation for or tendency to carry out defensive responses. It has been pointed out that even organisms low down in the evolutionary scale exhibit total actions of avoidance and that in the more complex organisms there are adaptive part responses which become more or less stereotyped with repetition.

The most direct fear response in man, as in lower animals, consists of flight or avoidance. The development of reactions of avoidance are then understandable on the basis of the fact that the fear reaction tends to dissipate more quickly if the organism is enabled to escape from the vicinity of the offending stimulus.

Flight, however, is not the only method of avoidance, and consequently stereotyped part reactions of various kinds may appear in the conditioning process. Ritualistic hand washing removes the dirt; anti-septics destroy germs in the mouth and throat; and if there is no real way to render the threats harmless, then resort may be had to magic. If these reactions serve to dissipate the fear, they tend to become routinized and ritualistic.

In conclusion we should say that the specific causes appear to be stresses of prolonged emotional insecurity resulting from external threats or induced by attitude and example of dominant figures in the individual's environment. These emotional tensions become associated with certain objects or situations as the result of conditioning experiences, and this association gives rise to phobias, obsessions, and compulsions. A group of defense reactions is then developed, including primarily the fundamental biological reactions of defense and avoidance and, in addition, partial adaptive defense reactions, the form and content of which are determined by conditioning experiences.

HYSTERIAS

Hysteria is one of the oldest of the known mental abnormalities and is probably of greater interest to the general psychologist than any of the other disorders. The term "hysteria" is derived from the Greek word

ὑστέρα meaning uterus. The Greeks believed that the disorder was restricted to women and was a disease of the womb. The term, at the present time, in no way indicates the complexity or wide range of the disorders grouped under it, for it is now used to cover a particularly wide range of phenomena from the hysterical fits of laughing and crying which may come within the scope of the normal to the complex disorders of multiple personality. All attempts to show an organic basis for the manifestations of hysteria have failed, and consequently there has been considerable theorizing concerning the nature of the disorder. Undoubtedly many have failed because of the tendency to explain the disorder by referring to some specific factor and failing to recognize the fact that any attitudes are the results of a large number of experiences.

Theories of hysteria

Charcot (880). The value of Charcot's work was principally the stimulating effect that it had on many later students such as Janet and Freud. Charcot was principally concerned with symptomatology. He attempted to show that certain sensory and motor disorders were present which did not depend on actual destruction of tissue or which were inconsistent with organic findings. He then pointed out that we were dealing with functional disorders since the symptoms depended upon disturbance of the functions only. He was interested in the phenomena of hypnosis and in their relation to hysteria. He was not, however, cognizant of the fact that the symptoms of hysteria could be learned by the patient.

Babinski (881). To Babinski we must give credit for bringing to the fore in hysteria analysis the fundamental feature of suggestion which had been ignored by the earlier investigators. He maintained that suggestibility was the most salient characteristic of hysteria and that the disorders were produced by suggestion and removed by persuasion. He pointed out that the anesthetics, hyperesthesias, etc., were usually the product of suggestion by the physician and showed quite clearly that in many instances the patient was manifesting the symptoms which the doctor expected to find. Removal of the symptoms, he claimed, could be attained by persuasion, which, however, appears to be nothing more than suggestion, but we must recognize the fact that clinical studies of hysteria give evidence of the appearance of disorders which could obviously not be the product of suggestion.

Janet (882). According to Janet, hysteria is a form of mental depression, beginning with exhaustion and characterized by a retraction of the fields of consciousness and a tendency to dissociation of ideas and functions which constitute the personality. For him the hysteric is a person who, partly due to heredity and partly due to emotional stress or shock, never develops a normal synthesis. Thus he speaks of hysterical personalities. An intense emotional shock or extreme exhaustion may then further weaken this synthesis resulting in a partial or complete dissociation of the personality. The events of the disturbing emotional experience may in this way be dissociated from the main personality. The paralyses, anesthetics and the similar behavior of the hysteric are explained as functional dissociations of the personality. The hysteric is unable to move a part of his body because he is unable to think of doing so. Briefly, for Janet, the hysterical seizures, the paralyses, the anesthetics, the tics, the contractures, and the amnesias are a consequence of the hysterical personality, the emotional disturbance and the dissociation. The criticism of the theory is directed mainly at the form which the disturbance takes. Why, for example, should a particular case develop a paralysis rather than an anesthesia? The theory also does not offer an explanation of what brings the dissociation about. Freud, whose theory we discuss now, attempts to supply this deficiency.

Freud (883). Freud explains the hysteria as the result of a conflict between the ego and some wish which is distasteful to it and is therefore repressed. The repression, however, is only partial; and consequently indirect expression is attained through conversion. That is, it escapes from the unconscious in its disguised form—the symptom. He further explains the basis of the hysteria to be some real or fantastic sexual trauma of early childhood. This trauma is repressed but is revived later in life by another emotional shock.

At best, the Freudian interpretation can be accepted only as explaining a portion of the hysterias.

As is pointed out by Henderson and Gillespie (884),

It is impossible to see anything sexual in the aetiology of hysteria occurring in the soldier on the field of battle, or in peace time as the result of injury involving questions of compensation. It is likewise superfluous to involve a particular type of sexual experience in childhood as a necessary predisposition for hysteria. If it were not superfluous, then it would be necessary to suppose that in the late war, officers, as a class, being subject to anxiety states rather than hysteria, were distinguished from privates in that the officers had not suffered infantile sexual traumata while the privates, who were hysterical when ill, had so suffered.

Etiology

It is generally supposed that heredity is an important factor in the development of hysteria. But again we must remind ourselves that mere psychopathic history in the ancestry of the patient is not sufficient evidence that the predispositions are inherited. We still have to consider the fact that the patients may have lived in an environment which could not be viewed as healthy. Alcohol and tuberculosis in the ancestry of the patients have frequently been mentioned as possible contributory factors. Aside from a weakened synthesis which is easily dissociated, the personality is shy, emotional and suggestible. Since we have a suggestible personality, we may expect that psychoneurotic parents may have a particularly bad effect. In many instances the hysteric has adopted certain attitudes, usually bodily illness, in order to attain some end. Just as the small child uses his temper tantrum to be allowed to do as he wishes, so the adult hysteric secures an end which frequently he would not admit even to himself. This suggests the fact that the case may be simple malingering or a conscious attempt to deceive. As a matter of fact, it is quite difficult to distinguish between deliberate malingering and the true hysteric. The fact that a large number of the hysterical sufferers in the first World War recovered when the armistice was signed suggests that some of the motives were not so unconscious as we were led to believe. The real hysteric is much more likely to be truthful about his desire to escape danger or arduous duty, but he fails to see the connection between his recently developed symptoms and the desire. The malingerer is much less likely to admit that he wishes to escape some situation.

There is another factor which makes the distinction doubly difficult. The disorder is sometimes not entirely functional but has some organic disability as a basis. That is, the symptoms are in many cases exaggerations of existing organic disorders, and therefore are sufficient to fool the neurologist. Real hysteria, however, must not be considered as a deliberate and conscious attempt to escape some situation. The individual who develops hysteria in order to escape does so without being aware of his motives.

Symptoms and forms of hysteria

The symptoms and forms of hysteria are almost numberless, and therefore no exhaustive attempt to describe them will be made here. It should be noted that any of the physical symptoms could be produced in the beginning either by volition or emotion, but a clinical examination

of several cases is sufficient to indicate that these symptoms could not be maintained by volition over a long period of time, nor could they be carried to the degree that is evidenced by many patients. One of the interesting disclosures of the clinical cases is that the symptoms frequently correspond to the lay conception of some disease. This is shown in the peculiar anesthetics and paralyses that are developed. For example, the anesthesia is an anesthesia of the hand or foot or "glove and stocking anesthetics."

Motor symptoms which include paralyses, tics, tremors, and contractures are frequently found. The tremors, coarse and usually involving the whole limb, occur especially when attention is drawn to them or when voluntary movements are made.

Sensory disturbances are also common, particularly anesthetics, hyperesthesias and paresthesias. These can be distinguished from true organic disorders by the fact that they do not correspond to nerve distribution. They are variable, inconsistent and may be produced by suggestion. Disorders occur in all the senses, the incidence being greater in vision and hearing. The individual cannot see or cannot hear, but he uses the senses to advantage in avoiding injuries. The bilaterally blind hysteric, for example, will avoid obstacles placed in his way or dodge missiles coming toward him.

These functional defects of vision are very interesting. We must recognize, of course, the fact that seeing is a function of the whole organism and that disorders may occur even when the optic nerve and the visual apparatus are intact. In other words, the difficulty may be a failure of integration. The beginning of a functional blindness is usually most peculiar. A number of cases of functional blindness lasting several years have followed such a simple incident as being struck in the face with a greasy rag. It is also interesting to note that recovery takes place in an equally mysterious manner. Actually we are dealing not with an organic lesion but with something much more complex in the psychological mechanism. That these people do use their vision at times has already been mentioned. Further evidence that they are able to see is shown by the way they move about while sleep walking and by the fact that the reflexes are maintained. If there were a nerve injury back of the optic chiasma, half of each eye would be blind. In some cases the blindness is unilateral, that is, a blindness of one eye.

An interesting test has been devised to indicate when a unilateral blindness is functional. Some red and green letters are pasted on a dark background, so that the colors appear alternately. Consequently

the red letters seen alone would have no significance, that is they spell nothing. The same thing would be true if the green letters alone were seen. For example, suppose the red letters were J H S O K N and the green letters O N H P I S. Separately they mean nothing, but spaced alternately they spell Johns Hopkins. Now glasses are applied to the eyes of the subject, the lens of one eye corresponding to the color of the red letters, the lens of the other eye corresponding to the color of the green letters, and the subject is shown the test card. With one eye he can see only the red letters, with the other eye, only the green. If he is blind in one eye, he should see only meaningless letters. If he sees all of the letters and reads Johns Hopkins, it is evident that he is using both eyes. Recently the electroencephalograph has been used as a test for functional blindness. Lemere (886) indicates that persistence of alpha waves when a subject attempts to look at an object is presumptive evidence for true organic blindness. Disappearance of these waves under similar conditions is presumptive evidence of malingering or hysterical blindness.

Of the visceral symptoms the most frequent are primary and secondary mental anorexia. Simple anorexia begins as a voluntary restriction of the diet and is found most frequently in females. The refusal to take food may be shown to have an emotional basis, but the individuals often carry the starvation to such extremes that serious physical disorders develop. While the refusal of food is at first voluntary, the appetite is soon lost, and the patient has no desire for food. This is explained by Janet (569) as being due to the dissociation of the gastric function. Secondary mental anorexia results in the restriction of the diet due to a false belief that the stomach is disordered. This disorder is common in both sexes. The patient has a fear of some gastric disease and consequently becomes more and more concerned about his diet.

The mental symptoms also are all considered to be of the dissociative type. The amnesias, somnambulisms, trances, fugues, dream states and fits are all regarded as parts of the mental content functioning independently.

The amnesic and fugue states have become well known to the lay public through the sensational reports in the newspapers of individuals who have wandered away and forgotten who they were. In numerous cases these people, having forgotten their past, remained in this amnesic condition for a period of weeks or months. Such individuals usually have a record of nervous instability, periods of great fatigue and considerable worry from the environment. Faced with an unpleasant en-

vironment which becomes unbearably distasteful, worn out by work and worry, the individual has an impulse to get away from the disagreeable situation. To run away, however, is an act too cowardly for him to permit. Eventually the conflict between the desire to get away from the distasteful situation and the ideals which inhibit the individual from doing so becomes so great that the impulse breaks away from the main personality. In the period of the fugue the individual has no recollection of his past, his consciousness being completely dominated by the impulse to get away. He, however, is usually able to get along and care for himself in a reasonable fashion until for some reason, difficult to ascertain, the impulse loses its dominance and recollections of the past return. The individual then has an amnesia for the period of the fugue. The nature of the fugue state may be more clearly seen in the following example.

A man of thirty-five left home to attend a business meeting but failed to arrive at the appointed place and all efforts to locate him proved futile. Three days later he found himself in a town 200 miles from his home, completely bewildered as to how he had got there, and unable to recall any of his actions since he had bid his wife goodby and started for the meeting. All attempts to overcome the amnesia failed until hypnosis was induced. In the hypnotic state he was able to recall all of the details of the incident and to reconstruct the entire picture. The memory of these facts was retained in the waking state. He had been having an affair with another woman and had been greatly worried over the possibility that her husband realized the situation. Two days before his disappearance he had received an anonymous letter stating that he was in danger. Just before he left home to attend the business meeting his phone rang, but when he answered the person on the other end cut off. On his way down town he suddenly noticed that the car directly behind him was being driven by the husband of the woman with whom he had been having the affair. He became greatly alarmed, drove as rapidly as possible out into the country and, turning down a blind road, he jumped out of his car and ran through the country. He was apparently driven by the strong impulse of fear and the desire to get out of the dangerous situation.

The somnambulisms or sleep walking conditions are fugue-like states which occur during sleep. The victim of the somnambulistic episode evidently becomes dominated by a group of closely knit ideas which are usually memories of some highly emotional situation. Thus Janet (887) has described them as mono-ideic states. A part of the individual's

personality which is not recognized by the conscious self dominates the personality. Here again we may recognize the hysteric's ability to block off a part of the personality from a conscious recognition.

The hysterias are sometimes referred to as conversion neuroses, indicating that the disorder consists of the conversion of an emotional conflict into some specific symptom, somatic or mental. Four types of conversions representing different forms of hysterical reactions can be recognized. They are as follows:

1. The creation of physical symptoms where organic pathology cannot be demonstrated. Practically any somatic function may be involved, and either complete or partial loss of sensation may be manifest.

2. The exaggeration of organic symptoms or their persistence when the cause has been removed. In such cases organic disease is present or has existed in the past, but the symptoms are unconsciously exploited either beyond their intensity or after the organic basis for them has been removed. Such persistence of somatic complaints is frequently seen in individuals who have been injured and are involved in industrial accident insurance procedures, and the individuals may, therefore, be difficult to distinguish from pure malingerers. The understanding of their development may be better appreciated by recognition of the common tendency to exaggerate ordinary discomforts such as slight gastro-intestinal distress.

3. Since emotional disturbances are accompanied by changes in the physiological functions, the possibility of the production of real organic pathology must be recognized. A great deal of attention has recently been given to the occurrence of pathological conditions which find their origin in emotional conflicts. The emotionally induced gastric ulcer is perhaps the best known, but in the field of psychosomatic medicine we find considerable evidence for the importance of psychic factors in the development of a wide variety of organic disorders. It is true that in this field speculation probably goes beyond the known facts, but this does not minimize the importance of real discoveries.

4. As has been indicated in the discussion of symptomatology, conversion manifestations may find their expression not only in somatic symptoms but also in the form of serious personality disturbances of which the amnesia is a good example.

MULTIPLE PERSONALITY

The term "multiple personality" and the descriptions of such states have been so alluring to the writers of fiction that the public has come to believe that dual or multiple personality is quite a common occurrence. Stevenson's (888) classical "Dr. Jekyll and Mr. Hyde" is now only one of an ever increasing number of stories of dual and multiple personalities. Actually the disorder is peculiarly rare, there being not more than fifty authentic cases on record. There has also been a tendency to confuse the multiple personality with the easily recognized fact that any individual's pattern of reaction differs from time to time. Since the person-

ality is sometimes referred to as a stimulus pattern toward which others react, it can therefore be inferred that any individual has as many personalities as there are people viewing him at a given time. In other words, he may be a different personality to each person present. Actually, however, there is a real personality which he himself recognizes even while he understands that his behavior patterns differ at different times. These marked differences which appear in the same individual at different times occasionally give rise to the use of the term "dual" or "multiple personality." But there is, in such instances, no loss of memory, no disappearance of basic emotions, no break-up or dissociation of the normal synthesis but merely a domination of a particular form of behavior. Scientifically considered, such a person is not an example of dual personality.

In our examination of the phenomena of hysteria we have noted that sometimes in one individual certain portions of the personality do not function in a normal way. The integration or synthesis is in some way interfered with, but not even all of these cases can be termed dual or multiple personalities. The amnesias, somnambulisms, and fugues, may throw light on the understanding of the multiple personalities, but the latter term is reserved for cases where the dissociated functions are so complete and extensive that any of the dissociated groups when fully conscious is capable of appearing as a complete personality.

In the multiple personality cases, a change from one personality to another may take place frequently, that is several times a day. In other instances one personality may function without a change for weeks or months.

Sometimes the one personality is unable to recall any of the memory content of another, and the character traits of the second differ markedly from the first, occasionally appearing as direct opposites. In most instances, however, there is some recall of the ideational and perceptive experiences of the other. When this is true, the memories are likely to be vague and may be somewhat compared to the waking recall of dream experiences.

In most cases there has been reason to believe that heredity played its part, in that there was an innate predisposition to nervous weakness. There is usually some history of slight psychoneurotic disorder, frequently neurasthenia or at least a history of prolonged or excessive fatigue.

The shocking emotional experience which is described as the precipitating cause in other forms of hysteria is also prominent. Morton

Prince (889) describes the underlying psychogenesis in the famous Beauchamp case as including the repression of all of the gay, youthful, mischievous impulses which later appeared in the personality of Sally. These impulses were in conflict with the serious, studious desires of Miss Beauchamp. She had also cultivated the habits of absent mindedness and day dreaming. According to Prince, then, this mass of repressed material became dissociated from the main personality, and due to the repression, functioned only subconsciously and appeared as a synthesized personality only when the main personality was shattered. Miss Beauchamp is described as being tired, overburdened, worried and excessively fatigued. Then, in the midst of a thunderstorm, there came unexpectedly an experience which brought back all of the emotional excitement of a recently unsatisfactory love affair, which is pointed to as the precipitating emotional shock. Since space does not permit a detailed report of the Beauchamp case, Professor McDougall's concise summary of it is presented.²

Case 25. The Beauchamp case involved, in addition to the normal personality (here called B), which existed before and after the long period of disorder, three distinct personalities called by Prince B₁, B₃, and B₄. B₃ was known as Sally, and that name will be used here. It will conduce to clearness of this condensed statement if I describe first the personalities B₁ and B₄ and outline their history, leaving Sally for later description; but the reader must bear in mind that Sally complicated the picture throughout the history.

B was a nervous impressionable child, given to day dreaming. Her parents' marriage was unhappy, and her mother was harsh and indifferent to her; but B, nevertheless, was strongly attached to her mother, and when the latter died B, who was thirteen years of age, suffered much emotional disturbance. During the following three years she lived under the care of her father, and suffered many shocks of a minor kind. At sixteen she ran away from her unhappy home. Two years later (i.e., when eighteen) B had become a nurse in a hospital and had formed a strong idealistic attachment to a young man, G. One evening G appeared unexpectedly under dramatic circumstances, and approached her in such a way that her very sensitive nature received a severe emotional shock. One might fairly infer from the account given that G kissed her. B remained much agitated and, in the course of the next few days, manifested a marked change of character. "All her peculiarities became exaggerated. She became unstable and developed aboulia. She grew, too, abnormally religious." This shock initiated what may be called the second main period of the history.

This second period lasted six years, during which this new character continued to figure in her social circle as Miss B. In reality the new character was the personality of B₁. She seems to have been formed by the exclusion, from the make-up of B, of certain character-elements which became the nucleus or foundation of the personality B₄. During these six years B₁ led an active life and became a college student; she was hampered by her

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poor health and the vagaries of Sally (to be described later). During these six years B₄ seems to have remained entirely latent. It was one year before the end of this period that the case came under the care of Prince.

A third period was initiated by another emotional shock related to that which had initiated the second period six years earlier. B₁ was much shaken; Dr. Prince was sent for and a sudden change took place in his presence. Much study was required to elucidate this change; the main facts only can be stated here. B₁ disappeared or became latent, giving place to B₄. This personality, B₄, which manifested herself at this moment for the first time, had no recollection of the past six years, during which she had been latent. She could recollect the events of Miss B's life up to the time of the shock which initiated the second period (shock 1); these events seemed to her to be her own remembered experiences; she took up conscious existence anew from this point of time (shock 2), as though the six years had not been. She thus had, in common with B₁, command of all memories up to the time of the first shock; but she was not identical with the B who suffered that shock. Just as B₁ differed from B in character, while retaining the memories of B, so also B₄ commanded the memories of B, but differed in character from B and also from B₁.

For nearly one year (the fourth period) B₁ and B₄ led the life of alternating personalities with reciprocal amnesia; and careful study of them during this time showed that they were complementary characters, each having command of the memories of the first period and of the memories of her own phases of dominance in the third period; while B₁ commanded also the memories of the second period. B₁ was an humble, weakly individual, very suggestible, shy, retiring, studious, religious, always submissive, amiable and altruistic, considerate of others, and fond of others and old people. B₄ was very self-assertive, given to quick and violent anger, intolerant, and quarrelsome, vain, sociable, irreligious, disliking children and old people. There were corresponding differences in tastes. Both were very emotional, but, whereas B₁ was wholly swayed by her emotions, B₄ fought them down. B₁ was easily tired and relatively inactive, though studious. B₄ was energetic and fond of bodily activity; she disliked most of the things that B₁ liked.

A fifth period was initiated by inducing deep hypnosis, when a personality appeared which commanded all of the memories of both B₁ and B₄ and seemed to be, in respect of character also, a fusion of the two personalities B₁ and B₄. "She had lost the reserve, the depression, the emotionality, and the idealism of B₁; but she had lost also the quick temper, the lack of faith, the resentment, and the egoism of B₄. She was a person of even temperament, frank and open in address—one who seemed to be natural and simple in her modes of thought and manner. Yet she more closely resembled B₁, and might fairly be regarded as B₁ restored to a condition of healthy-mindedness." This personality, who seemed to be, and is regarded by Prince as being, essentially the normal personality B, restored to wholeness by synthesis of B₁ and B₄, her two halves, could not at first be maintained, owing in the main to the opposition of Sally and B₄. There were frequent alternations of B with B₁ and B₄. During this period both B₁ and B₄ were amnesic for B's phases; but B commanded the memories of the B₁ and B₄ phases. There occurred some give and take of knowledge and memories between B₁ and B₄, and perhaps of character-constituents; what was lost by the one being gained by the other. It was not until after the lapse of some years that this fifth period was terminated by the enduring dominance of the healthy, normal B.

The case, so far as described above was, one of alternating complementary personalities, B₁ and B₄ with reciprocal amnesia. It remains to add to the picture the history of Sally.

Sally was an impish, childish personality and showed remarkable consistency, without

any clear indications of increasing maturity throughout the several (some six) years of her active career. Her existence was discovered by Prince shortly after the case came under his care, i.e., early in the last year of the six-year second period. She manifested herself when B₁ was in hypnosis, speaking of B₁ as "she" and of herself as "I," and claiming to be a personality as entirely distinct from B₁ as was possible under the circumstances, namely, that they inhabited and made use of the same bodily organism. The subsequent course of events went far to substantiate this claim. The new personality at first was nameless; but soon she spontaneously adopted the name Sally Beauchamp.

It must not be assumed that Sally was merely the hypnotic state of B₁. Prince brings out very clearly the fact that the hypnotic state of B₁ (which was called B₂) was very different from Sally, was in fact, as is usually the case manifestly the normal personality in hypnosis; whereas Sally was extremely different; and sudden changes in hypnosis from B₂ to Sally, and back again produced startling contrasts. There was not only extreme difference of character between Sally, on the one hand, and B₁ and B₂ on the other; there was also difference of memory and knowledge. This difference cannot be described by saying that the memory of either personality was more extensive or inclusive than that of the other. Sally claimed that, between the times of her appearance in hypnosis, she led a subconscious or coconscious existence; and that, during these periods of submerged existence, she could, if she so wished (and frequently she did so wish) know and afterwards remember what went on in the mind of B₁; but that at times, as when for example, B₁ read books uninteresting to Sally, she (Sally) would pay no attention and would occupy herself with her own thoughts. Sally claimed not only to be entirely distinct from and independent of B₁ but also to dislike and despise her; and she manifested this attitude and supported her claims by forcing certain sensory and motor automatisms upon B₁, namely, visual hallucinations and impulsions to automatic speech and other actions, impulsions which B₁ found herself unable to resist, even when they led to actions that were very repugnant to her, such as telling lies.

Among these automatic actions was rubbing of the closed eyes frequently repeated. This seemed to be an endeavor on Sally's part to get her eyes open. Hitherto, when Sally had been dominant, her eyes had always been closed. After many attempts the manoeuvre succeeded at a moment when B₁ was drowsily resting, and Sally for the first time was able to see and to dominate practically the whole organism. From this time on Sally frequently alternated with B₁, not only in hypnosis as previously but at other times also; and, during the phases of dominance of B₁, Sally gave much evidence of continued existence as a conscious personality. Sally could not always exclude B₁ and secure dominance at will; but she was able to achieve this when B₁ was tired or more "run down" than usual; and she monopolized the organism for considerable periods during which B₁ seemed entirely latent, and of which B₁ had no direct knowledge or memory. During this time Sally's activities largely took the form of teasing and hazing B₁, by writing to her impudent messages and playing upon her elaborate practical jokes; e.g. on one occasion Sally, while dominant, unraveled B₁'s knitting and wound the thread all over the furniture of her room. Sally also during her subconscious phases would force inhibitions and automatisms upon the dominant B₁, much to the latter's annoyance. There was thus a struggle of two wills. "Such scenes as this were the outcome of a contest of wills, of Sally's will against Miss Beauchamp's will. . . . In these contests Sally usually won and Miss Beauchamp's will (that of B₁) would be paralysed. The latter would not only find herself unable to will to do what she wished, but often was actually compelled to do something she did not wish to do."

Sally did not command all the accomplishments of the highly educated B₁; for example, she did not read French, a fact explained by her lack of interest in the more serious reading of B₁.

Prince summarizes the relations between B₁ and Sally as follows: "Sally is a distinct personality in the sense of having a character, trains of thought, memories, perceptions, acquisitions, and mental acquirements, different from those of B₁. Secondly, she is an alternating personality in that during the times when the primary self has vanished, Sally for the time being the whole, conscious personality, having taken the place of the other. . . . At such times B₁ does not become a subconsciousness to Sally but as a personality is wiped out (or rather, is latent). Thirdly, Sally does not simply alternate with B₁. There are times when Sally manifests herself as an extra-consciousness, concomitant with the primary personality B₁." The only incompleteness of Sally during her periods of dominance was a rare form of anaesthesia, namely, complete anaesthesia of the skin senses and of the "muscular sense" when her eyes were closed, and a general and continued anaesthesia of the deep tissues.

After the appearance of B₄, Sally continued her pranks, but the conflict became more serious; because B₄, as soon as she learned of Sally's existence and nature, made a sustained effort to get the better of Sally and to suppress her. Like B₁, the new personality of B₄ knew nothing directly of Sally or of the events of Sally's phases of dominance. Sally had not the power of sharing or reading the thoughts of B₄, as she read those of B₁; but she could and did force upon B₄ some inhibitions and automatisms; though less successfully than in the case of B₁, because B₄ resisted and fought against such influences from the conscious Sally.

At this time Sally wrote her autobiography, claiming to remember her own existence as a subconscious and coconscious personality from the time when the child B began to walk, and to have had even at that time tastes and points of view very different from B's.

Towards the end of the fifth period, Sally, who had fought for her life valiantly and successfully, began to show signs of discouragement, under the combined efforts to suppress her of B₄ and of Dr. Prince. She described herself as feeling "squeezed" during her subconscious phases. When the normal personality was restored as a stable synthesis of B₁ and B₄, Sally seemed to be deprived of her power, both her power of controlling the primary personality by inhibiting her actions or forcing upon her "automatic" actions and hallucinations, and also her power to secure dominance of the organism. Prince frequently refers to Sally as a group of conscious states or ideas split off from the main personality and synthesised to form a secondary personality; and in several passages he writes of the restored personality in terms which imply that Sally was included in the synthesis. But, whatever Sally's nature and origin, it must be insisted that Prince's account does not justify the view that Sally was in any sense synthesized with or incorporated into the restored personality B. He has told us that he had found it "easy to amalgamate by suggestion the dissociated experiences of B₁ with those of B₄, so that they were remembered but impossible to amalgamate Sally's with either." And, he repeatedly states that the synthesis of B₁ with B₄ produced the normal whole personality B, while Sally became at such times "squeezed." Further, the restored personality did not command memories of the events of the phases of Sally's dominance. We are told "the real Miss Beauchamp is disintegrated into personalities B₁ and B₄, who, conversely, may be synthesised into real B." Further—"the resurrection of the real Miss B is through the death of Sally. . . . Of Sally, her life and her doings, she, (the restored B) knows nothing except indirectly. Of this part of her mental life she has no more memory than has B₁ or B₄." And, of Sally we

are told "With the resurrection of the real self she 'goes back to where she came from,' imprisoned, 'squeezed,' unable either to 'come' at will or to be brought at command. Automatic writing, speech, and such phenomena cease, and it has not been possible as yet to communicate with her and determine what part if any she plays in Miss Beauchamp's subconsciousness, or whether as a subpersonality she exists at all. When, however, as a result of some mental catastrophe, she appeared again as an alternating personality, her language implied a persistent existence as a subconsciousness like that of her early youth, and as described in the autobiography."

While a wide variety of symptoms have been presented as appearing in the hysterical syndrome, these symptoms may be generally recognized as degrees of inactivation or autonomous behavior. The mutism, anorexia, paralysis, anesthesia, amblyopia, amaurosis and even amnesia of the hysteric may be satisfactorily understood as progressions of normal inactivation, while the hysterical tremors, tics, cramps and seizures, as well as dual personality states, may be seen as exaggerations of normal autonomous states.

Inactivation, or the loss of particular abilities in special emotional situations, is not an unusual part of normal behavior. Practically everyone can recall instances of the loss of voice or at least difficulty in speaking in the face of a shocking situation, unexpected bad news, or when suddenly confronted by a stern superior. Similarly in a variety of circumstances one suffers a loss of appetite. In much the same way one may be insensitive to a variety of sensory stimulations or unable to make specific muscular movements. Since the inactivation may spread or be symbolically aroused, it is not surprising to find inactivations exaggerated to the point of becoming pathological hysterical symptoms.

CHAPTER XV

MENTAL DEFICIENCY AND PSYCHOPATHIC PERSONALITY

The study of mental deficiency has been greatly hampered by a lamentable lack of uniformity in the use and meanings of key terms. Identical words in common usage convey widely divergent meanings. It is not our purpose here to become involved in the battle of terminology or to attempt to unfold this tangled mesh but rather to try to use terms that will be meaningful to the reader. The abnormal individuals considered in the sections on the psychoses may be thought of as demented. In this section it will be our purpose to study those who have been defective from birth or a very early age. Such individuals may be referred to as aments, feebleminded, or mentally deficient. Perhaps the distinction between the terms "amentia" and "dementia" affords the best opportunity to understand the difference between the two groups. Dementia means down from the mind and indicates that normal mental functioning has degenerated; whereas amentia means without a mind, that is, normal mental functioning never existed. Although constitutional emotional deficiencies will be studied here, most of the discussion will be centered around intellectual deficiencies.

NATURE AND MEASUREMENT OF INTELLIGENCE

The nature of intelligence has received much attention from psychologists, and unfortunately a large number of contradictory or, at least, conflicting conceptions of the term have been presented. It is at once obvious that we cannot talk about deficiencies of intelligence until we have a clear conception of the term. A British Royal Commission investigating the matter stated that the intelligent person was one who was capable of competing on equal terms with his fellow men and who could manage himself and his affairs with normal prudence. Such a definition, however, fails to consider the fact that the managing of affairs is not the same for all individuals. One individual may face particularly complicated experiences which require unusual ability, while another has his affairs so well arranged for him that it becomes a relatively simple matter to manage them adequately. To judge the intelligence of these two individuals on the basis of success or failure in

managing their affairs is to ignore the fact that there is an extremely wide variation in the responsibilities of individuals. It is important for us to recognize that the term "intelligence" was not invented by psychologists but has been widely used for centuries to indicate certain gross abilities. Consequently, we may profit materially by reviewing briefly the use of the term by some of the early investigators who are responsible for the development of the tests. According to Ebbinghaus (890), intelligence was the ability to combine the elements of experience or the integrative ability (Kombinationsaktivität). Binet (891) considered judgment to be the most important factor of intelligence. His conception was broader than that of Ebbinghaus, including such factors as memory, reason, ability to compare, comprehension, use of number concepts, power to combine objects into a meaningful whole, and knowledge of common events. He was seeking for some quantitative measure which led to the development of the measurement of mental age. Spearman (892) believed intelligence to be the ability to discriminate fine differences, whereas Thorndike (893) defined it as the sum total of specific abilities. Stern (894) believed adaptability to be of primary importance and defined intelligence as "a general capacity of an individual consciously to adjust his thinking to new acquisitions—it is general mental adaptability to new problems and conditions of life." He also considered Binet's designation of intelligence in terms of mental age to be inadequate and argued that defect and superiority should be expressed in terms of a ratio of mental age divided by chronological age. This quotient he termed the intelligence quotient. Freeman (895) has defined intelligence as the "faculty with which the subject-matter of experience can be organized into new patterns." In 1921 13 psychologists who had been active in developing testing methods assembled their views regarding the nature of intelligence, and such a wide diversity of conceptions was presented that psychologists in general are inclined to use the term as a generic or trade name for the tests, and some have gone so far as to say that intelligence is whatever intelligence tests measure.

Wechsler (896) has stated his position in the following manner: "Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment. It is global because it characterizes the individual's behavior as a whole; it is an aggregate because it is composed of elements or abilities which, though not entirely independent, are qualitatively differentiable. By measurement of these abilities, we ultimately evalu-

ate intelligence. But intelligence is not identical with the mere sum of these abilities, however inclusive. There are three important reasons for this: 1) The ultimate products of intelligent behavior are not only a function of the number of abilities or their quality but also of the way in which they are combined, that is, upon their configuration. 2) Factors other than intellectual ability, for example, those of drive and incentive, enter into intelligent behavior. 3) Finally, while different orders of intelligent behavior may require varying degrees of intellectual ability, an excess of any given ability may add relatively little to the effectiveness of the behavior as a whole. It would seem that, so far as general intelligence is concerned, intellectual ability as such merely enters as a necessary minimum."

Wechsler has elaborated the point that although intelligence is not the mere sum of intellectual abilities, the only way to evaluate it quantitatively is by the measurement of the various aspects of these abilities. He has discussed intelligence as a kind of energy that is understood by us in terms of the things it enables us to do, such as making appropriate associations between events, drawing correct inferences from propositions, understanding the meaning of words, solving mathematical problems.

Tests constructed for the measurement of intelligence may differ from one another in terms of the importance given to the verbal factor, psychomotor reactions, social comprehension, etc. The weighting of these factors leads to the distinguishing of various types of intelligence. Thus facility in the use of symbols, manipulating objects, or in dealing with human beings may be referred to respectively as abstract, practical and social intelligence. The score attained by an individual may depend to some degree on the type of test used. It should be noted, however, that individuals scoring high on one type of test tend to make high scores on other tests. Thus there appears the dual characteristic of human abilities—their specificity on one hand and their interdependence on the other.

Spearman (897) led the way for the solution of this dilemma by showing through rigorous mathematical proof that all intellectual abilities could be expressed as functions of two factors, one a general or intellectual factor common to every ability, and another a specific factor, specific to any particular ability and in every case different from that of all others. This point of view has been subjected to a great amount of discussion, experimental investigation and criticism which cannot be elaborated here. Much of the misunderstanding regarding factor anal-

ysis has centered around the Spearman two-factor theory as it was earlier presented. The more recently developed form admitting group factors (i.e. a three factor theory) as described by Spearman (898) and Holzinger (899) has eliminated much of the controversy. A very careful survey of the status of factorial concepts has been presented by Burt (900).

Clinical experience has indicated that individuals attaining identical intelligence scores cannot always be classified in the same way. One child who obtains an I.Q. of 75 on the Binet scale may be definitely defective, whereas another child with an I.Q. of 65 may not be so classified. In such situations it is claimed that the classification of mental deficiency is, in part, a social diagnosis. The clinician's answer has usually been that the capacity for social adaptation is as much a part of intelligence as the ability to define words and perceive analogies. The clinician has, therefore, generally assumed that there are other factors, besides the intellective "g" which enter into intelligent behavior. Alexander (901) has studied this problem in his investigations to account for the intercorrelation variance found among any large battery of intelligence tests. He reports that after eliminating the general factor "g" and such other factors as "v" (common to tests involving verbal ability) and "p" (common to tests purporting to measure practical ability), a considerable amount of intercorrelation variance was still unaccounted for. These latter factors covering such items as, interest in doing the tasks, persistence and desire to succeed, he provisionally called "x" and "z." The position might, therefore, be taken that intelligence tests do not measure all of intelligence, but that they do measure sufficient portions of it to enable us to have a fairly reliable index of the individual's capacity. The intelligence tests measure more than mere learning ability, or reasoning ability or even general intellectual ability. They measure, in addition, capacities which cannot be defined as either intellective or cognitive, but may be represented by factors such as "x" and "z." Attempts to exclude these factors from a test have, in general, resulted in making the tests less effective as a measure of general intelligence. Wechsler (902) has pointed out that at different ages the intelligence tests measure different portions of the general intelligence and that as the individual becomes older, our tests become less and less an effective measure of his global intelligence.

Much of the intelligence testing has been done by what is known as the mental age method. It is important to note that the mental age, however obtained, is only a score. There are certain conveniences in expressing the score obtained in years and months, but the method also

has some decided limitations, not the least of which is that it limits the range of possible scores so that beyond certain points the mental age equivalents cannot be obtained. Such limits for any test are reached when the mean scores made on the test cease to increase with advancing chronological age. The point at which the mean scores cease to increase with advancing age is dependent upon various causes. On some tests this situation prevails because the tests are too easy, whereas on other tests the differences between the mean scores at higher ages disappear because the abilities measured by these tests no longer increase with age. Although the means of the actual test scores continue to increase with age, this increase progressively diminishes from age 12 on, and it is generally conceded that from age 15 or 16 the differences are practically negligible.

The intelligence quotient (I.Q.) is the most used index of intellectual capacity. The quotient is obtained by dividing the subject's mental age (M.A.) by his chronological age (C.A.). Thus, if a child of 10 obtains a mental age of 11, his I.Q. is 1.10 or dropping the decimal point 110. The I.Q. has been assumed to be a measure of the relative brightness of an individual on a more or less permanent basis. The supposition that an individual's I.Q. will remain the same throughout life brings up the question of the constancy of the I.Q. No permanent scheme of intelligence classification is possible unless, in general, the I.Q.'s are independent of the age at which they are calculated. The controversy over the constancy of the I.Q. cannot be considered in detail here. In general it may be said that the I.Q.'s not far from the average will remain constant. Such a constancy does not appear to hold for I.Q.'s any appreciable distance (one or two standard deviations) from the mean. Direct evidence of the variability of the I.Q. with age may be found by studying the data presented by Burt (903) and by Terman and Merrill (904). The problem of the variability of the I.Q., however, does not become acute until we consider the measurement of adults. In calculating the I.Q. of adults, the usual method has been to use as the divisor the highest C.A. beyond which the observed M.A. scores cease to increase. The actual age chosen has varied from 14 to 18 and has varied in terms of the scale employed and the experience of the investigator. Such a method involves the assumption that the mental age scores remain constant throughout life. Wechsler (905), Miles (906), Jones and Conrad (907) and others have shown that beginning at an age varying from 15 to 22, scores of mental ability begin to fall off. On most intelligence scales the differences between ages 15 and 25 are practically

negligible, but above that age an appreciable decline is noted. Valid results in the calculation of I.Q.'s by the regular method of M.A. over C.A. may be expected from ages 4 to 13, and only slight variations are noted up to age 25. Wechsler has pointed out that the method may even be satisfactory up to age 35 at which time a new method taking account of the curve of mental decline is necessary.

The history of mental testing is a long and varied one into which we will not go in great detail. Psychological measurements may be said to have really begun with Fechner (1801-1887), and Weber's law (1834) must be considered as a landmark in the development of testing. The older psychologists were concerned with the testing of functions and faculties of the mind, the first real studies of intelligence being made by Galton (908) in 1883 and Cattell (909) in 1890. It was not until 1905 that Binet (910) devised the first scale for the measurement of intelligence, his second series appearing in 1908 and his latest revision in 1911. Terman (911), working with a group of collaborators, revised and extended this last scale of Binet's and termed it the Stanford Revision of the Binet-Simon tests. Some later revisions of the scale have been offered by Herring (912) and Kuhlman (913).

Mainly through Goddard's sponsorship the intelligence test gained acceptance and became widely used. The Stanford Revision devised by Terman has been the most popular. This revision introduced the Intelligence Quotient, which was originally presented by Stern (914). The development of these measuring scales represented a real stride forward in the study of mental deficiency. Classification which formerly had depended upon personal empirical opinions was now placed on solid foundations approaching scientific exactness. Gradually there were devised tests that did not have to be individually administered but could be given to large groups at one sitting. One of the most interesting of these was the test used for rating and classification of the National Army during World War I. The tests used were prepared by a special committee of the American Psychological Association which included such prominent psychologists as Whipple, Yerkes, Angell, Bingham, Dodge, Strong, Terman, Thorndike, Watson, Woodworth, Scott and Shepard. Two types of tests were devised, the Army Alpha for those who could read and write English and the Army Beta for illiterates and foreigners. The latter test was given entirely by pantomime and demonstration. These tests were administered to about 1,300,000 men in groups of from 75 to 500 between May 1 and October 1, 1918. In some special cases persons who failed were given indi-

vidual tests. At the present time, many of the leading colleges have adopted group intelligence examinations as college entrance requirements, and many others who do not require the test for entrance, administer a test, the results of which are used as valuable aids for the classification of students. Tests have also been devised for use in the selection of employees and executives for business and industry. These tests are referred to as special aptitude tests and trade tests and are designed to predict abilities in special lines. One of the criticisms that is frequently made of the group intelligence tests is that they do not take into consideration the personality or the fact that certain individuals may have been affected markedly by the test situation and consequently were not able to show to their best ability. Such a defect is well recognized by the psychologist, but we may at least say that the results have been particularly valuable for the prediction of what groups are capable of doing. Invariably it is found that the records of the group making up the top decile are superior to the records of the groups below them. For an example, if we give a group test to the entering college students, we may predict with a fair degree of certainty that the large number of honor students will be found to have scores in the upper tenth of the class, whereas the students who are dismissed because of failures in studies will be found largely in the lower tenth of the intelligence scores.

For careful measurement, however, the individual tests offer us our best opportunity. These are the tests that are administered by the tester to one person at a time, a situation which has certain obvious advantages over the group testing. In administering an individual test, the tester has the opportunity of observing his subject closely and determining such important factors as the amount of coöperation given by the subject, his persistence and the amount of emotional upheaval in the test situation. Such tests are particularly valuable with psychotic patients, for in these cases the amount of intelligence is frequently of great importance, since it not only gives an understanding of the patient's possibility of developing insight into his condition as well as his ability to profit from attempts at reëducation, but it also serves as a valuable aid in getting the patient into rapport with the examiner.

The Binet-Simon scale was devised by giving many tests to a large, unselected group of children and placing each test at a particular age level on the basis of the number of individuals of that age who were able to pass it. For an example, since the average number of 4 year olds were able to choose the prettier face in each of two pairs and more than an average number of the 5 year olds and less than an average number

of 3 year olds were able to do so, the test was placed in the 4 year old level. Thus, such a test is said to be one of the tests of average 4 year old ability. The methods of giving and scoring the test must be carefully and rigorously followed, and in no instance is it permissible to select a few items of the test and give them in the hope of being able to judge the intelligence. The norms were established under standard conditions, and these conditions must be followed exactly if the results are to be considered as meaningful.

Herring (915) revised the test in an attempt to simplify both the administration and scoring of the examination. The entire directions for giving and scoring the test along with the norms established are presented in a small book. More recently Terman and Merrill (916) have presented a revision of Terman's original scale with two forms well standardized and making possible more accurate measurement of upper limits of adult intelligence.

The most severe criticism that is offered of the Binet examination is that it is too heavily weighted in language ability. Obviously, an illiterate or foreign subject is greatly handicapped in taking such a test; so a number of performance scales have been devised for testing such persons. These tests have not only proved of great value in the testing of the illiterate and foreign born, but serve as valuable supplementary tests to the Binet for all individuals.

The earliest classifications of intelligence were not very fine ones. Modern psychology has attempted to make the classifications such as idiots, imbeciles, morons, more precise by the introduction of quantitative methods of measurement. Thus the mentally deficient is one who fails to obtain an M.A. or I.Q. of a particular level. One of the practical difficulties encountered in quantitative classifications is that of deciding the meanings we can attach to our indices. The procedure has usually been to pair certain familiar qualitative terms against I.Q. ratings falling within certain limits. In Table 14 one may see that according to Terman, individuals attaining I.Q.'s below 70 are deficient, those between 70 and 80 borderline, etc. On the other hand Kuhlmann classifies those below 75 as defective, 75 to 84 borderline, 85 to 94 dull, etc. In this way every author of a test is in a position to devise his own I.Q. scale. One of the frequent objections made is that no rationale is furnished for the choice of the indicated class intervals.

Wechsler (917) has attempted to deal with this problem by presenting a scheme in which intelligence levels are defined in terms of statistical frequencies. Each intelligence level is defined as a class interval em-

bracing a range of I.Q.'s falling at a certain distance from the mean, where these distances are expressed as multiples of the probable error. Thus, in his classification a mental defective is a person who falls at a distance of 3 or more P.E.'s below the mean. In terms of percentile rankings, the mental defective is among the lower 2.2 per cent of the total population. Wechsler's classification is presented in Tables 15 and

TABLE 14
Classification of grades of intelligence according to the intelligence quotient

CLASSIFICATION	RANGE IN TERMS OF I.Q.
Genius or near genius.....	Above 140
Very superior.....	120-140
Superior.....	110-120
Normal or average.....	90-110
Borderline deficiency.....	80-90
Definitely feeble-minded:	70-80
a. Moron.....	50-70
b. Imbecile.....	25-50
c. Idiot.....	Below 25

TABLE 15
Statistical basis of intelligence classifications (theoretical)

CLASSIFICATION	LIMITS IN TERMS OF P.E.	PER CENT INCLUDED
Defective.....	-3 P.E. and below	2.15
Borderline.....	-2 P.E. to -3 P.E.	6.72
Dull Normal.....	-1 P.E. to -2 P.E.	16.13
Average.....	-1 P.E. to +1 P.E.	50.00
Bright Normal.....	+1 P.E. to +2 P.E.	16.13
Superior.....	+2 P.E. to +3 P.E.	6.72
Very Superior.....	+3 P.E. and over	2.15

16. The important thing to be noted with regard to all such classifications is that they merely tell us how much better or worse or how much above or below the average any individual is, when compared with persons of his own age. It is also important to realize that while the I.Q. is an excellent single measure of intelligence, it is not a complete measure of it. This should be obvious from the fact that all individuals of the same I.Q. do not show the same actual or potential capacity for

intelligent behavior. In our attempts to evaluate intelligence, attention must be given to the individual's past history including his social, emotional, vocational and economic adjustments. Doll's (918) social maturity scale is one of the better attempts at such a systematic evaluation. The kind of life one leads is a pretty good measure of his intelligence, and when this evidence is at a decided variance with the psychometric test, the test results will bear looking into.

It should also be pointed out that an individual can deteriorate mentally as the result of a psychosis, and his intelligence quotient measured after the psychosis will differ from his intelligence quotient measured previous to the psychotic condition. We also know that some persons are born with defects that may be shown to exist by administering an intelligence test. The value of the intelligence test is not so much what it measures,

TABLE 16
Intelligence classification according to I.Q.—ages 10-60 (actual)

CLASSIFICATION	I.Q. LIMITS	PER CENT INCLUDED
Defective.....	65 and below	2.2
Borderline.....	66-79	6.7
Dull Normal.....	80-90	16.1
Average.....	91-110	50.0
Bright Normal.....	111-119	16.1
Superior.....	120-127	6.7
Very Superior.....	128 and over	2.2

but the fact that it does measure a variety of functions that have been well standardized. In spite of the fact that the movement is still young and requires much improvement, the results to date indicate that the scores of the intelligence tests show that some individuals possess abilities which others lack and that the possession of these abilities makes for success in various fields of endeavor.

Notwithstanding the importance of the intelligence tests for purposes of classification, it should be noted that their value has frequently been over-emphasized. The tests are not without their limitations, and it should be recognized that the same individual may respond quite differently at different moments to the same test. A number of highly variable factors such as the emotional makeup, attitude toward the test and the environmental situation, may condition the result. The opinion that feeble-mindedness should be diagnosed on the basis of the whole per-

sonality was indicated by the American Association on Mental Deficiency in adopting the report of its committee on statistics which set up the following standards.

The condition of mental deficiency or the diagnostic mental status is to be determined by a combined consideration of all clinical data relating to the patient; that is, his present mental condition, as to intelligence level and emotional reactions in relation to his anatomical, physiological and neurological constitution; his general behavior and social adjustment, his background in biological and social heredity; and his genetic developmental history, including particularly events affecting his physical, social and emotional development. In short, all those data which are necessary in order to evaluate the present status of the individual.¹

MENTAL DEFICIENCY

The scale devised by Binet and Simon for measuring the mental age of individuals was introduced in the United States by Goddard, who tried it on the children at the Vineland Training School. As a result of his experience with the test, Goddard devised a system for grading the mentally defective into three groups, idiots, imbeciles, and morons. These three groups of intellectual deficiency may be seen to be based primarily on the individual's ability to accept responsibility.

Idiocy is the lowest form of mental development including, as it does, only those individuals whose mental ability does not reach 3 years. The condition is early recognizable, since there are many physical deformities. Both walking and talking are late in developing and in some cases do not appear at all. If the idiot learns to walk, the gait is clumsy and uncertain, and speech, when it does appear, consists mainly of unpleasant grunts and growls or, in some instances, of a few monosyllables. Paralysis and convulsive attacks are common, and sensory defects are frequently present. Because idiots are unable to do anything for themselves, it is practically impossible to teach them even the fundamental habits of cleanliness. They are voracious and animal-like in feeding, are unable to wash or dress, and have very little control of the excretory functions. Only faint glimmerings of memory and imagination are seen, and the emotional life is particularly crude. They are frequently destructive, showing anger and fear, but very little self protective ability. Most of them are sterile and unusually susceptible to disease, especially tuberculosis. They are, however, too feeble in mind to be aware of their physical abnormalities, and consequently these are of little psychological importance.

¹ Albert Deutsch. *The Mentally Ill in America*. Doubleday, Doran and Company, Inc., New York, 1937, p. 363.

Imbecility is the next grade of mental defect, the mental age ranging from 3 to 7 years inclusive. The imbeciles are described as being incapable of managing themselves or their affairs with ordinary prudence and of being incapable of being taught to do so. Physical deformities and abnormalities of various degrees are usually pronounced, and consequently their physical appearance quickly marks them. Muscular coördination is poor, making them appear clumsy and ungainly despite the fact that their motor control is much superior to that of idiots. They are able to protect themselves from common physical dangers and may even be taught to do simple tasks, particularly those of a manual type. They are, however, incapable of carrying on independently and must be carefully directed and watched as any task that requires attention for even a small period of time quickly fatigues them. Initiative is entirely lacking, in fact, the ease with which their attention is attracted and the complete lack of initiative causes them to become, in a fashion, imitative. Their memory, although better than that of idiots, is definitely limited, and the imbeciles can be expected to perform only simple routine functions. It is true that they develop some language ability, but their vocabulary remains very small, and they speak in simple sentences, usually with defective pronunciation. While they sometimes appear to enjoy looking at pictures, reading is impossible in most cases. They present the picture of a body that has grown up while the mind has remained that of a child.

Morosity is the term used to designate the third degree of amentia or feeble-mindedness. The moron is described as having a mental age of from 7 to 12 years reaching up to the borderline of low normal intelligence. Since in many instances these individuals present none of the physical abnormalities of the idiots or imbeciles, they are frequently thought of as being just dull or slow without any recognition of the fact that they are fundamentally incapable of accomplishing the feats of the normal mind. Frequently, through the watchfulness of friends and relatives they are able to manage their affairs and get along fairly well if situations do not become too complicated. Since in adult life they often recognize their defects and are able to compensate for them, the real incapability goes unrecognized. Occasionally we see them as good natured, irresponsible children. They are, however, really defective in reasoning and judgment and live by habit. Their attention is poor and easily distracted, and consequently good memory can not be expected. The defect is most noticeable, however, when we look for originality, inventiveness, constructive imagination and reasoning.

The finer aesthetic feelings are never present, and appreciation of subtle humor is not to be expected. Many of them become social problems because of lack of control or faulty judgment. Their criminal offenses are usually petty thievery or violent offences due to their poor discrimination or to their unrestrained expression of sudden desires. Their general deficiency, including ready suggestibility, also makes them dangerous tools in the hands of intelligent criminals.

It is important to recognize that the defectives who already have been mentioned do not develop normally up to a certain age at which time there is an abrupt cessation of development. That is, the idiot does not develop normally up to 2 years and then stop, nor does the imbecile or moron develop normally to 7 and 12 and then cease to develop. These defects must be recognized as retardations in development, the idiot being slowest in development, the imbecile developing more rapidly than the idiot, but more slowly than the moron, and the moron more slowly than the normal individual.

Understanding and classification of mental deficiency have gone far beyond such simple classifications, but it is still difficult to obtain agreement on a definition of the condition. Yepsen (919) has taken the position that the definitions that are offered do not define mental deficiency, but are descriptive of the results of mental deficiency. He considers the mental age and intelligence quotient as valuable for ascertaining the degree of brightness, but points out that normality or deficiency may exist regardless of the ascertained degree of brightness. Kuhlmann (920) believes that the misunderstandings are due to attempts to include in the term "mental deficiency" a number of things frequently, but not universally, associated with it, and points to the necessity of keeping distinct the mental condition as such. He, therefore, offers the following definition: "Mental deficiency is a mental condition resulting from a subnormal rate of development of some or of all mental functions." The latter part of this definition he believes takes care of Binet's position that retardation is not uniform and that an individual may be obstructed in one direction while his development may progress in another direction. Doll (921) has emphasized social incompetence in his definition and has pointed to the danger of attempting to measure social subnormality by a single intelligence scale. He has frequently insisted that the verbal intelligence tests must be supplemented by non-verbal, motor aptitude and total personality tests. The Vineland Social Maturity scale affords a practical method for the measurement of social competence and the establishment of limiting standards. The

definition offered by Doll is as follows: "Mental deficiency is a state of social incompetence obtaining at maturity, resulting from developmental mental arrest of constitutional (hereditary or acquired) origin; the condition is essentially incurable through treatment and unremediable through training except as treatment and training instill habits which superficially or temporarily compensate for the limitations of the person so affected while under favorable circumstances and for more or less limited periods of time."

TYPES OF MENTAL DEFICIENCY

Considerable difficulty has been encountered in the classification of defectives since the exact etiology of all of the disorders is not completely understood. Some clinicians have emphasized the behavioral aspects and others the clinical aspects, but no clearcut and completely satisfactory classification seems possible. Genetic factors account for some of the deficiencies, and it is possible to note that some of the deficiencies appear to have their origins in the germinal, embryonic, fetal, natal and postnatal periods.

The large majority of feebleminded individuals cannot be so distinguished by their physical appearances and consequently cannot be differentiated from the normal by casual observation. There are, however, a number of clinical types whose mental defect is accompanied by marked physical abnormalities. These types may be easily classified since the physical defects are so obvious that they can be recognized by the layman. A brief discussion of the more important of these clinical types will be presented here with some mention of the causes of the deficiencies.

Cretinism. The disorder of cretinism offers an outstanding example of mental deficiency resulting from endocrine imbalance. The condition is due to an early deficiency in thyroid secretion.

Hypothyroidism is caused by atrophy of the thyroid gland before or shortly after birth. The symptoms of cretinism are usually recognizable from 6 to 12 months after birth although in rare instances the condition may not be recognized for several years. The undersecretion of the thyroid gland in later life produces a condition known as myxedema. The mental characteristics of cretinism are usually those of idiocy or low grade imbecility. The physical characteristics are conspicuous. The child fails to develop beyond an infantile level and is a dwarf physically as well as mentally. Not only does he fail to grow in stature, but the growth that does take place is poorly pro-

portioned. The arms and legs remain short and the hands and feet are stumpy and unnaturally formed. The abdomen usually protrudes considerably out of proportion to the rest of the body. The head is relatively large, the lips are thick and a thickened tongue protrudes from the mouth. The teeth are slow to appear, badly formed, deficient in enamel and quick to decay. The skin is rough and dry; the hair, coarse and scanty. The picture is that of a dull, stupid looking child whose muscular movements are uncoördinated, making walking clumsy or at times impossible.

The condition may be easily diagnosed, and if thyroid extract is immediately administered, startling improvement may follow. If treatment is delayed, however, there is great difficulty in securing any improvement whatever. The condition is found sporadically in all parts of the world and endemically in certain areas where there is a deficiency of iodine (the chief constituent of thyroxin). Today the worst endemic regions are in Switzerland and India. Some parts of Italy, France, Sweden, Norway and Finland and the Great Lakes region of the United States also report large numbers of cases.

Hydrocephalus. The hydrocephalic is noted for the large size of the head which is due to an abnormal increase of cerebrospinal fluid with a dilatation of cerebral ventricles and increased intracranial pressure. Distinction is usually made between external and internal hydrocephalus. The external type is not seen very frequently and does not produce greatly increased intracranial pressure and ventricular dilatation. This type is usually due to a cerebral defect of congenital origin, but may be caused by acquired cerebral disease or injuries. The more frequently seen internal type results from an obstruction in the cerebrospinal pathway. Malformations of structure or tumor growths obstruct the circulation of the cerebrospinal fluid and result in the accumulation of the fluid in the ventricles of the brain. In some cases the condition is fully developed before birth and many such children die in delivery. The larger proportion of cases, however, do not develop until after birth. Since the fluid pressure occurs usually at a time before the fontanelles have closed and when the skull is plastic, the head is expanded to an abnormal size. The pressure of the accumulated fluid gradually destroys the brain tissue so that the convolutions and sulci may be completely wiped out. Frequently, autopsies show the brain to be nothing but a shell surrounding huge ventricles. The causation is not definitely known, but occasionally it is attributed to chronic meningitis, syphilis, toxic factors or tubercular tumors. The draining

off of the cerebrospinal fluid produces only temporary relief, and even the removal of the principal cause is usually ineffective, since the damage to the brain tissue has already taken place. Obviously, if a disorder of this kind continues to progress, eventually all mental activity must cease, but fortunately most of these children die at an early age. There are some exceptions, however, when the disorder is arrested, and the mental state varies from that of the lowest grade of idiocy to the normal. The number of cases where there is no mental impairment is very small. The hydrocephalics suffer physical disabilities of the special senses, and paralytic and epileptic seizures are often found as accompanying abnormalities. The muscles of these individuals are usually weak and coördination, poor; hence they are not able to do much physically. With regard to disposition, most of them are cheerful, good humored, affectionate and easy to get along with.

Macrocephalus. The macrocephalic, like the hydrocephalic, has an abnormally large head, but in this case the extreme size is due to an increase in brain tissue rather than to an increase in cerebrospinal fluid. The increase does not, however, take place in active brain cells, but in the supporting elements known as glia cells.

Microcephalus. From superficial observation the microcephalic appears to be the direct opposite of the hydrocephalic or the macrocephalic, for in this type of disorder the head is abnormally small. Tredgold (922) has suggested that the term "microcephalus" be applied when the head is less than 17 inches in circumference, but he reports a case in which the head circumference was 21 inches. The cone-like (oxycephalic) shape of the skull is, however, the distinguishing feature of the condition. There is a marked recession of the chin and forehead and usually a flattening of the occipital region. The hair is coarse and thick, and the scalp is too abundant for the skull. The brains of the microcephalics are extremely small, some being reported to weigh only 170 grams as compared to 1375 grams for the normal male and 1240 grams for the normal female. While it is true that most of the microcephalics have brains weighing several hundred grams more than the lowest reported, they are still much lighter than those of normal persons. The convolutions are simpler and less numerous than those of the normal brain, and many developmental anomalies occur, even in some cases the absence of the corpus-callosum.

There is considerable range in their mental endowment, though most of them belong in the imbecile group. They appear to be good natured, easy to handle, and many of them are imitative, but otherwise they evidence the usual deficiencies of feeble-mindedness.

The exact cause of the hypoplasia of the brain is not known, but since many of the brain cells appear to be embryonic, it is possible that metabolic or chemical imbalance during the embryonic period may account for the malformations. Murphy (923) has reported that extensive application of x-rays to the pelvic region in pregnant women frequently results in subsequent microcephalic off-spring.

Mongolism. The name for this group of individuals was suggested by the close resemblance of their physical characteristics to those of the members of the Mongolian race. The condition was formerly called "Mongolian Idiocy" since it was supposed that idiocy was the mental status of the members of the group. Numerous studies have indicated that the mental status is variable and that the Mongols are more frequently imbeciles than idiots. Pototzky and Gregg (924) in a recent study of Mongolism reported a mean I.Q. of 46 or that of a high grade imbecile. They found the range in I.Q.'s to be from 71 to 24. In this study the social age, measured by the Vineland Social Test, was found to be higher than the mental age, a fact which may make them appear more intelligent than they really are. In the same study it is claimed that the Mongols do not possess the stereotyped pleasant personality that is typically claimed for them, but that some of them are stubborn and obstinate. The tendency toward imitation may possibly be accounted for by their inability to inhibit. The study purports to show that they are capable of mental and social development to a much higher level than heretofore supposed.

Despite the fact that numerous factors have been suggested as being responsible for the anomalies, the causation is still obscure. The early theory of Crookshank maintaining that Mongolism is a reversion to a former phylogenetic type has found little support in recent investigations. In fact, the increasing number of cases of Mongolism reported in the Negro and American Indian races in which the infusion of Mongol blood is improbable is evidence against the point of view.

The importance of syphilitic infection is still stressed by some, but the majority of recent investigations do not support the position, the claim being that the report of positive Wassermann is not significantly higher in Mongols than in random samples. Mayerhofer (925), reporting on 50 cases, and Turpin (926), on 104, found no instances of positive Wassermann; and several other investigators report the number of positive reactions found, to be negligible.

Parental alcoholism has been investigated, but there are no conclusive findings with regard to its importance as a causative agent.

The arrest of mental development as a result of increased amniotic

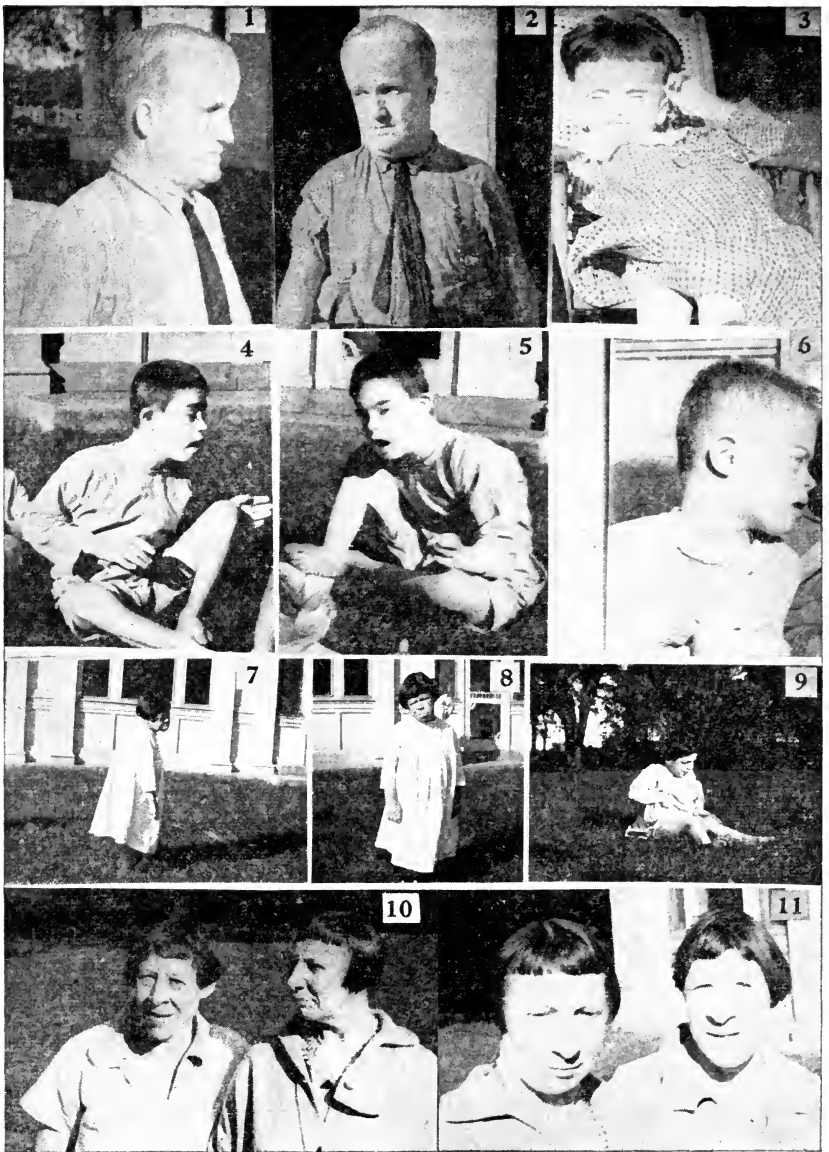


PLATE IV

Numbers 1, 2 and 3 show the extreme size of the head in hydrocephalus.

Numbers 4, 5 and 6 are examples of mongolian idiocy. The facial characteristics from which the name is derived are evident.

Numbers 7 and 8 show a forty-five-year-old myxedema dwarfed in both mind and body.

Number 9 is a cretin.

Numbers 10 and 11 are microcephalic sisters. The hair dress of the one on the left in number 11 makes the head appear much larger than it really is.

pressure has been suggested, but experimental evidence is lacking and Battistini is the only recent investigator to accept the theory that Mongolism is caused by the abnormal smallness of the amniotic sac. A few investigators have maintained that the use of contraceptive chemical agents is responsible for the occurrence of Mongolism. Scientific evidence for the position is lacking, and it is to be noted that the disease was known long before the use of chemical contraceptives. Other investigators have suggested that the damage to the uterine mucosa caused by surgical curettage may be significant.

The endocrine origin of the disease has been recently supported by many investigators. Clark (927) maintains that Mongolism is caused by fetal hyperthyroidism ceasing at birth. A number of investigators have attempted to explain the condition in terms of polyglandular alterations in which thyroid dysfunction plays a prominent rôle. Benda (928), who has made some valuable contributions to the understanding of the disorder, sees the dysfunction of the hypothesis and hormonal secretion of the basophile cells as important causation factors.

Goddard (929) and others have reported that the Mongolians are often the last born of large families, the implication being that the condition is due to uterine exhaustion that causes the mother to be unable to bring the offspring to full development. Murphy (930) has reported a statistically significant tendency for the Mongol child to be born late in the family, even in families of from 2 to 5 children. The birth position of a feebleminded child not of this type is said by Murphy to be a matter of chance. The hypothesis that Mongolism is caused by defective ova has continued to gain favor. This position is mainly based upon the fact that Mongols are often offspring of old mothers. There is still much disagreement regarding the importance of birth position, but Bleyer (931) has presented the most complete information on this topic. In addition to the above opinions it should be noted that many investigators believe Mongolism to be of genetic origin.

The condition is characterized by three principal anomalies of the skull, eyes and tongue. The skull is small, rounded, greatly diminished in anterior-posterior measurement, and the face and occipital region are both flattened. The tongue is large with hypertrophied papillae and large transverse fissures. These patients are known to be great tongue suckers and this, coupled with the fact that their mucous membranes are easily susceptible to injury, may account for the condition of the tongue. The eyes are narrow and slitlike, sloping upward and outward, and abnormalities such as ectropion, cataract and strabismus are not

uncommon. The hair is usually dry and sparse and the mouth slightly open. Circulatory abnormalities, particularly of the extremities, are frequently present. These individuals are usually of a pleasant, happy disposition and are easily amused. There is considerable range in their mental ability, but most of them are imbeciles.

Amaurotic family idiocy. This type of mental deficiency is the result of a pathological brain disorder of hereditary origin which is accompanied by eye disturbances usually resulting in blindness (amaurosis). It is customary to distinguish two types of the disorder, infantile and juvenile, although occasionally a third or adolescent type is seen. The amaurotic infant is normal at birth, but in the infantile type symptoms of the disorder begin to show somewhere between the third and sixth month of life. At this time intellectual development is arrested and the vision begins to fail, finally leading to blindness. The course of the disorder is progressive and usually results in death at about 2 years. The symptoms of the juvenile type usually appear between the fifth and seventh year and result in death in about 5 years. In both types the arrest of mental development and the developing blindness are accompanied by muscular disturbances and epileptiform seizures. Although the exact hereditary factors are not known, it is generally believed that the genes responsible for the transmission operate as Mendelian recessives.

Other types. Many other types of feeble-mindedness may be distinguished in which paralysis, epilepsy, syphilis and acute inflammatory conditions may be pointed to as either direct or indirect causes. Most of the paralytic types result from injury in instrumental delivery, injury in the early months of life, or from tumors of the brain. In some cases the cause may be a congenital lack of development of certain portions of the brain. Most individuals who suffer paralysis from such causes show some subsequent defect.

Epilepsy accompanies many types of mental deficiency. In some cases there seems to be sufficient evidence for the belief that when the epilepsy appears early and frequently, it may be the chief cause of the mental defect. Such patients show great irritability and sudden outbursts of temper.

ETIOLOGY

Despite the fact that a large percentage of the defectives show a positive Wassermann reaction, Dayton (932), after a study of thousands of cases, offered the opinion that syphilis is a negligible factor in the causation of feeble-mindedness. Ramsey (933), however, has pointed

out that congenital syphilis does not always show a reaction to the blood tests, but is the result of injury to the germ plasm of the parent. It is also true that an early infection may cause syphilitic brain lesions with resulting mental deficiency. Doll (934) has presented considerable evidence to substantiate the point that some cases of mental deficiency are directly traceable to birth injuries.

Infectious fevers such as pneumonia and influenza may cause inflammation of the brain and its meninges, and as a consequence mental development may be retarded. The condition usually begins with an acute attack including severe headache, accompanied by fever and vomiting and followed by loss of consciousness, delirium and convulsions. In some cases the resulting brain lesion may be so extensive as to damage permanently the child's mental functions.

Alcohol has been spoken of as a possible cause, but at the present time it is safer to think of it as an accompaniment rather than a cause. Stockard (935), after some careful and extensive work with guinea-pigs, draws the following conclusion:

With full appreciation of all the difficulties in transferring the results obtained from the study of one animal kind to another, we may assume from the experiments on the effects of alcohol in development and inheritance that it is highly improbable that the quality of human stock has been at all injured or adversely modified by the long use of alcohol.

Recently the Rh factor in the blood has been viewed as a possible cause of mental deficiency. Investigations by Yannet and Lieberman (936) and by Snyder, Schonfeld and Offerman (937) tend to support the position that many cases of mental deficiency of previously unknown origin may be due to Rh immunization.

Consanguinity or blood relationship has also received considerable attention. There has long been a popular belief that the marriage of cousins is dangerous because their offspring are doomed to be feeble-minded. This popular traditional belief seems to prevail even in cases where the heredity is particularly good. The facts of heredity, however, fail to offer much basis for the assumption. If the hereditary factors are in any way (and at the present time we believe such to be the case) important causal agents in the development of feeble-mindedness, then the possibilities of defects appearing in the offspring of a union of cousins depends upon the type of germ plasm from which the cousins have developed. If there is a history of defect in the family, then the possibility of a defect in the offspring is doubled because the potentiality for defect may be present in the germ plasm of both parents. The fear that persists regarding the mating of cousins results from observances of such

examples as the following. Two apparently normal people who are cousins marry and have, let us say, feeble-minded children. Since to all outward appearances the parents were normal, the fact that they have defective children terrifies their friends and makes them greatly fear the results of a marriage of cousins.

The reason for such a belief, however, results from an inability to distinguish between real normals and apparent normals. In Mendel's (938) original experiments with his pea plants, he showed that some plants would produce offspring all like their parents and others produced another kind of offspring in addition to their own kind. The first of them are pure, while the second are hybrids. The same thing may be true of humans; some are pure, while others are hybrids. In other words, some of them are pure normals, while others may appear normal, but have the potentiality for feeble-mindedness. Normal parents can have feeble-minded offspring theoretically only when both are hybrid, and then they may appear in the simple Mendelian ratio of three normals to one defective. This will take place regardless of whether the parents are close relatives or not. If, however, the two parents are close relatives, the chances are comparatively great that both will be hybrids, hence the feeble-mindedness. The fact that has generally been overlooked is that inbreeding does not allow only bad qualities to express themselves in the offspring, but also the good qualities. Inbreeding then can assist in the selection of a good trait as well as bad ones. This fact is well known to animal breeders. Practically all of the best breeds of horses and dogs are closely inbred. If, therefore, a careful examination of the family record shows no objectionable traits, then there should be no objection to the marriage of cousins. Thus in the Darwin family, with exceptionally good genes the marriage of cousins is highly desirable since the inbreeding tends to bring out the good in the stock. If, however, there is a bad recessive gene in the family, both cousins may be carrying it, and although they may appear normal, some of the children of the mating may be expected to be defective.

The rôle played by heredity in the causation of feeble-mindedness has been extensively studied, and while there is no general agreement, most authorities admit that hereditary factors are of great importance. The mass of evidence accumulated to show this importance centers around such studies as that made by Dugdale (939) in 1877. Davies (940) makes the following statement regarding the Dugdale study:

While written from the standpoint of penology in order to show the combined influence of heredity and environment acting on the individual in the production of crime, this study, nevertheless, revealed how heredity in a degenerate stock, especially when fostered

in an isolated community, tends to repeat itself generation after generation in all kinds of anti-social behavior. The Dugdale study included the progeny of five notorious sisters, of whom the most notorious was known as "Margaret, the mother of criminals." There were seven hundred and nine individuals included in this study, of whom five hundred and forty were of Juke blood and one hundred and sixty-nine were of "x" blood connected by marriage or co-habitation. Of these seven hundred and nine, Dugdale stated there were one hundred and eighty who had either received poorhouse care or outdoor relief aggregating eight hundred years. Among the social offenders were listed one hundred and forty criminals and other law breakers, sixty habitual thieves, fifty common prostitutes and forty women venereally diseased. Dugdale estimated that the total cost to the state resulting from the social failures of this one stock over a period of seventy-five years amounted to \$1,308,000. Although Dugdale reports only one case of outright idiocy, one of insanity and one of epilepsy in the Juke blood, it is apparent that we have here a typically defective stock in which by modern methods of examination, a large amount of mental defect would be found.

A number of other studies might be cited to support the same theory, the most notable of which is that of the Kallikak family. Martin Kallikak mated with two women, one defective and the other normal. The descendants of these two matings were traced through several generations. The study reveals that the descendants of his mating with the feebleminded woman showed a tremendous number of social incompetents including prostitutes, criminals, alcoholics, mentally deficient and insane individuals. In contrast to this picture, the descendants resulting from his mating with the normal woman include numerous reputable and respected citizens among which were physicians, lawyers, teachers, judges and successful business men. In such studies, however, it is not possible to prove that the persons from whom the tracing begins were really defective since no criterion of measurement was then known.

Goddard's (941) extensive and careful study of children in the Vineland Training School seemed to indicate that normal intelligence was inherited according to the Mendelian unit, and feeblemindedness through a defect in that unit.

Davenport (942) came to the conclusion that feeblemindedness was a legal or sociological term rather than a biological one and was, therefore, due to the absence now of one set of traits and now of quite a different set. He found that when two feebleminded persons mated (nulliplex for normality), the proportion of defective offspring was not 100 per cent, but only $77\frac{3}{10}$ per cent.

Myerson (943) has challenged the validity of the conclusions reached by Goddard and others, stating that many of the cases of feeblemindedness which they referred to family inheritance may have been caused by the direct effects of alcohol and syphilis.

Recently many authorities have criticized the attempts to show the

importance of hereditary factors in mental deficiency by elaborate genealogical studies such as that of the Jukes and the Kallikaks. Morgan (944) writes:

The numerous pedigrees that have been published showing a long history of social misconduct, crime, alcoholism, debauchery, and venereal diseases, are open to the same criticism from the genetic point of view, for it is obvious that these groups of individuals have lived under demoralizing social conditions that might swamp a family of average persons. It is not surprising that, once begun, from whatever cause, the effects may be to a large extent communicated rather than inherited.

The author has had the opportunity to trace a family history which could be used as the Jukes and Kallikaks have been used to stress the importance of hereditary factors. The rôle played by the unhealthy, environmental conditions in keeping this family at such a low level, however, must also be evaluated. The individuals discussed below are all members of the family of a young schizophrenic patient whose case has been thoroughly discussed in the chapter on functional psychoses. The accompanying chart (Fig. 38) shows the complete family group, and a number of the members are discussed below in some detail.

FAMILY HISTORY

Paternal history

The paternal grandfather of the patient in question is an illiterate farmer sixty-eight years of age. He deserted his wife twenty years ago, after having had eight children by her. Twelve years ago he moved to another state where he has been living with a feebleminded woman by whom he has had six children. The two oldest children were placed in an orphanage; the third child died in infancy; the fourth is living with a legitimate daughter of the first marriage, while he and his wife have two girls, six and fifteen months, at home with them. The woman with whom he lives is definitely feebleminded and quite incapable of keeping a good home. The grandfather himself is heavily alcoholic and impresses one as being of low grade mentally. The paternal grandmother, who comes of a much higher type of family, is now living in the South. She went through the first year college and then ran away to marry the grandfather. There was no history of any instability until three or four months following the birth of her first child when she had to go to a state hospital for approximately a month. Since then she has had the same experience each time she delivered a child, that is, about four months after delivery she would have a manic attack which necessitated about a month's hospitalization. She stayed out of the hospital for two years following the birth of the last child but has been in and out of the state hospital ever since. Her hospital periods are growing longer, and her adjustment in the community, shorter. This is partly due to the fact that she lives in a very unfavorable environment when out of the hospital. In the hospital she has always been diagnosed as manic-depressive. One maternal great-uncle who entered the state hospital as a young man and died there within a few years was also diagnosed manic depressive.

Father's laterals. R. was said to have been a very bright young girl; she is now married and has three children. She assumed charge of the household in her mother's periodic

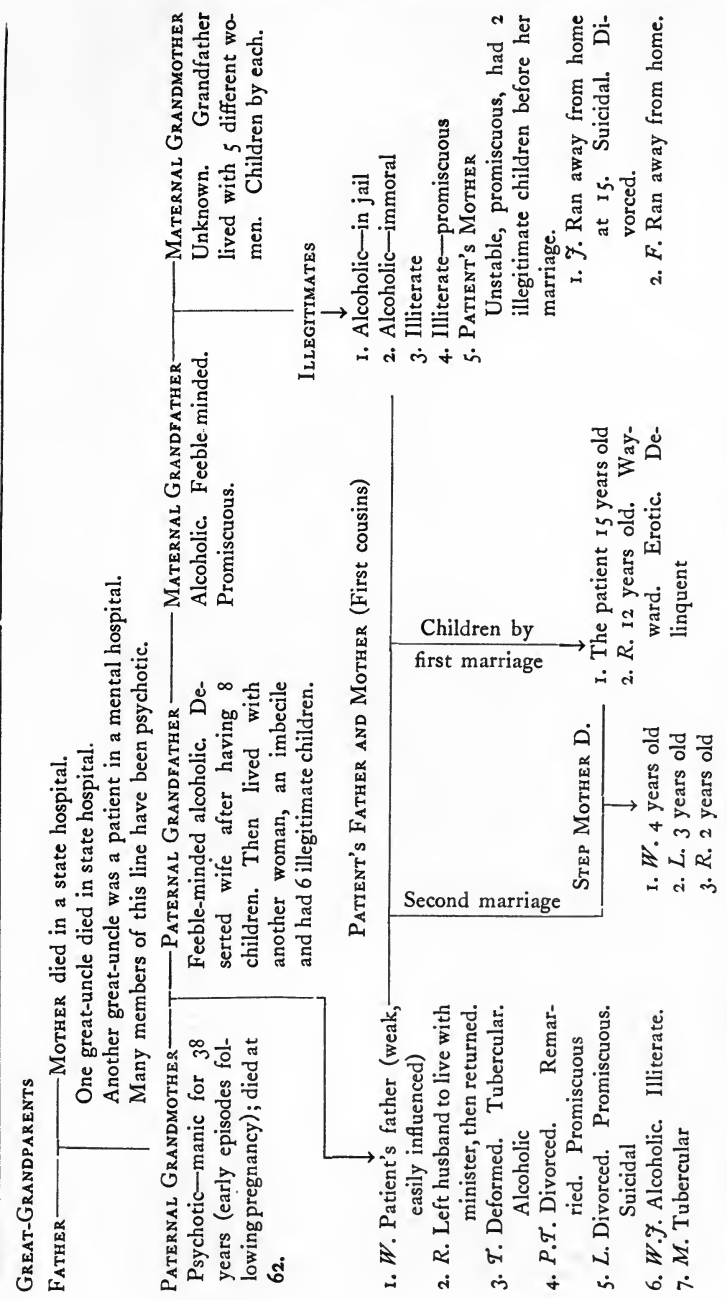


FIG. 38. Chart showing family history of a young pre-schizophrenic patient

hospitalizations. When about fifteen years of age, she married in order to escape from her home and went to live in a distant city. After her home was firmly established, she gradually took in one after another of her siblings so that they might get away from home. She was considered quite stable until a year ago when she fell in love with a minister, becoming so infatuated that she broke up her home, placed her two oldest children with her husband's mother and set out with her youngest child to meet the minister in another state. When he failed to meet her, she became reconciled to her husband and is now in her own home again.

T., as a child working in the field, ran a rusted pitch-fork through a toe and through neglect his leg and pelvic region became infected. He had eight or ten operations to remove parts of his leg and there is a residual lameness and tuberculosis. In spite of the fact that he has had no education at all, he is said to be quite bright and well-known as a skillful designer of houses. He is married and has two children who are very advanced in school for their ages. Although heavily alcoholic, he supports his home adequately.

P. T. was placed in an institution when quite a small child during her mother's various hospital periods. When she was eleven years old, the oldest sister sent for her and she worked in a factory close to her sister's home until she was thirteen. Because she resented the fact that she had to turn her pay-roll over to her sister, she ran away to New York, where she entered the show business as a dancer. At fifteen she became a member of the Ziegfeld Follies where she remained until she was eighteen. She then returned to the city where her oldest sister resided and married a young dancing instructor. The husband's family objected to the marriage and paid P. T. a large sum of money to divorce him. At about this time she met a woman considerably older than herself to whom she became very much attached and with whom she lived for two years. This woman taught her "the value of immoral life." After these two years with Aunt Annie, as she called the woman, she left her and lived alone for two years. While employed in a life insurance company as a telephone operator, she had a "nervous breakdown" and was sent by the company to their sanatorium for mental diseases. She is said to have had an excited, rather manic period for one week. She stayed there for three months, and on her return home, took an apartment and sent for her younger sister M. to live with her. At this time she had become engaged to her second husband, but when she suspected that he and her younger sister were in love with each other, and he verified her suspicions by his own statement, she forced him to marry her saying that she could not allow her baby sister, whom she loved so dearly, to marry a man like him. He, however, has never lived with her and never supported her. She is sexually promiscuous, has no standards, gets large sums of money from as many men as she can, though interestingly enough, she uses this money not for herself but for the various members of her family. A year and a half ago she met a young Italian whom she could not completely control. When he decided to leave her, she phoned him and asked that he call at her office. When he appeared she took poison, probably iodine, and created quite a scene in the office. That same day she had a very violent manic outbreak (whether before or after taking the poison could not be definitely ascertained). During this period she bit people in the office who attempted to restrain her and carried on so that she had to be strapped to a stretcher and taken to a general hospital. At the hospital she was diagnosed as suffering from the intense heat, and two hours later discharged to her home. Shortly after arriving home she had another outbreak during which she hid behind the sofa and before she was discovered had swallowed thirty tablets of luminal in a second suicidal attempt. She was unconscious from 8 o'clock that evening until 11 o'clock the next evening. At the volunteer hospital where she was taken she had another manic outbreak. When her

sister came to call upon her, she screamed, yelled, threw flowers all over the room and was quieted only when her sister left. She remained in the hospital five days, was discharged and returned to work three days later.

L. came to live with an older sister when quite young but was not happy with her so she joined P. T. in New York where she modeled shoes. She married but soon left her husband for another man. She has had many affairs with quite wealthy men but later fell in love with a young Baptist minister's son who married her and took her West to live. The home was a happy one until the youngest sister M. came to them on a visit when the young husband promptly fell in love with her. She returned the affection, so L. sent her back South hoping to save the situation. The husband, however, had no more interest in L. and went about with other women. She left him, but has recently returned to him taking with her the three year old illegitimate daughter of her father. She has twice made suicidal attempts.

W. J. is said to have been heavily alcoholic until a year and a half ago when he became engaged to a young school teacher. His eldest brother, the patient's father, has set him up in a small store where he is doing fairly well.

M. was recently diagnosed as having advanced tuberculosis and has entered a sanatorium. She is said to be quite modest and very friendly on a superficial level. Her friends say of her "no one really knows anything about M., she is so quiet."

All of the children except the youngest had to leave school very early or did not go to school at all because the father did not believe in education and demanded the help of the children on his farm. The home life was continually broken by the mother's hospitalizations so that none of them had any standards of what a home may mean.

W., father of the patient, eldest of the children, went as far as the fifth grade when he left to work on his father's farm. He is now a farmer and small store-keeper. He is said to be devoted to his family and the most generous of the whole group. He is easy going, allows himself to be walked over by anyone, is generous to a fault, weak, easily influenced; all of his siblings depend upon him for financial assistance. He is said to be quite stable emotionally. As a young man he boarded with a first cousin, G., who had two children to support and had such a hard time that he felt extremely sorry for her and married her though she was sixteen years his senior. A year after her death he married his present wife.

Maternal history

The maternal grandfather was the brother of the paternal grandfather and uncle of the patient's father. He died at fifty of cancer. He was said to be totally ignorant, very emotional, sexually promiscuous and heavily alcoholic. He had five children by five different women. When the women left him or he put them out, he refused to let them take the children whom he kept and did his best for. Whenever he lived with a new woman, he forced her to take the children that he already had so that none of the children knew who their mother was. The grandfather lived and died in the home of the patient's mother. The maternal grandmother is unknown.

Mother's collaterals. One brother is in jail most of the time because of alcoholism. The other brother is said to be very lax morally and sexually. Two sisters who are illiterate have, however, married and have families respected in their communities. All of these children were illiterate, living a rather roaming existence with their father and various women in whom he was interested.

The mother G. C. was the first cousin of her husband. She died at forty-eight of cancer of the stomach. When she was seventeen, she ran away from her father's home. Her

family heard nothing whatever about her until she came home with two children and said she was the widow of a man named H. Later it was found that these children were illegitimate and had different fathers. She was a very hard worker in her home but was so unsystematic that her hard work brought her no results, and her home was always untidy. She had no friends, felt keenly her own inferiority, refused to associate with people of her own level and repulsed neighbors who might have been friendly to her. She had a deep sense of guilt about her two illegitimate children and tried hard to make amends to them. However, she refused to allow her husband, the patient's father, to spend his money on her two daughters though he was fond of them and wished to treat them as his children. She constantly tried to get her children, both legitimate and illegitimate, interested in higher class groups than her own. In matters of discipline she was most inconsistent, whipping the children severely for some misbehavior which the next time she would entirely overlook. She had a very violent temper, and once during a temper spell, broke her eldest illegitimate daughter's hand. It is interesting to note that she would shelter and aid anyone who was in poorer circumstances than hers. She apparently got a good deal of satisfaction out of feeling superior to someone worse off than she. Her two illegitimate children were J. and F.

J. was said to have been a very bright child, popular with other children and showing a good deal of promise. When she was fifteen years old, the patient was born; and J. resented this very much. She wanted to leave home saying she desired to make something of herself but really because she resented this sister. Because her mother refused to allow her to go she attempted suicide by poison. After this her mother let her go and she soon married. Some years after her marriage, the husband's family learned something of her family history, whereupon she left her husband and is now well established in a hair-dressing parlor in New York. F., now married, was said to have been a very quiet child, given much to day-dreaming. She gave little trouble and rather quietly walked out of the home at fifteen years of age. She is now married and has two children in a stable home.

Siblings

E., the patient, was the first child of the legitimate marriage of her father and G. Her case has been fully discussed in an earlier chapter. R., eleven years of age, is unusually well-developed physically although she has not yet established menstruation. She is a serious problem to her father and step-mother because she smokes, runs around as much as she can, has a nasty nagging disposition and does everything possible to aggravate her step-mother. She has always been entirely self-sufficient, self-centered and has shown no affection for anyone but her father and little demonstrative affection to him, although she respects him and tries not to hurt him. She does not dislike her step-mother but resents her supervision and her attempts to train her in better ways of living. She shows, moreover, absolutely no affection to her little step-brothers, and if they are in her way, she is quite likely to knock them down. She thinks the patient and her difficulties are a great joke. Quite frankly she says she will marry the first man that comes along in order to get away from home.

Stepmother

A year after his first wife's death the father married his present wife, D., who has a high school education and is quite superior to the rest of the family. She had been a next door neighbor of his and his first wife while she lived. She is well thought of by the family and has been welcomed by them. Being quite a leader in the neighborhood she is always

the first one to be called on when anyone in the surrounding district needs help. She keeps a good home, welcomes all of her husband's many difficult relatives and has rather overdone her solicitousness and care for the two step-daughters in fear that they should feel discriminated against.

A summary of the various causes of feeble-mindedness makes it evident that the condition may be inherited, congenital, acquired in early life through injury, disease or poison. Some of the clinical types, as has already been mentioned, may be definitely caused by a particular condition, as cretinism is the result of thyroid deficiency. But in such a case, the mental defect is only one of the many accompanying anomalies of an endocrine disturbance and the disorder is more a problem of endocrine imbalance than of mental defect. Most of the cases, however, are the result of multiple causes.

The above discussion of clinical types is sufficient to suggest to the reader that the causes of amentia are many and varied. In some cases we have referred to the failure of the endocrine system to function properly as is evidenced by the disorder of cretinism. In other cases syphilis, epilepsy, paralysis, injuries to the brain, tumors, acute inflammatory diseases and injuries to the nervous system as a result of birth trauma have been mentioned as the chief causative factors.

SOCIAL SIGNIFICANCE

It is apparent that the intellectual defectives must constitute a definite social problem. This is, in the first instance true, purely from an economic point of view, since a large proportion of them must be institutionalized at a tremendous cost to society. Their participation in general delinquencies, immoralities and criminal acts has also been viewed with considerable alarm. The cost to society is purely an economic and sociological question, but delinquency, immoral and criminal acts must be viewed as abnormal behavior and as such they merit some attention here.

In many of the sociological treatises emphasis has been placed on the relationship between intellectual deficiency and crime and delinquency. In general we have been led to believe that half of the criminal behavior could be accounted for on the basis of feeble-mindedness. Such conclusions have been based on the intelligence records of the inmates of prisons, reformatories and other individuals indicted for crime. These records show that from 40 to 60 per cent of this group are feeble-minded, and consequently it has been assumed that the crimes are the results of the deficiencies. The fallacy of such a belief is, however,

clearly shown by the fact that in the neighborhood of 40 per cent of the entire population is feeble-minded when measured by the same standards. Recent studies indicate that the average intelligence of the normal population is not much higher than the average intelligence of the inmates of the various reform institutions. In other words, the standards used to measure the delinquents, immorals, and criminals have been too high, and actually we have practically as many individuals of low intelligence who are not guilty of such behavior. We have also to remember that the clever criminals are not so frequently apprehended and brought to prisons and reformatories. It, therefore, appears that the intelligence of all criminals, both in and out of institutions, might correspond roughly to the average range of intelligence. As a matter of fact, crime among defectives appears in a certain restricted group that may be called the borderline group and does not appear so frequently in the lower grades of imbeciles and morons. In addition to this fact, a large number of the crimes require normal or superior intelligence for commission, the feeble-minded individual, for example, being incapable of such crimes as forgery and the bogus investment schemes. In brief, though deficiency may be a factor in crime, it must be recognized that the criminality of the defective may frequently be due to the same factors that account for crime in general—that is, socio-economic factors.

IMPROVEMENT OF THE STOCK

The problem of the improvement of the stock by the increase of the reproduction of the fit and the decrease of the reproduction of the unfit belongs in the field of the eugenicist and will be only briefly presented here. All attempts at improvement through the increase in reproduction of the fit have failed dismally; first, because of the difficulties of deciding upon the "fit" and second, because of the impossibility in our present socio-economic system of securing any increase in the rate of reproduction in these classes. The second program, the decrease in the reproduction of the unfit is, however, of interest to us since the feeble-minded are definitely recognized as unfit. This is the only practicable program for eugenics at the present time, and various methods have been proposed to secure the objective.

The first of these, the lethal method of extermination, is obviously impossible. The prevention of mating has been presented as a possible solution, and although it is helpful with regard to certain definite classes, it does not begin to solve the problem. The lower grades of

feeble-minded will continue to mate with or without marriage if given the opportunity. At one time segregation was viewed as an eugenical panacea, but even the most enthusiastic proponents of this notion are now convinced of its futility. The failure of isolation as a solution to the problem may be clearly seen by reviewing a few significant figures. In 1904 the total number of patients in institutions for mental defectives was 14,347. In 1923 this figure had risen to 42,954, and by 1938 approximately 80,000 were accommodated in special institutions. In spite of the fact that in this period of time the number of institutional cases has increased more than fivefold, we have still only segregated about one-fifteenth of the conservatively estimated 1,250,000 defectives in this country. The ability to institutionalize all of the mentally defective appears to be out of the question; and even if this were possible, it is generally believed that the proportion of the defect thus prevented would amount to but a small fraction of the total.

Sterilization is believed by many to offer one of the most hopeful means for the decrease of reproduction of the unfit. In the male, sterilization consists in the cutting of the vas deferens (the duct which conveys the spermatozoa from the testes to the seminal vesicles) and is relatively a simple operation. The result is a sterile individual (that is, incapable of having offspring), but there is no change in the sexual functions. In the female the operation consists in cutting the Fallopian tubes (the means of conveying the ova from the ovaries to the uterus), a process which involves entering the abdominal cavity and is, therefore, more serious than the operation in the male. There is, however, no disturbance of sex or other organic functions in either case except that offspring are impossible.

In 1907 Indiana passed the first human sterilization law in this country providing for the compulsory sterilization of "confirmed criminals, idiots, imbeciles and rapists." This law later extended the scope of sterilization to non-institutionalized mental defectives upon the recommendation and approval of the proper authorities. State after state followed the lead of Indiana, though many of the laws were later repealed or declared unconstitutional. In 1927 the United States Supreme Court upheld the constitutionality of the Virginia sterilization statute in the famous *Black vs. Bell* Case, thus easing the way for subsequent sterilization legislation. Following this decision eugenic sterilization laws were enacted in many states. The groups subject to sterilization are not the same in all of the laws. Some statutes include persons suffering from mental disease, habitual criminals, sexual perverts, rapists, drug addicts,

and epileptics. Most of the laws authorize compulsory sterilization for selected feeble-minded persons, but some authorize the sterilization only with consent of the patient or his legal guardian.

Despite the fact that eugenic sterilization laws exist in over half of the states of this country, in only a few states are the laws in operation, nearly one-half of the total operations having been performed in California. In most states, strong opposition and administrative difficulties have prevented the enforcing of these laws. The number of mental defectives operated upon since the laws came into effect represents but a small fraction of one per cent of the total in this country, and consequently at the present time sterilization has had little effect as a measure for reducing defective stock.

The theological and moral objections to the practice of sterilization of defectives are too far removed from logic to be discussed here, but the scientific objections are much more formidable. The position taken by many geneticists is that, as yet, we do not have sufficient knowledge of hereditary factors to warrant the application of eugenic sterilization to any appreciable extent. It is estimated that about 89 per cent of inheritable mental defect is transmitted by normal "carriers," that is, persons who are not themselves defective. Since we are not able to tell who these carriers are, the sterilization of all of the feeble-minded at once would reduce the number in the next generation only about 11 per cent. In later generations, according to Jennings (945), preventing the propagation of the feeble-minded would have little effect other than keeping down the number to that already reached. As has already been pointed out, mental defect is not a single clinical entity, but a condition dependent upon varying causes. Certainly genetic analysis of these complex entities is not possible at present, and more research is necessary before sterilization can be scientifically employed on a considerable scale.

In view of the fact that the primary criterion in judging feeble-mindedness is the social one, it should be noted that there are grave social objections to sterilization at the present time. The determination of who is to judge the standards of social fitness and desirability constitutes a serious social problem. The sterilization laws might easily be converted from a useful tool into a perilous weapon in the hands of unscrupulous politicians. The danger of placing sterilizing power in the hands of men filled with hatred against individuals on racial, religious or political grounds is obvious. The social dangers of the practice may be most clearly seen by referring to the wave of enthusiasm for sterilization in

Germany where under Hitler 9 vaguely defined categories of humans including the "slightly feebleminded" were liable to sterilization.

Besides segregation and sterilization, methods of contraception and the prohibition of marriage of the feebleminded have been urged as preventive measures against hereditary defect, but so far neither of these measures has been of much value. With the failure of the major measures of prevention, more emphasis has been placed upon other types of social control such as early identification and registration, special classes, institutional care, parole and boarding out. The ultimate solution, however, lies in prevention rather than therapy and involves us again in the problem of whether the greatest gains are to come from the seeking of more satisfactory environmental conditions or from genetic sources. In this connection the opinion of the distinguished geneticist, H. S. Jennings (946), is worthy of consideration.

The great difficulty about this is that bad living conditions often produce the same kinds of results that bad genes do. . . . So long as living conditions are bad, we do not know what ills are due to poor genes. We must therefore correct the bad living conditions, not only for their directly beneficial effect, but also for the sake of eugenics. When this is done, it will be possible to discover what defects are primarily the result of defective genes, and then to plan measures for getting rid of these genes: measures for stopping the propagation of their carriers. That is, as a preliminary to the effective work of eugenics other reforms must be carried through. Measures of public health must be carried out, overwork and bad conditions done away with, faults of diet, both quantitative and qualitative, corrected, economic ills conquered, grinding poverty abolished. When the human plant is given conditions under which it unfolds its capabilities without stunting, poisoning and mutilation by the environment, then it will be possible to discover what ills are due primarily to defective genes, and to plan such measures as are possible for their eradication. Acting on such precise knowledge, far more rapid results may be hoped for than from the present blind action in merely encouraging the propagation of certain classes, discouraging that of others. . . .

To join with energy in present attempts to correct environmental evils of society is one of the two most important steps for the advance of eugenics. Until the preventable environmental ills are largely corrected, what eugenics can do is relatively little. The other important step toward increased efficiency of eugenic measures is to promote the advance of genetic science, that the normal carriers of defective genes may become identifiable.

TREATMENT AND EDUCATION

We are now fully cognizant of the fact that the feebleminded are definitely limited, and therefore they cannot be expected to go beyond a certain point depending upon the extent of the defect. The problem regarding them, therefore, resolves itself into training them to take a place in society that is within the limit of their possibilities. Since

they constitute a particularly large group, it is impossible for all of them to be institutionalized, therefore special classes have been organized in the public schools with the aim of training them to perform useful tasks. The newer and more sensible program is designed to prepare them to take their own place in the social and economic world rather than the impossible program of attempting to educate them to take a higher position. They are now taught simple, but fundamental habits of hygiene and cleanliness, and instruction is given in routine phases of farming, gardening, and simple industrial and mechanical operations. Wherever the capacity merits it, instruction in academic work is provided.

We are also continually being impressed with the fact that the much talked of inability to control the impulse is the result of our failure to train them systematically. We have been too prone to remain idle and allow pernicious activities or habits to develop and then throw up our hands in horror at the impossibility of changing these habits. In most cases there is no reason for such pessimistic notions as are prevalent regarding the lack of inhibition of the feeble-minded. This apparent lack of inhibition is frequently nothing more than a failure to give adequate training in the control of impulses. In this connection, it is interesting that the most helpful aid in the teaching of these lessons is play, the same activity which has such an outstanding rôle in the development of normals. A carefully worked out and well supervised physical education program will go a long way towards solving this problem. The control of impulses and the important lessons of life are no-where better and more easily taught than in vigorous, competitive games, and we have learned that in a large measure this applies to the dull as well as to the normal.

SUPERIOR INTELLIGENCE²

The genius, or the person with superior intelligence, has not been studied with the same zest that has fired the study of the defective. If we consider the man of average intelligence to be the normal, we must necessarily be concerned, in the study of abnormals, with those above the average as well as those below it. The possibility of defining genius

² The experimental work is not discussed here. For a more thorough account the reader is referred to such works as the following. Huntington and Whitney: *The Builders of America*. William Morrow and Co., New York, 1927; Popenoe and Johnson: *Applied Eugenics*; Macmillan and Co., New York, 1920; Terman, Cox, et al.: *Genetic Studies of Genius*. Stanford University Press, California, 1926-1930.

or the specially gifted is probably hopeless. Cattell (947) attempted to arrive at some conclusion by measuring the relative amount of space devoted to a given name in encyclopedias and biographical dictionaries, but ran up against the problem of whether eminence and genius could be considered synonymous. Galton (948) offers some evidence to show the relationship between genius and eminence in the following statements:

1. An individual who attains eminence is more than two thousand times as likely to have eminent relatives as a person who does not attain eminence.
2. The more distantly related a relative is to an eminent man, the less likely is the relative to become eminent.
3. There is a tendency for inherited ability to be specified.
4. Individuals who attain eminence tend to be very precocious and to show marked manifestations of their superior ability early in life.

The argument that training and opportunity, rather than inherited ability, are the important factors was also combated in this study which showed an advantage in favor of the real sons of eminent men over the adopted ones of popes. Galton also believed that special and specific abilities were inherited.

In the language of the mental tester, a genius is an individual with an intelligence quotient above one hundred and forty, but there are many reasons which might be presented to show that an individual should not be classified as a genius merely on the grounds of a superior intelligence quotient.

The mental make-up of any individual must be considered as including personality traits as well as intellectual ones, and just as we view some mental defects in terms of personality, so we may find certain personality traits to be responsible for the higher grades or geniuses. The popular belief that genius is very close to insanity is well known, but is based on a few observations of especially gifted persons who have behaved queerly. Lombroso (949) believed that the great overdevelopment of certain traits in the genius was accompanied by certain defects which pointed toward degeneration. This idea was popularized by Max Nordau (950), and many people still believe the genius to be at least partially insane. This idea is supported by such examples as Napoleon and Dostoevsky who were epileptics, the former showing some strong paranoid trends; Nietzsche and Charles Lamb, who were both definitely mentally sick; John Clare, who spent a large part of his life in an insane asylum; and a host of others who are pointed to as having been queer people. It would, however, be no more difficult to

select a list of great men who were certainly not insane. While it is impossible to reach any worthwhile conclusion from the consideration of a few particular cases, it is obviously true that our greatest work is not done by the residents of mental hospitals. The genius may suffer from a psychosis or psychoneurosis just as the feeble-minded, but such is not necessarily the case.

Some theorists believe genius to be the result of special trait endowment. Such a theory assumes that the genius is born with a predisposition to the development of exceptional superiority in some particular field. Thus certain individuals are originally endowed with specific traits which predispose them to become great musicians, poets, mathematicians, or scientists. Our present biological information offers no explanation of such possibilities, so for the present we must view the idea as being purely theoretical.

PSYCHOLOGICAL DEFICIT

A discussion of the degree of intellectual ability possessed by individuals is perhaps incomplete without some reference to the loss in efficiency that may come about from a variety of causes. No one could have studied people with any exactness without recognizing the fact that with increasing age and a variety of diseases, some loss in intellectual ability is manifest. A considerable body of research on what may be called psychological deficit has been accumulated, but is too lengthy to report here. The following summary and conclusion concerning the nature of deficit are taken from the excellent work of Hunt and Cofer (1951), and a reading of the full report is recommended for everyone interested in the problems of psychological deficit.

1. Pseudo-measurements of deficit with standard tests have shown some degree of deficit in all the disorders except, possibly, the psychoneuroses, in the aged, and in patients with surgical brain injury. The deficit is largest in the "organic" psychoses, but some schizophrenics, particularly those of the hebephrenic subgroup, show deficits as large as those in the "organic" disorders. The present tests of intelligence and deficit are not so well adapted as the tests of "abstract" ability to uncover the deficit following surgical brain injury, but the latter are still not well standardized nor have they been well adapted for scoring.

2. Tests of vocabulary and information are failed least often, and tests involving conceptual thinking, sustained associative thinking and speed are most regularly failed. In the feeble-minded and in cases of brain injury in infancy the pattern of success and failure differs considerably from that in the disorders and that following adult brain injury. Although the patterns in "functional" and "organic" disorders show many similarities, there are some interesting differences.

3. In studies of specific aspects of behavior the evidence of deficit consistently becomes more pronounced as either receptive or expressive performances become more complex.

4. Although schizophrenics show excessive variability in the expressive indicators of emotion, they show no evidence of "apathy" on these indicators, and schizophrenic startle reactions are exaggerated. Evidence of "apathy" shows clearly, however, in the overt behavior of these patients and appears as a loss of interests.

5. Reversal of the "fatigue effect" with continuous work, slowness of perceived fluctuations in ambiguous figures, and possibly certain alterations of the patellar reflex appear specifically characteristic of manic-depressive patients.

6. Evidence of retrograde amnesia in the "organic" psychoses confirms clinical observation. Deficit in memorial efficiency appears to be more a function of aging than psychosis, however, and some evidence indicates that this deficit is more a matter of impressionability or modifiability than of retention.

7. While the deficit in the aphasias is greatest in performance involving language, it is certainly not limited to language performances.

8. Studies of the thought processes, especially those using the sorting tests and the other tests of "abstract" ability, have brought out marked deficiencies in patients with "organic" psychoses, with aphasia, with brain injuries outside the speech-areas, and with schizophrenia.

9. So long as one looks only at the success of patients on these thought tasks, the deficiencies in schizophrenics appear similar to those in the "organic" conditions, but differences appear when experiments are designed to bring out motivation and other factors controlling performance.

10. In reviewing these investigations of deficit, we have developed the hypothesis that intelligent behavior and thinking are dependent upon both fundamental capacities and learned skills. These fundamental capacities we conceive to be based somehow on neural structures and to consist behaviorally of ready modifiability of response and of capacity to sustain several attitudes or tasks simultaneously, to shift readily from one to another, and to synthesize them into a single complex operation. In order for such capacities to be manifest in test-situations, the skills involving them must have been learned. We conceive these skills as higher-order habits acquired through and continually reinforced by the individual's social living. We admit that knowledge of these thought skills and of how to teach them constitutes a hiatus in the field of psychology. The deficit shown in the "organic" psychoses, in the aged, and in cases of adult brain injury we should attribute largely to damage to the neural structures underlying these performances. Such a deficit may show as reduced modifiability, as inability in performances where many attitudes or tasks must be sustained simultaneously or in performances that involve shifting readily from one attitude to another. Those deficits from which the structurally damaged individual recovers with training may be conceived as resulting from damage to the architectonic arrangements through which these particular performances are organized. The fundamental capacity upon which they depend is not ruined so long as the performances can be relearned, which presumably must involve either healing of tissue or new architectonic arrangements. The deficit in the "functional" psychoses, and particularly in schizophrenia, we conceive as an extinction of standards for performance and of thought skills that have been socially rewarded. The deficit in these disorders is also complicated by conflicts between response tendencies and by distraction from idiosyncratic preoccupations which arise as substitutes for the socially rewarded skills and responses.

11. In the future, we should like to see more experiments to bring out differences in the factors controlling performance, and we should like to see every technique applied to representative samples of the whole gamut of disorders and conditions. Only then can the conclusions of today be denied, or verified or amplified.

EMOTIONAL DEFECTIVE STATES

In the beginning of this chapter it was stated that emotional defects, as well as intellectual defects, would be studied under the heading of mental deficiency. In general the term "mental deficiency" has been used to refer to the failures of an intellectual or ideational nature, but it should be understood that the defect may also appear in emotional responses. As early as 1835 Prichard (952) drew attention to certain states which were characterized by a disorder of the affections and feelings in contradistinction to understanding and intellect. These states were referred to as moral insanity or moral imbecility. Later the term "moral defective" was accepted; and though it is an obvious misnomer, it is still in current usage. The type of disorder under consideration may be clearly understood by examining the following quotation from Prichard.

There is likewise a form of mental derangement in which the intellectual faculties appear to have sustained little or no injury, while the disorder is manifested, principally or alone, in the state of the feelings, temper or habits. In cases of this nature, the moral and active principles of the mind are strongly perverted or depraved; the power of self-government is lost or greatly impaired and the individual is found to be incapable, not of talking or reasoning upon any subject proposed to him, but of conducting himself with decency and propriety in the business of life.

Not infrequently we find individuals who have developed normally intellectually but whose emotional reactions appear definitely childish. That is, though they are normal and occasionally superior in intellectual ability, their personality or emotional reactions appear stunted. Many investigators have been concerned with the problem of developing tests that will measure such deficiencies, but at the present time very little has been accomplished. In the light of our past experiences with the development of the measurement of intelligence, we are probably justified in believing that in the future some success may be gained in the measurement of personality traits. Not very long ago the most exact statements that we were able to make regarding intellectual capacity were in terms of idiots, imbeciles, morons, etc.; but now we have a direct quantitative measurement, an intelligence quotient. Such an accomplishment in the field of emotions appears infinitely more complex. However, in view of the increase in attention to the problems of personality, we may anticipate the development of some quantitative measurement of the capacities. One of the attempts to gain this objective was made by Furfey (953), who devised a series of tests designed to show the failure of the personality to develop normally and

included a scale for the measurement of what he called the "Developmental Quotient."

Many of the early clinicians included under the diagnosis of moral insanity a wide range of clinical conditions today recognized as types of psychoses and psychoneuroses. However, it was not until 1888 that Koch (954) introduced the term "psychopathic inferiority" and suggested that certain of the hysterias and obsessional states could be included as evidences of psychological inferiorities. Following this time, a number of terms, including "defective delinquents," "defective abnormal personalities," and "constitutional inferiorities," were introduced. At the present time the term "psychopathic state" appears to be the most satisfactory one since it does not stress either innate or acquired characteristics and does not imply total mental unsoundness, defect or delinquency, but allows for modifications of all of them.

Psychopathic states

In general, the term "psychopathic state" refers to one who is poorly equipped to meet the demands of his environment. The deficiency, however, appears not in the intellect but in matters of decency, honesty, or consideration for others. Individuals of this type cannot be depended upon and seem to be unable to function in any permanent position. They are noted for their poor judgment in matters involving the emotions, frequently acting upon impulse. The tendency to refer to them as being constitutionally inferior is unsatisfactory, since though their behavior cannot be traced to any definite organic cause, it is equally true that it cannot be demonstrated to be constitutional. It is much wiser, in view of our present knowledge, or lack of knowledge, to appreciate the possibility that in some instances the disorders are the outgrowth of poor or unfortunate environmental circumstances. These people are, nevertheless, abnormal in spite of the fact that their abnormalities may not have reached the extent of a mental disorder. The term "psychopathic," then, expresses their instability and lack of social responsiveness.

Their emotional instabilities are often recognizable in early childhood in irritability, temper tantrums, lack of courage and tendencies to be easily elated or depressed. Such elations and depressions, however, quickly disappear. There is usually very little continuity of effort or ambition, and consequently the records of the psychopaths show that they have shifted rapidly from one occupation to another, using some trifling excuse in each instance in order to make the change. Since

they are susceptible to suggestion and influenced by quickly passing moods, it is to be expected that judgment will be poor. They are usually quite demonstrative and affectionate and completely dependent upon friends and relatives. Their delinquency, vagrancy, and ready susceptibility to drug and alcoholic addiction and sex irregularities, as well as their criminal behavior, make them important social problems. The general picture is one of a shiftless individual who drifts from one occupation to another, gambles optimistically, engages in general delinquencies, is easily led into shady transactions, and is frequently guilty of criminal behavior for which he may show genuine regret, a condition, however, that is not lasting. In a large number of psychopaths there appear marked feelings of inferiority with much sense of guilt. The guilt feelings may center around either real or fancied wrongs, but in either case the psychopath feels that he must be punished. He, however, does not punish himself, but forces society to do so. Consequently, criminal behavior frequently becomes an outlet for his feelings of inferiority or serves the purpose of forcing society to punish him. The failures of these people to make adequate environmental adjustments sometimes precipitate definite mental breaks requiring hospitalization. Thus we may see that the name "psychopath" is applied to individuals not intellectually deficient, but who throughout their lives, or from a comparatively early age, have exhibited disorders of conduct of an antisocial or asocial nature and usually of a recurrent or episodic type.

Partridge (955) considers the disorders from a wider sociological viewpoint and would prefer to describe the conditions as sociopathic. In the description of his cases he finds antagonism towards some important person in the environment, feelings of inferiority and very often a variety of behavior disorders.

It should now be obvious that the diagnosis of the psychopathic state is far from clear cut and that the causes are not known. We are all familiar with the fact that diffuse organic conditions such as encephalitis, chorea, epilepsy and head injury are sometimes followed by dramatic reversals of conduct, and that such changes are also bound up with involvements of the autonomic nervous system and endocrine imbalance. The cells, tissues and organs, however, cannot be thought of as functioning independently, but form a part of the whole biological unit termed the individual. We still have this individual, his total personality, and his integration to deal with.

Clinicians have been unable to agree that any one symptom or combination of symptoms, which are described as clinical manifestations of

psychopathic personality is specific for that condition. Delinquency, socially unconventional behavior, emotional instability, sexual aberration, alcoholism are found in a variety of personality disorders. Woolley (956) has presented a point of view that is promising for an understanding of the dynamics of the disorder. He proposes to include in the group of psychopathic states all personalities of normal or near normal intelligence who show throughout life a relative inability to forego a present satisfaction for a future gain and for whom there is no evidence of organic damage to the central nervous system. A study of the case histories of psychopaths reveals that in practically all cases the former characteristic is a part of the make-up of the individual. This point of view would seem to indicate that the defect appears in the reasoning of the child, who is trained in skills of aggression and indulgence of impulse rather than in the controls which society demands of its members.

This view may be seen to be somewhat in agreement with that of Aichorn (957) who described three types of delinquents: those who are delinquent because of receiving too much love; those who are neglected in the sense of having too much sternness; and those who have a mixture of the two. Further light is shed on the problem by a study by Washburne (958), who gave tests to a group of school children to determine their ability to delay immediate satisfaction for the sake of a future advantage. The results showed that consistent choice of immediate satisfaction above the age of 8 years was associated with delinquent behavior, and the older the child, the more serious was the delinquency. The study suggested that the individuals who pursue antisocial patterns throughout life have somehow failed to achieve that degree of control that would enable them to resist impulsive behavior.

It may be possible to explain such a defect on a constitutional basis, but it should be noted that the psychopath has almost invariably been protected from the natural consequences of his behavior by his family and his friends. Someone is always running to his assistance, extricating him from tangles with authority, or protecting him from the usual consequences of excesses. The statements frequently made by clinicians that the psychopath is unable to learn from experience would seem to be contradicted by the fact that they learn very well from experience that someone will extricate them from their difficulties.

Mangun (959) and Woolley (960), approaching the etiology of the psychopath from divergent points of view, have been in essential agreement regarding their therapeutic management. The former has viewed the disorder as a constitutional one and has reported the ability to correct the condition by consistent therapeutic discipline together with psycho-

therapeutic interviews. The latter has held that the personality defect is due to the fact that the individual has grown up in an environment in which he has been able to avoid the consequences of impulsive behavior. He, therefore, claims that treatment calls for a consistent disciplinary regimen in which impulsive behavior would constantly be deprived of success and in which natural consequences of such behavior would be allowed to impinge upon the individual in every case.

In contrast with these therapeutic efforts is the program presented by Aichorn (961) with younger delinquents. His method was one of tolerance of the child, regardless of its behavior, the therapists never permitting themselves to become emotionally involved in the scenes created by their charges. As a result of this procedure he claims success in the training of delinquents. Perhaps the essence of both approaches is a refusal to let the psychopath exploit those who surround him while at the same time he is not rejected. In some ways, however, the position of Aichorn, not carefully controlled, might prove to be the soil out of which the psychopath grows.

The consistent performance by most psychopaths of acts involving aggression or delinquency has led many clinicians to believe that the psychopath filled with a sense of guilt must continue this behavior in order to secure punishment. Although it is true that feelings of guilt lead many individuals to the need for punishment, it should be noted that most of the delinquencies of the psychopath do not lead to punishment and if there is immediate punishment, these people are able to control their behavior. Moreover, if they are not punished, there is no need to alter the behavior.

Recently Lindner (962) has emphasized the need of the psychopath for immediate satisfaction of infantile needs and has claimed that the psychopath never gets beyond the pre-genital level of sexual development to the stage of object love, precipitation of environmental factors causing an abrupt cessation of psychosexual development before the successful resolution of the Oedipus situation.

For illuminating discussions of psychopathic states the reader is referred to the works of Henderson (963), Kahn (964) and Clekley (965).

Case 13. (Diagnosis: Psychopathic personality.) Female, aged 20, married. Intelligence superior.

Family history. The paternal grandmother in late life was paranoid. A maternal aunt and a maternal uncle suicided. The father was moody, alternating between over-indulgence and sternness with the children. The patient is the elder of two siblings; the second, aged 18, is said to be normal in every way.

Personal history. As an infant the patient showed marked jealousy of her sister, and had frequent temper tantrums in early childhood. Her infancy was characterized by

great attachment on the part of the family which diminished when the second child was born. She graduated from high school after considerable difficulty throughout her whole school life. She never fell in line with the group and was transferred from one school to another. The patient was impudent, always preoccupied, never had any friends, and any social activities in which she participated were forced on her by her parents. The last three years of her high school life were spent in a co-educational boarding school for adolescents with behavior problems, where she is said to have adjusted quite well. She has had frequent heterosexual relationships since the age of sixteen, the first being with a cousin. She had a gonorrheal infection at eleven which may or may not have resulted from sexual relationship. The patient was married two years ago to a man eight years her senior. She and her husband agreed before marriage that they were both to be allowed to participate later in extra-marital sex relationships. She has had no actual episodic attack although all her life she has been a problem, visiting various psychiatrists because of her delinquencies and inability to adjust to any kind of situation. A short time before admission she became extra-maritally impregnated and her husband notified her parents of the difficulty, at the same time telling them of their premarital agreement. An abortion was induced, and she subsequently separated from her husband insisting that inasmuch as he had broken the premarital promise and told her parents, she would have nothing more to do with him. She said she would secure a position and maintain an independent existence. She finally secured employment in a dive along the wharves where she met a young man with criminal tendencies, with whom she says she fell in love. They made plans to leave the country together, but were apprehended in New York and the patient was brought to the hospital.

Physical examination. Completely negative. There is some history of thyroid disturbance.

Mental examination. In intelligence the patient proved to be definitely superior, completing the Binet test with but a single error. Her personality reactions were, however, particularly childish. She staged temper tantrums, was aggressive in her demands and for the most part seclusive in her contact with the other patients. She displayed an extremely naïve, bewildered attitude when asked to attend various social functions and repeatedly asked how she should act and what she should say. She gave an elaborate account of what occurred at the dive, her relations with the young criminal and her plans to marry him upon leaving the hospital. She spoke with amazement of her own stupidity in failing completely to understand the nature of the place in which she worked. She talked of her marital life with considerable frankness stating that she had no hesitancy about indulging in extra-marital affairs and that she always told her husband everything that occurred. There was no feeling on her part that anything was wrong with her, and though she agreed that there might be something in her personality that repeatedly got her into jams, she did not view her difficulties with any degree of seriousness and saw no necessity for treatment.

Course in the hospital. The patient was for the most part seclusive and moody, showed marked irritability and, not infrequently, temper tantrums. After about a six-week stay during which time her resentment toward the hospital practically disappeared she was removed against the advice of the staff.

The above case is a rather typical picture of a psychopath, evidencing clearly the childish personality reactions in spite of the fact that the patient was of superior intelligence.

CHAPTER XVI

PHYSICAL AND CHEMICAL THERAPIES

In a textbook of abnormal psychology it is to be expected that the major discussion of therapies will concern those that may be termed psychotherapies, and consequently these are reviewed in detail in the last chapter. The possibility that many of the abnormal behavior manifestations are directly due to failures at lower integrative levels, or that defect at one level may possibly be balanced or compensated somewhat by creating defects at some other level must, however, be considered. The point of view to be stressed is that treatment should be of the organism as a whole. This means more specifically that the possibility of corrective adjustments at every integrative level must be studied. No attempt will be made in this writing to review all of the special therapies, but the recent wave of enthusiasm for therapies such as insulin, metrazol, electric shock and sleep demands some attention, and a brief examination of these techniques will be presented here.

METRAZOL, INSULIN AND ELECTRIC SHOCK THERAPY

In 1928 Meduna (966) began convulsive treatment of schizophrenia, using intra-muscular injections of camphor in oil to induce the seizure. The procedure was based on the questionable assertion that it had been observed that patients who have convulsions seldom develop schizophrenic symptoms and that those schizophrenics who had convulsions tended to recover. Neither of these statements has been satisfactorily substantiated. Jasper, Fitzpatrick and Solomon (967) reviewed the literature regarding the incompatibility of convulsions with schizophrenia and found the evidence very confusing. They reported that individual schizophrenic patients show extremely wide differences in characteristic brain function as recorded. Some overlap the normal, some appear in the direction of the type found in epileptics, and others appear in opposite directions. Finley and Campbell (968) found no significant relationship between schizophrenia and epilepsy on the basis of the electroencephalogram. It should be noted that many characteristics of epileptic equivalent states could not be distinguished from those of schizophrenia in the absence of a history of convulsive seizures, and

work by Gibbs (969) and his associates has indicated a similarity of electroencephalograms in the two conditions. Notwithstanding the fact that some schizophrenics who have one or more convulsive seizures do very poorly, Meduna noted marked changes in the behavior of the patients treated by this method.

Finding camphor undesirable as a convulsion inducing agent because of its slow absorption, unpredictability as to time of seizure, the necessity of walking the patients about to promote the reaction, and the large quantities necessarily used, Meduna turned to metrazol (formerly designated as cardiazol), which can be given intravenously and will produce seizures immediately and with great reliability. Since the patient remains in bed, accidents can more easily be avoided. There is no point in describing the technique of the camphor treatment nor the various modifications of the metrazol treatment. The more or less standard practice today consists in giving rapidly an intravenous injection of metrazol sufficient to cause a seizure, safeguarding the patient as far as possible, through this and any succeeding period of confusion, and repeating the procedure as frequently and as many times as is thought necessary by the operator. As a rule, the injections are given two or three times a week and not less than a total of 18 or 20 times, but in practice these rules are varied greatly, as is indicated by the reports of Winkelman (970), Brousseau (971), and Finkelman (972).

It may be taken as established fact that a large percentage of patients so treated will show sudden, startling changes in behavior, often after a few treatments (3 or 4) and sometimes after a single treatment. Some patients, however, show no material change until many more injections have been given and a fair proportion, especially of those in whom there has been longer duration of the illness with a tendency to more passive and vegetative existence, will show no substantial change regardless of the number of times the injection is repeated.

In 1936 Dussik and Sakel (973) reported on the use of shock doses of insulin in the treatment of schizophrenics. This therapeutic effort was motivated by Sakel's observation that accidental insulin shock in drug addicts resulted in the disappearance of schizophrenic-like symptoms. Clinical experience led to a more or less standard technique, although there have been many modifications in the hands of various workers. The usual procedure is as follows: Breakfast is omitted, and the insulin is given very early in the morning. Fifteen or more units are given the first day, and this amount is gradually increased each morning until the patient develops evidences of shock. Two kinds of shock are reported.

"Dry" shock consists of a convulsion, altogether similar to an epileptic seizure. It may occur in about one-third to one-half of the patients undergoing this therapy. "Wet" shock is a gradually deepening coma with profuse sweating and other evidences of profound metabolic and nervous system changes. The treatment may be carried on daily for a long period of time. Usually the procedure is omitted on one or two days each week.

In 1938 Cerletti and Bini (974) reported on the treatment of psychotic patients using electrically induced convulsions as the therapeutic agent. The work of Robinson (975), Almansi and Impastato (976), Kalinowski, Bigelow and Brikates (977), and Glueck (978) indicates that this procedure had great advantages over other forms of shock treatment since complications and deaths are relatively rare, and the patient becomes unconscious before he feels any discomfort, thus eliminating much of the fear attendant upon the use of metrazol.

The procedure varies to some extent, but consists essentially of passing an electric current through the cortex by means of electrodes placed bitemporally. The amount of current required to produce grand mal attacks varies from patient to patient, and usually does not exceed 600 milliamperes passing for 0.3 seconds. 350 milliamperes passing for as short a time as 0.1 seconds will produce grand mal seizures in some cases. Electricity travels faster than the nerve impulse; hence the patient becomes unconscious before he feels any pain. The immediate impact of the current produces a sudden jerk of the body, then a gradually increasing tonic spasm that breaks down into clonic contractions which terminate usually in less than 60 seconds. The patient may awaken immediately or may remain stuporous for some time. The shocks are administered usually 2 or 3 times a week, but some operators prefer daily shocks for 3 to 6 days followed by a short rest period and a repetition of the series if necessary. Some operators prefer to give just enough to bring the patient to a good performance level and then to follow up with isolated treatments should the patient show any tendency to relapse. Others attempt to produce post-seizure concussion states as rapidly as possible. Petit mal attacks or apnoea lasting for variable periods may result instead of the grand mal attack.

Of these three main types of shock therapy, insulin reached America first. It was taken up with great enthusiasm but was quickly superseded, in part, by metrazol when the proponents of the latter method were able to gain a hearing. Metrazol had the advantage of simplicity, short period of actual technical procedure in administration, fewer

fatalities and serious complications (although fractures were more frequent), and equal claims to good results. However, Friedman (979), Angyal and Gyarfás (980), and Kennedy (981) have shown that there was one very serious drawback; namely, it often generated terror in the subjects exposed to it.

When electric shock was introduced by Berkwitz (982), Meggendorfer (983), Kalinowsky and Barrera (984), Braunmühl (985) and Müller (986) with claims for equally good results, the absence of intense terror in most patients and fewer complications of all kinds, it replaced to a large extent both of the other treatments. The excellent review by Kolb and Vogel (987) shows these facts very clearly. Insulin has been gradually replaced by metrazol and metrazol by electric shock as the new technique presented a greater effectiveness. The death rates are approximately: insulin 0.6 per cent; metrazol 0.1 per cent; electric shock 0.05 per cent. The complications are approximately: insulin 2.0 per cent; metrazol 4.3 per cent; electric shock 1.1 per cent.

The complications in insulin are more serious as might be inferred from the death rates. They include prolonged coma, 0.85 per cent; pneumonia, 0.29 per cent; cardiac and circulatory disturbances, 0.15 per cent; tuberculosis activation, 0.08 per cent; lung abscess, 0.05 per cent; cerebral vascular accidents, 0.02 per cent; hemiplegia, 0.02 per cent; epileptic seizures, 0.02 per cent. In comparison, metrazol shows tuberculosis activation in only 0.02 per cent, lung abscess in only 0.01 per cent and the others occurring very rarely indeed. Electric shock shows pneumonia, 0.06 per cent; cardiac and circulatory disturbances, 0.02 per cent, and practically none of the others. Fractures and dislocations, however, are more common in metrazol and electric shock, their incidence being: insulin, 0.11 per cent; metrazol, 3.90 per cent; and electric shock, 0.90 per cent. Fractures, of course, are serious enough complications, but do not usually threaten life and, in general, heal without disability. This is particularly striking in regard to fractures of the spinal column which constitute the overwhelming majority of bone injuries with these treatments. They are usually asymptomatic and require nothing to be done about them. Dislocations of the jaw, which are also very frequent, are reduced immediately and leave no handicapping defect. The figures introduced here are approximate but indicate the severity of the treatments.

Later, in discussion of the mechanisms underlying personality changes brought about by the treatment, we shall point out the fact that irreversible damage to cortical neurones appears to be a regular consequence of

such procedures. Further information on these aspects of the subject will be found in practically all of the references, but one should consult especially Ebaugh (988), Lewis (989), Bennett (990), and Bateman and Michael (991).

The early claims¹ for improvement and recovery rates in schizophrenia with these therapies were very expansive. While some later investigations like that of Impastato and Almansi (992) have reported great success with cases treated early, the results of Williams and others (993), Bowman and others (994), Meduna and Friedman (995), Halpern (996), Read and others (997), and Colomb and Wadsworth (998) have not substantiated the early claims. Androp (999) reports emphatically that the cures previously reported cannot be attained through any form of shock therapy. Of particular significance are the studies of Miller (1000), Niver, Weisz and Harris (1001), Notkin and others (1002), and Craig and Schilling (1003) of results in treated cases as compared with selected controls. Although some of these show a slight advantage with shock therapy, others show no gain whatever when the patients are exposed to the same procedures except for the omission of shock treatments. Reznikoff (1004) and Heilbrunn and Sternlieb (1005) have shown that follow-up results in shock treatment in schizophrenia show a steady decrease in the per cent recovered and improved. When these are compared to unselected controls, the tendency is for the results in both treated and control groups to become about the same by the end of a five year period due to decrease in "recovered" status in the treated group. Results in agreement with this statement have been reported by Bond (1006), Rivers and Bond (1007), Bond and Rivers (1008), Weinberg, Goldstein and Edlin (1009), Androp and Green (1010), Ross and others (1011), and Roberts (1012). Those who are enthusiastic about shock treatment point out (with some justification perhaps) that the duration of hospital care is materially decreased in the treated cases.

The work of Palmer (1013) and later of Pacella and Barrera (1014) indicates that as far as schizophrenia is concerned, there is little difference in the efficiency of the various forms of shock treatment. Many investigators following them agreed with this conclusion, while others

¹ Symposium on Therapy including Hypoglycemia. *Am. J. Psychiat.*, July, 1937, 94, 89.

Proceedings of the 89th Meeting of the Swiss Psychiatric Association at Munsingen, Berne, May 29-31, 1937. *Am. J. Psychiat. Supplement*, May, 1938.

Reese, H. H., Paskind, H. A., Sevringhaus, E. L.: Treatment with hypoglycemia shock. *Year Book of Neurology, Psychiatry & Endocrinology*, Year Book Publishers, Chicago, 1937, 386-409.

considered insulin to be the therapy of choice. However, in the affective psychoses, insulin is relatively ineffective, whereas many have been of the opinion that metrazol and electric shock are fairly reliable in producing remissions. Wilson (1015), Bennett (1016), Palmer, Hastings and Sherman (1017) and the Ziskinds (1018) have had satisfactory results with metrazol. Wilson treated 19 involuntional melancholias and 18 manic-depressives, giving shocks every other day for a week, then resting and continuing the treatment if necessary. Of the 19 involuntionals, 9 were greatly improved, 4 were somewhat improved, 3 showed slight improvement, and 3 relapsed. 6 months after the treatments, 14 still showed great improvement. Of the 18 manic-depressives, 11 had pure manic or depressive reactions; and of these 11, 5 still showed improvement at the end of 6 months. Bennett claims 90 per cent of severe depressive reactions are terminated in two or three weeks of treatment as a result of metrazol shock. He finds the treatment most successful with midlife and presenile depressions, but safe with the older group also. Palmer, Hastings and Sherman claim 73 per cent favorable change with involuntional melancholias as a result of metrazol shock, and Eugene, Esther and Louis Ziskind indicate partial and full remissions in 92 per cent of metrazol-treated patients.

Other investigators have found electric shock effective. Myerson (1019) had good results with depressions, but found the treatment too drastic for the neuroses except in the chronic and depressive types. Hauser and Barbato (1020), working with 16 depressives, found 9 complete remissions, 6 social remissions, and 1 case unimproved. Smith and others (1021) found electric shock better than metrazol because it is less severe and the fracture rate is only 5 per cent as compared with 22 per cent in cases treated with metrazol. They make the following report:

<i>Diagnosis</i>	<i>No. cases</i> %	<i>Recovered</i> %	<i>Improved</i> %	<i>Unimprov.</i> %	<i>Relapsed</i> %
Involuntional Melancholia.....	20	85	15	0	5
Manic-Depressive, Manic.....	10	70	0	30	0
Manic-Depressive Depressed.....	49	72	10	18	0
Schizophrenia.....	16	0	7	93	0
Undiagnosed.....	8	37.5	0	62.5	12.5
Psychoneurosis.....	5	60	0	40	0

Fetterman (1022) reports 16 good results with 21 schizophrenics.

Follow up reports on cases treated by electric shock are presented by Fitzgerald (1023), who states that 6 months after the treatment of

85 depressives, 63 were fully employed, 5 were at home, 9 had been readmitted, and 8 were undetermined. Smith, Hastings and Hughes (1024) report good results with involuntional melancholia and manic-depressive psychosis a year after the treatment. They feel, however, that manic patients do not hold their recovery as well as those who have an agitated depression.

In all of these shock treatments, physical complications may arise. Fractures are common, but Bennett (1025) suggests that spinal and lower extremity fractures can be prevented by spinal anesthesia. Other investigators have reported the occurrence of punctate hemorrhages, cardiac and pulmonary complications, vasomotor collapse, spasticity and subconjunctival hemorrhage.

It has become increasingly more evident in the last 5 years that a much larger number of patients are being treated by shock. However, the reports of investigators continue to be confusing and one may find statistics to support almost any point of view. Feldman, Susselman and Barrera (1026) recently reported that 66% of schizophrenic patients treated with insulin coma were returned to their homes but that there was a high readmission rate and that many who did not return to the hospital continued to be social and economic problems at home. Hinko and Lipschutz (1027) reported that a high percentage of paranoid and catatonic and a low percentage of hebephrenics were paroled after insulin therapy but that only 4% more patients were still on parole 5 years after treatment than a comparable untreated group. On the other hand Finiefs (1028) in one study and Fitzgerald (1029) in another report high recovery rates in schizophrenics treated with insulin coma. The former reports that 37% remained well 5 years after shock therapy compared to 14% of those not treated by shock.

The wide divergence of position presented by the reports makes it difficult to determine a consensus of opinion, but there are a few points at which there appears to be rather general agreement. Insulin is more frequently the preferred shock therapy for early schizophrenics. Metrazol has been largely replaced by electric shock, and endogenous depressions and involuntional melancholia are considered to respond well to electric shock. There is also a growing belief that symptoms rather than psychiatric diagnosis, are the important considerations in deciding which therapy to use.

All of this agrees reasonably well with our own experience, namely that shock therapies have not been consistently successful in increasing the recovery rate of schizophrenic patients. Metrazol and electric shock

will produce reversals of phase and occasional remissions in many depressive patients and some manic excitements, but here it interferes with intensive psychotherapy and makes for a difficult therapeutic decision. In involuntional psychoses, where the results of shock therapy are most consistent and the prognosis without it is for prolonged illness, there is at present no other technique which offers as much as convulsive shock therapy. Since metrazol has many disadvantages as compared with electric shock, the latter is the procedure of choice. Involuntional patients are generally at an age period when one could expect a slight falling off of intellectual efficiency; therefore any slight cortical damage sustained by the treatment will not be particularly conspicuous nor handicapping. Damage to other structures of the body can be and should be avoided.

All forms of shock therapy have been applied for the control of disturbed and excited patients who tend to disrupt the hospital and interfere with the treatment of other patients. All of them are effective in procuring temporary respite and can be used in this way. However, they seem even more severe than the outmoded use of such drugs as apomorphine to render the patient so physically ill that he has little spirit left for disturbance. Even more brutal is the technique as reported by Thompson (1030) whereby the patient is convulsed while still conscious. It is possible that the exigencies of manpower shortage may at times justify some use of electric shock for this purpose, but one would prefer to see these patients treated with appropriate hydrotherapy, sedation, and isolation where they are effective.

Many attempts have been made to reduce the dangers of these therapies. Other procedures have been sought which give similar results with fewer dangers. Low and others (1031) recommend the use of picrotoxin as a convulsant because of the absence of terror in the administration. Later, Low and others (1032) tried a combination of picrotoxin with metrazol and found that the percentage of recoveries was just as high as when either of the treatments was used alone, but vomiting and nausea were reduced to a minimum. These results were verified in Brazil by Doyle and others (1033). On the other hand, Bleckwenn, Hodgson, and Herwick (1034) do not recommend picrotoxin or coriamyrtin for the purpose of inducing therapeutic convulsions because of the long delay between injection and the development of a convulsion and because of the discomfort of the patient. Dax's (1035) work with ammonium chloride as a convulsant shows that the muscular movements following the injections are so slight that risk of fracture or dislocation

is negligible, but the results do not compare favorably with those of metrazol. Another attempt to reduce the dangers has been the production of anoxia by use of nitrous oxide. Zadore (1036), Fogel and Gray (1037), Himwich, Alexander and Lipetz (1038), and Alexander and Himwich (1039) have treated schizophrenia with nitrous oxide. Lengyel (1040) used nitrogen inhalation and Loevenhart, Lorenz and Waters (1041) tried carbon dioxide. Special procedures such as the use of benzedrine sulphate either alone or alternating with sodium amytal narcosis have been attempted by Davidoff and Reifenstein (1042), and Reznikoff (1043). Vivaldo and Barrancos (1044) treated auditory hallucinations with quinine salts, and Beca (1045) used an artificial fever induced by means of tuberculin. None of these attempts offers anything of importance. The use of unidirectional currents by Friedman (1046) in an effort to reduce the amount of electricity required to produce convulsions in electric shock is difficult to evaluate, but it is known that unidirectional currents are generally more damaging physiologically than are alternating currents.

On the other hand, attempts to remove the dangers attendant upon the shock therapies have been highly successful, especially as far as electric shock is concerned. Of outstanding importance in this respect is Bennett's (1047) introduction of paralysis by curare to prevent fractures and dislocations. Bennett's (1048) attempts to control the violence of the seizures by curarization with other drugs such as quinine methochloride, Yaskin's (1049) use of magnesium sulphate, and Cottington's (1050) employment of betaerythroidin have offered no advantages and introduce other complicating effects which render them relatively undesirable. Shorvon and Shorvon (1051) and Palmer (1052) found spinal anesthesia to be only partially successful and to introduce new hazards. Premedication by the induction of insulin coma, administration of scopolamine hydrobromide as tried by Edlin and Klein (1053), or barbiturates as reported by Hastings and Rivers (1054), or Impastato and others (1055) are unsuccessful as far as mitigating the seizure is concerned. Aside from curare the only practical method of injury prevention is postural control and this is unreliable. Barrett, Funkhouser and Barker (1056) show in some cases 60 per cent of the men and 30 per cent of the women had fractures. Rankin (1057) reports fractures of middorsal vertebral bodies, mandible, humerus and femur. Respiratory embarrassment following the convulsion is relieved readily by artificial respiration for a short time, making sure that the relaxed tongue and throat muscles do not occlude the air passages, removal of mucus

from the throat by aspiration or by drainage, and the use of the ordinary respiratory stimulants. Of these, the mechanical procedures are of the greatest importance. Where curarization is present, it is relieved immediately by prostigmin.

Any discussion of the mechanism by which these radical shock therapies produce behavior changes must take into consideration the following factors:

1. All observers agree that during and immediately following shock therapy in any of its forms, behavior characteristic of the organism's response to brain injury is exhibited. We can see evidence of this in the work of Friedman, Brett and Vogt (1058), Guerra (1059), Polatin, Strauss and Altman (1060), Ziskind (1061), and Mayer-Gross (1062). Of especial interest is the effect of one subconvulsive electric shock treatment administered to a normal subject with a permanent island of amnesia altogether comparable to the result of head trauma. This experiment was done by Watkins, Stainbrook, Lowenbach (1063).

2. Electroencephalographic studies are in general agreement that organic-like changes in the cortical potentials occur following shock treatments and persist for a variable length of time, possibly permanently. This can be seen in the reports of Levy, Serota, and Grinker (1064), Pacella and Barrera (1065), Proctor and Godwin (1066), Rubin and Wall (1067), and Finley and Lesko (1068).

3. Pathological studies of the brains of animals subjected to experimental shock show organic changes in the neurones. Arieti (1069), working with monkeys; Neuberger, and others (1070), experimenting with dogs; Alpers and Hughes (1071), inducing convulsions in cats; Cleckley, Bowles and Mettler (1072), studying mice; and Neumann, Cohn, and Katzenelbogen (1073), working also with cats, all bear out this conclusion.

The same types of organic neurone lesions are found consistently in the brains of treated human beings. J. L. Kinsey (1074) collected information in 36 states and 2 Canadian provinces and presents some very interesting statistics. In post mortem examinations of 21 metrazol deaths and 26 insulin deaths, cerebral damage was found invariably. Mollman (1075) reports brain damage after a prolonged coma induced by insulin. His patient suffered far-reaching loss of intellectual and memory functions, sensory aphasia, grave apraxia and disturbances of the optical sphere. Weil and Liebert (1076) found hypertrophy and hyperplasia of astrocytes and microglia after 6 patients had been given metrazol treatment. Liebert (1077) continued the work with 8 other

patients, with particular interest in spontaneous convulsions appearing after metrazol treatment. Wortis (1078) and Jansen and Waaler (1079) also report brain changes.

4. At times, as in the studies of Epstein (1080) and Read (1081) neurological evidences of organic lesions in the central nervous system are observed.

5. All forms of shock therapy produce profound shifts in the autonomic-sympathetic balance of the organism. These are more prolonged in insulin shock, but may be just as intense in the other convulsive therapies.

6. All forms of shock therapy regularly induce fear in the subjects. This effect is greatest with metrazol, less with insulin, and slightest with electric shock.

7. There are profound biochemical changes in all forms of shock treatment which are in part contingent upon the procedure directly and in part dependent upon the organic and emotional changes induced by the method used.

Probably the most plausible theories of the way in which results are obtained by such methods consider the behavior changes to occur as a result of the organic damage to the brain. Particularly the memory defect (which is retrograde) is thought to blot out the acute awareness of the psychotic episode and the events leading up to it. The greatest defects occur in the field of recent memory so that shock given during the psychotic episode affects preoccupation with the material of the psychosis most profoundly. Some authors have discussed the problem in terms of the breaking of synapses or the selective destruction of the pathological cells that cause the disease, etc. Sakel's (1082) attempts to account for the changes were ingenious. Proceeding on the basis that psychological factors are not the only ones involved in schizophrenia, he assumes that there must be some injury to the deeper vital processes. He believes that the nerve cells are continuously exposed to a stimulating substance resembling adrenalin and that insulin is its antagonist. The stimulating hormone is seen as not only overstimulating the activity of the cell, but as also reviving forgotten phylogenetically ancient and infantile nerve pathways and patterns. Thus, in the pathological states these infantile and primitive patterns are called into action. His success with insulin in the treatment of morphinists suggested the possibility of using a nonalkaloid to pacify the nerve cell in other excited states. Using moderate doses of insulin, he noted that certain mental changes took place which could not be en-

tirely explained by a quantitative diminution of cellular function. It was further deduced that these changes must be related to the hypoglycemia. The assumption that insulin diminished the activity of the nerve cell might be sufficient explanation of the sedative effect on excited patients, but it did not explain the mental changes during and after the hypoglycemia. These changes were explained by a further assumption that the hypoglycemia blockades pathways which happen to be the most active at a given time so that reactions to the same stimuli would now come through pathways which had previously been inactive. The injury to the nerve cell by some disease processes is seen as first involving the youngest pathways, and the older pathways must be activated. Thus, a response may take place over a false pathway, in which case an olfactory stimulus might induce reactions along visual and acoustic pathways resulting in hallucinatory experiences. Actually, if the most recent pathways are disturbed, the hallucinations should be primarily olfactory, the oldest in the evolutionary scheme. In justice to Sakel, it must be noted that he admits the risk of becoming involved in mythology.

This type of explanation is supported to some extent by studies of the disintegrative effect of such treatments on learned habits. This has been done only with insulin, but can probably be safely assumed to show similar results with other forms of shock therapy. Riess and Berman (1083) found that the disintegrative effect of insulin shock is greatest in poorly fixed habits; those better learned are more fixed and are not destroyed so easily nor to such an extent.

The very interesting experiments of Gellhorn, Kessler and Minatoya (1084) and of Kessler and Gellhorn (1085) show the revival of inhibited conditioned responses without reinforcement in animals treated by insulin, metrazol or electric shock, whereas control animals show continuous inhibition. This revival is maintained for several days and can be reinstated by further shock treatments should the conditioned response again disappear. Its duration is contingent upon the number of treatments and (with insulin) the depth or duration of the coma. Since inhibition is obviously a cortical function, it would seem logical to draw the inference that the learned responses from the past, which are inhibited during psychotic episodes, can be brought back into operation by sufficient cortical destruction to relieve the inhibiting effect. This treats the cortex quantitatively rather than postulating the questionable selective destruction of "pathological cells," "pathways," etc. It would lead us, however, to expect best results in the most regressed cases,

which is not true, although the highly inhibited and rut-like behavior of involuntal and depressive patients is quite regularly affected for the better.

Other authors have been much impressed by the stimulating effect of these therapies upon the autonomic nervous system (as was Sakel also). If one is willing to assume that the psychotic states are due to depression of either the sympathetic or parasympathetic systems, then studies such as those of Frostig (1086) and Parker (1087) would support the contention that the stimulating effect upon the autonomic system is all important, particularly since the latter has shown (with insulin at least) that when tone increases on one side of the system, it is not diminished on the other so that there tends to be a crescendo of stimulation of both, even though at one time or another either parasympathetic or sympathetic tone may predominate. Hence, the conclusion that if imbalance between them occurs, or one or the other is depressed, shock treatments will tend to correct the abnormal condition since it stimulates both.

Farrell and Vassaf (1088) noted that in improved cases the heart shadow increased and the circulation showed simultaneous improvement. After treatment, if the heart decreased in size, the patient relapsed. They attributed the favorable results to sympathetic stimulation.

Other authors such as Good (1089) have been willing to account for favorable results on the basis of the fear generated by the treatments. Glueck and Ackerman (1090) utilize a more holistic explanation. They believe that the shock therapies propel the patient's personality back in the direction of a primitive, relatively undifferentiated, biological state remotely comparable to that of the newborn child, or the child in utero. This gives impetus to the movement of opposite forces in the direction of redifferentiation of the personality which may carry with it a stronger tendency toward the normal than toward the pathological. This, supplemented by the experience of shock treatment with its connotation of death and rebirth, results in restorative trends.

It is still not possible to determine to what extent the patient's recovery is related to physico-chemical processes and to what extent it is related to psychodynamic and symbolic ones. Recently, Baeyer (1091) has elaborated the theory of reversible organic brain change induced by electric shock, while Flescher (1092) has suggested that the shock provides an outlet for unconscious tensions as a kind of discharge phenomenon. The difficulties involved in theoretical interpretations may well

be understood by an examination of Gordon's (1093) collection of fifty theories.

Confusion still exists with regard to evidence of damage as indicated by psychological tests. Brooks (1094) reported that shocked patients showed improved mental efficiency as measured by the Hunt-Minnesota and Wechsler-Bellevue tests, but Carp (1095) repeated the experiment and interpreted the improved scores as practice effect on the test. Harris et al. (1096) found no significant change on Wechsler-Bellevue scores for shocked patients. Animal experimentation, under a variety of circumstances, has shown that electrically induced convulsions result in impairment of habit-retention, habit-performance and learning ability.

Careful observation of patients treated by shock leaves the impression that in many there has been some permanent organic loss, particularly affecting the attention and memory of the patients and resulting in a certain triviality of interests and dulling of the personality. These impressions are not always substantiated by clinical tests, but such tests are fairly gross; and, moreover, it rarely happens that patients suffering from severe psychoses lend themselves to careful psychological testing. Hence, during periods preceding treatment, testing is inaccurate and does not establish a valid baseline for comparison. More important is the fact that relatives of patients treated by these methods, although delighted to have the patient at home and more tractable, offer quite frequently such comments as, "But he doesn't seem to remember very well." This occurs in cases where clinical testing reveals no defect.

From another viewpoint we have the fact that the best results are usually reported from state hospitals and other large institutions. Smaller hospitals, more active with other therapies, do not generally show such high figures. When one considers that a patient selected for these therapies becomes the object of a great deal of attention, interest, and special care, it seems likely that this factor alone plays an important rôle in what eventuates.

Again, the best results appear in cases ill less than six months, but workers in psychiatry have realized for a long time that patients seen early in their first schizophrenic episode have a spontaneous remission rate of approximately 25 per cent, and this can be raised to well over 50 per cent by intensive interest and psychotherapy.

No real grasp of the difficulties of the problems can be obtained without taking into account the large number of previous attempts to establish a formal treatment of schizophrenia. It is a matter of common

psychiatric knowledge that many schizophrenics (as well as other functionally ill mental patients) tend to rise to biological emergencies with re-integration of the personality. In general, these effects are transient. In times past the mentally ill have been beaten, or ducked into cold water, or spun about until dizzy, or otherwise subjected to treatment we would consider inhuman today, either for the sake of cure or to render them more tractable. Other chemical attacks have also been used. Prolonged sleep with chemicals ranging from ether to barbiturates has had many advocates in the past and, as indicated by Palmer and Brace-land (1097), still has a few. Adrenalin was once advanced as a cure with claims for recovery rivaling those of insulin and metrazol. Intra-spinous injection of horse serum to produce aseptic meningitis had its day and advocates. As late as 1936 a determined physical assault upon the patient with purges and emetics was urged and used by Aschner (1098) on the basis that if the patient's surroundings and internal reality were sufficiently painful, he would abandon his world of fantasy in order to pay attention to it. This is a revival of medieval medicine. In 1684 Theoph. Bonet (1099) advocated bleeding the patient, purging with hellebore or the use of mercury to the point of salivation, application of the actual cautery to the corneal suture or the occiput, and reports on transfusion with calf's blood, the beneficial effect of frequent venery, etc. Beca's (1100) reintroduction of tuberculin induced fever as late as 1939 is also a revival of outmoded and unsuccessful attempts to apply fever induced by protein sensitization or by infection to schizophrenia after it had been found to be relatively successful in general paresis. A fairly complete summary of these attempts is contained in Menninger-Lerchenthal's article (1101).

Weigert (1102) says, "The sleep and shock treatment seems to have grown out of our psychiatric despair. This despair concerns our emotional relation to the psychotic patient, the difficulty of establishing a working transference relation which is more than a repetition of childhood relations. . . . This despair throws the psychiatrist back to the forcible maneuvers of shock treatment—far removed from the ideals of rational therapy—in order to break through emotionally insurmountable difficulties." It would seem that this "despair" consists largely of rage at our impotence so that we become determined to have our own way regardless of damage to the patient or our own therapeutic ideals. Through the ages it has led to every sort of physical, chemical, moral and emotional assault upon the patient when, after all, one should not expect his willing return to a world so actively and sadistically hostile. Kind-

ness, patience and understanding, in the long run, can be expected to do more. It is of special significance that in those institutions where these characteristics prevail together with opportunity for frequent interviews with competent psychotherapists, these treatments are accepted with justifiable skepticism and reluctance. However, shock therapy appears to have won a place in the treatment of the involutional and has made strides in some other directions. Because therapy for mental disease is still in a pioneering stage, the door must be left open for experimentation and revision of theories.

PSYCHOSURGERY

In 1936 Moniz (1103) reported on the results of destructive operations on the frontal lobes of the brain. The operation was conceived on the basis of the observation that monkeys whose frontal lobes had been removed failed to develop agitation in certain test situations which regularly produced severe disturbance in unoperated animals. Also, observations on patients with frontal lobe lesions, or postoperatively after the removal of tumors of that region, revealed a certain lack of worry and concern in many instances. The Moniz operation, known as prefrontal lobotomy, consisted of trephining the cranial vault at an appropriate site, following which a leucotome was introduced by means of which spheres of the white matter could be severed from their cortical connections. The spheres were one centimeter in diameter, and six of them were cut in each hemisphere. The leucotome being withdrawn leaves the severed fragments in situ. He reported favorable results in patients showing agitation.

In America the work was taken up enthusiastically by Freeman and Watts (1104), who presented the results of the procedure in their first six cases to the Southern Medical Association in November 1936. At that time they stated, "We are able to say, with Moniz, that no patient has died and none has been made worse. All of our patients except one have returned home, and some of them are no longer in need of nursing care. All of them are more comfortable, having been relieved of certain symptoms that had previously been very troublesome." This was within two months of their first operation.

The beneficial effects of the lobotomy were early attributed to the destruction of the cortical tissue. The purpose of the operation was, according to Moniz, to destroy the rigid connections between the cells, which he assumed was responsible for the fixed abnormal states. Freeman and Watts have gradually shifted to the position, held by many

theorists, that the purpose of the operation is to destroy neural connections between the frontal lobe and the thalamus. Their operative procedure has, therefore, been modified to sever the frontal thalamic tract without doing gross injury to the frontal lobe. This technique is based on the assumption that the abnormal symptoms are due to the effect of the frontal lobe upon the thalamic region.

The therapy has undergone various modifications but the operation is now most frequently performed by making bilateral openings in the side of the skull in the plane of the coronal suture. In addition to the frontal type, parietal, temporal and transorbital lobotomies are being performed.

A summary of the symptoms most consistently reported as either temporarily or permanently relieved by the operation includes worry, nervous tension, obsessive thinking, apprehension, preoccupation, anxiety, depression, insomnia, etc. Most of these are practically synonymous. Symptoms reported as permanently resulting from the operation include emotional flattening, procrastination, diminished spontaneity, laziness, slowness, indifference, poor judgment, talkativeness, facetiousness, euphoria, sarcasm, startle reaction, restlessness, aggressiveness, inattention, unresponsiveness, perseveration, playfulness, indecency and confabulation. Recurrent convulsions and death also have resulted.

The psychological studies of the patients who have undergone lobotomy have not been very revealing, but it is increasingly more obvious that such patients must suffer some loss. Though tensions and depressions are frequently relieved, the patient is flattened and sacrifices his driving force, altruism and creative spirit. Many such patients appear to have some understanding of the emotional situation but do not act emotionally to it. Such observations have caused numerous investigators to refer to the lobotomy as resulting in the loss of the "soul."

Freeman (1105) and others have been enthusiastic and have reported good results but Strecker, Palmer and Grant (1106) are more conservative and Heilbrunn and Hletko (1107) are decidedly disappointed with the procedure. It is likely that continued efforts in psychosurgery will result in better understanding of frontal lobe function. The results up to the present time, however, do not appear to justify the operation in cases where recovery could possibly occur without it.

NARCOSIS THERAPY

Sleep-producing medicines have been used in the treatment of mental and nervous disorders from early times. Prior to the advent of anes-

thetics and modern chemistry, the primary recourse was to opiates and their derivatives. With the advent of ether as a surgical anesthetic in 1842, a new sleep-producing agent was available; and from that time on, attempts have been made to utilize the various sleep-producing agents as they have developed. In the early part of this century, bromides were much in vogue; but following the development of the coal tar derivatives, bromides have to a large extent been replaced. In Germany a systematic attempt was made to treat the mentally ill with sleep-producing drugs, principally somniferin, but untoward reactions from this agent were rather frequent, and it was not until the advent of sodium amytal in the latter part of the second decade that a really satisfactory sleep-producing agent for continuous administration was available. At one time or another all the barbiturates and many other hypnotics have been used.

The sleep-producing medications are administered with various ends in view. The commonest use is to produce brief periods of rest in patients who otherwise are not sleeping, in an effort to allay the anxiety arising from this source. In extra-mural practice this may be necessary, but it is not usually so when the patient is adequately cared for in a modern mental hospital; physical, physiological, and psychotherapeutic measures are often adequate and always preferable. The administration of chemicals for the sole purpose of providing sleep to a patient otherwise in good condition is based upon an erroneous over-evaluation of the importance of sleep as contrasted with the need for rest and relaxation.

The second, and probably the most useful, application of such agents is to produce relaxation, rest and sleep in patients who are physically in very poor condition and for whom the enforcement of rest may be life-saving. Physical and physiological methods are frequently ineffective in such instances, and may even endanger the survival of the patient.

The above two objectives in applying these chemicals do not particularly concern us here. What we usually mean when we refer to narcosis therapy in psychiatry is the utilization of chemical agents for producing prolonged periods of sleep or twilight states in the expectation that either the patient will somehow miraculously emerge from his mental illness as a result of the prolonged narcosis or that during the period of narcosis, and particularly in the twilight states, there will be a catharsis of those topics to which the patient is unduly sensitive and which, perhaps, bear an etiological relationship to his sickness. In this case it is a matter of breaking down the inhibiting influences of cortical action

with a view to getting the patient to tell of experiences which he would not otherwise divulge. Prolonged periods of narcosis may also be utilized for the purpose of furthering psychotherapeutic attempts such as establishing rapport or rendering the patient more amenable to suggestion.

Reports in the literature indicate improvement and recovery rates in manic-depressive and schizophrenic psychoses ranging from 50 per cent to 80 per cent. That such high therapeutic success is not generally obtained with these agents is evidenced by their sporadic popularity and the remarkable enthusiasm exhibited in regard to insulin, metrazol and electric shock which is now waning.

The technique consists of the administration of a sufficient dose of the drug to produce from 18 to 22 hours of sleep out of each 24 hour period. This period of deep narcosis is continued for varying lengths of time, and the depth of it is varied depending upon the predilections of the physician administering it. For more detailed information the student is referred to the article by Broder (1108) which gives a good discussion of the psychotherapeutic aspects, and that of Palmer and Braceland (1109) who give an excellent brief summary of the literature.

Broder, using sodium amytal in search of a chemical agent that would make patients more accessible to psychotherapy, reported the probability that manic and catatonic patients would need large doses for long periods, while schizophrenic and depressed patients would react better on small doses for short periods. The drug, in any case, would be regulated according to the patient's response, and the lucid interval be used for psychotherapy. He believes that recovery does not depend on the depth of narcosis nor the duration of the sleep, but upon the twilight state which makes psychotherapy possible. Broder suggests the treatment particularly for manic-depressives and reactive depressions and states that while it may be said that many of these patients would recover anyhow, much time might be saved by using this method.

That this method of treatment is not without its dangers is evidenced by the array of complications which may be enumerated as follows: strangling due to mucus in the throat, the occurrence of convulsions, urinary retention, renal damage, aspiration pneumonias, persistent vomiting, cardiac or respiratory collapse, persistent hiccough, smothering by swallowing the tongue, persistent cough, abdominal distension, and fevers. Nevertheless, this type of therapy is by no means so dangerous as the use of either insulin or metrazol.

Attention must be called to the fact that investigations by Noble and Germuth (1110) concerning the excretion of barbituric acid derivatives

indicate a much longer retention within the body than had previously been supposed. In the more rapidly acting and more rapidly excreted barbiturates such as sodium amytal, the excretion period lasts from one to two weeks, whereas with the slower acting and less rapidly excreted drugs, such as barbital and luminal, the excretion period may run from 4 to 6 weeks. This results in cumulative effects that have an important bearing upon the treatment.

Clinically, it is to be noted that about one-third of the patients subjected to sodium amytal narcosis therapy will have convulsions upon abrupt withdrawal of the drug. Usually there is only one seizure, which takes place about 24 to 48 hours after medication is stopped, but occasionally there may be a series of grand mal and petit mal attacks; and we have seen them start as late as 96 hours after abrupt withdrawal. The impending seizure is heralded by evidences of irritability of the nervous system; there is a jerky irregular tremor, the patient is anxious and uneasy, the reflexes are hyperactive and the pupils dilated. In this stage of withdrawal, the seizure at times can be avoided by administration of a moderate dose of the medication. However, even gradual withdrawal does not eliminate seizures, and patients must be watched carefully to avoid injury when they fall. Some authorities advocate abrupt withdrawal when the patient exhibits a more or less "normal" attitude during the treatment, and look upon the seizure as therapeutically desirable.

Recent advances in this field have been concerned primarily with the use of either twilight or deep narcosis induced by the administration of barbiturates intravenously. For deep narcosis, it is doubtful if the intravenous route offers any advantage. For the induction of twilight states, however, the procedure permits the limiting of the narcosis to a brief period each day. Harris and Katz (1111) made a study of patients' responses to fractional intravenous doses. Some patients showed marked temporary improvement, reverting to a more or less normal attitude; some became much more communicative; some were unchanged. Horsley (1112) used nembutal, and Stungo (1113) evipal in a similar way. What we have here is a method for increasing the certainty of hypnosis or hypnotic-like states in patients whose content is otherwise difficult to obtain. The favorable response with this method has been applied by Pfister and others (1114) as a prognostic test preliminary to shock therapy, and Gottlieb and Hope (1115) go so far as to say that if the patient shows a good response to sodium amytal, he is likely to recover regardless of the type of therapy.

The term narcosynthesis has been used to describe the procedure of

producing a narcotic state for purposes of therapy, diagnosis or prognosis. During the war, sleep therapy, or narcoanalysis received considerable attention. The sleep state, usually induced by sodium amytol or sodium pentothal, was used to allow the patient to reenact his traumatic experiences. This situation provided opportunity for a variety of therapeutic approaches.

BENZEDRINE SULPHATE THERAPY

Benzedrine sulphate has been advocated both for the treatment of mental conditions and for the relief of fatigue in normal subjects. Myerson (1116) has reported a study indicating that the drug may be helpful in ameliorating fatigue and apathetic moods in normal and neurotic persons. Other enthusiastic reports have been made regarding the effectiveness of benzedrine with depressed patients. Carefully controlled experiments by Woolley (1117), however, have pointed to the fact that reaction to this drug is a highly individual one and that different subjects vary a great deal in their response. In this experiment with severely ill patients showing retardation, about 25 per cent responded with some improvement, 50 per cent were unaffected, and 25 per cent were adversely affected with moderate doses. Normal subjects showed similar wide diversity of response ranging from drowsiness to states of mild elation. Some subjects report difficulty in concentration, "wool gathering" feelings, and boredom. Individual subjects may show varying responses on different occasions.

Cohen and Myerson (1118) have also reported on the use of benzedrine sulphate with phenobarbital in the treatment of epileptics. The phenobarbital was found to be effective in reducing the number of seizures as well as in allowing for accurate predictability of the time of the seizure. Benzedrine was used to permit the retention of effective doses of phenobarbital otherwise impossible.

VITAMIN THERAPY

A sufficient intake of all vitamins—A, B, B₂, C, D, E, and K—is essential for the healthy physical and behavior functioning of the human organism. However, not all of these are known to play very important rôles in mental disease. Vitamin A has been utilized in the treatment of disseminated sclerosis, but good results with this treatment have not been confirmed. The anti-scorbutic vitamin (Vitamin C) is specific for the relief of scurvy, and only in relationship to that disease does it seem to have any bearing upon personality disorders, although Vitamin C deficiency (along with deficiency of Vitamin B, which will be dis-

cussed later) is reported in alcoholics. There are some reports that Vitamin C is decreased in depressed and bedridden cases and one report of the cure of both scurvy and menopausal depressive psychosis with Vitamin C treatment. Vitamin D deficiency is related to rickets and may play a role in establishing feelings of inferiority or actual inferiority states. Similarly, deficiency in Vitamin E (the anti-sterility vitamin) may contribute to inferiority feelings and might have to do with the precipitation of acute illnesses due to habitual or threatened abortion, amenorrhea and sterility. Vitamin K has not as yet been related in any way to human behavior.

Contrasting with the vague and equivocal results of shock, narcosis and benzedrine therapies, and the diffuse and indefinite relationships to personality disorders brought about by deficiency of the other vitamins, inadequate intake of Vitamin B complex (which has now been divided into a large number of separate chemical compounds) results in characteristic diseases of the central nervous system that are closely related to gross disturbances of behavior. These states are pellagra and alcoholic neuritis. Therapy with either the entire Vitamin B complex, or with the specific chemical compound related to each of these disorders, results in recovery. The specificity of this reaction is so striking that no one could dispute the relationship and the efficacy of the treatment. It has now become standard practice in the treatment of alcoholic neuritis (and in other neuritides which might be related) to administer Vitamin B₁ (Thiamin) in large doses. There is no evidence that excessive intake produces any detrimental result. It is important to note that the alcoholic neuritis appears to be due to the dietetic inadequacy rather than to the toxic effect of alcohol. Hence, alcoholic neuritis may be viewed as an avitaminosis.

In pellagra one administers Vitamin B₂ or that portion of the B₂ complex which has been isolated as nicotinic acid. In either event, one notes a rapid cessation of the mental symptoms and a more gradual recovery from the physical disturbances. These agents have also been employed in other obscure encephalopathies, at times, with good results. For more detailed information concerning vitamin deficiency in alcoholic neuritis and pellagra the reader is referred to the reports of Smith, Ruffing and Smith (1119), Fouts, and others (1120), Spies, and others (1121), Spies, Bean and Stone (1122), Jolliffe, Colbert and Joffie (1123), and Wortis, Wortis and Marsh (1124).

Alcoholic neuritis and pellagrous states make up two large groups of the mentally ill. The discovery of the vitamin deficiency in relation to these disorders provides not only means for their treatment, but also

prophylactic agents of high efficiency. Since these vitamins are readily obtainable in inexpensive form, the practical eradication of pellagra becomes a distinct possibility, and the diminution of the incidence of alcoholic neuritis can be anticipated.

Clinical observations indicate that the diet has important effects on behavior. The observations of Williams, and others (1125), Egana, and others (1126) and Johnson, and others (1127) point to the fact that one of the symptoms of Vitamin B deficiency in human subjects is their increased irritability, moodiness and lack of cooperation. Apathy, depression and emotional instability have been observed with more pronounced B-Vitamin deficiency. Williams (1128) restricted thiamin intake of eleven women to .45 mg. daily and found that within 6 to 8 weeks the subjects began to show such symptoms of emotional instability as irritability, moodiness, quarrelsomeness, lack of coöperation and vague fears progressing to agitation and depression. These symptoms were not observed when thiamin was restored to the diets or when riboflavin was reduced in the presence of adequate thiamin. Studies in which vitamin administrations have appeared effective in improving the mental status of psychotic patients have been reviewed by Jolliffe (1129), Norbury (1130) and Aring (1131).

Most of the experimental work on the effects of vitamins on behavior has been done with animals and it is well to maintain a healthy skepticism particularly with regard to startling claims.

FEVER THERAPY

Some of the organic psychotic disorders react favorably to artificially produced high fever. The high fever has been most effective in the treatment of paresis. The fever is usually induced by inoculation of the malaria parasite. The high fever thus induced is frequently efficacious in destruction of the syphilitic spirochete which is responsible for the disease. Other fever therapies include the Kettering Hyperthem, the electric blanket and the inductotherm.

CHAPTER XVII

PSYCHOTHERAPY

The history of the treatment of mental disorders indicates our lack of information regarding adequate therapeutic measures. This is due largely to the fact that only recently have we recognized these manifestations as actual disorders. It is to be expected then, that understanding and treatment of the mentally ill must lag behind adequate treatment for physical disorders. Secondly, it has been difficult to attract enough well trained medical men to specialize in this field. A part of this responsibility rests with the administrators of our medical schools, who have failed to interest and train their students sufficiently in psychiatry. This is especially discouraging in view of the fact that a large proportion of every physician's patients need some psychiatric treatment. Too frequently we find not only the general practitioner, but also the psychiatrist, inadequately trained in the fundamentals of psychology. It must also be recognized that since the underlying psychogenic factors have not been well understood, the student of practical medicine has been uninterested in functional disorders, especially in view of the many bogus, mystical, and pseudoscientific attempts to explain these aberrations. Finally, the fact that an organic basis has been found for several of the disorders originally supposed to be functional has led many investigators to disregard life experiences in toto as being possible causative factors, while others, lost in a maze of philosophical wandering, have pointed to particular life experiences as being responsible for everything. Thus, one group insists that endocrinology will eventually explain all, while another, for example, the Freudians finds sex the ever important determinant. Recent indications are that psychiatry will be given more prominence in the medical curricula and that the psychobiological point of view will be stressed.

The methods and practices of psychotherapy have been greatly impeded by the attempts to distinguish exactly between physiological and psychological functions. The point of view to be elaborated here is that psychology is not independent of physiology but demands a more thorough physiology. Any attempt to understand the behavior anomalies

that are termed mental illnesses must proceed from the recognition of the individual as a psychobiologically integrated organism. Such a conception involves an understanding of integration of the various lower levels. Thus, anatomical integration places the organs in specific relation to each other; physiological integration is brought about primarily by two sets of factors, biochemical and neurological; and finally psychological integration is shown in the reaction of the individual to his environment. Disturbances at any level must have some effect upon the psychobiologically integrated activity, since the total behavior is dependent upon the intactness of integration at the lower levels.

Our first problem, therefore, in dealing with abnormalities of behavior is to attempt to correct any anomalies that may be discovered at the lower integrative levels, which may be responsible for the unusual reaction of the organism as a whole. There are, however, some abnormalities which cannot be demonstrated to be dependent upon disturbances at the lower levels. Such disturbances are due to failures at the higher level, that is, to failures in psychobiological integration. We should also note that disturbances at the lower levels may result from failures at the psychobiological level and should, therefore, not be misconstrued as etiological factors. This problem of whether certain peculiarities or disturbances are cause or effect is constantly present in our studies and must be carefully evaluated.

The therapeutic program to be outlined here is one aimed at correcting disturbances of psychobiological integration not specifically traceable to sources at the lower integrative levels. Such psychotherapeutic situations may be examined with regard to the amount of direction given by the therapist. On this basis one may distinguish between directive and non-directive techniques.

The rôle of the early psychotherapist was primarily directive. The physician was asked to cure the patient's illness or to provide a solution for his dilemma. The rôle of the physician was that of a prescriber, and just as he prescribed medicines for physical ailments, he attempted to prescribe ways out of the difficult mental dilemma. Thus the patient may have been advised to rest, take a trip, separate himself from his family, change his job, or take stepstoward marriage. Some effort might be made by the therapist to direct the patient's thinking or his emotional life, to reorganize his habits, and indeed in many instances to prescribe a full daily routine. The therapist was dominant in the situation, and the patient was dependent upon the direction of the physician. In much the same way psychologists in the development of counseling and

guidance services tended to stress the importance of supervising and guiding their clients to bring about satisfactory adjustment. Consequently, through most of the early development of psychotherapy the emphasis was on the therapist's directive rôle in assisting the patient to resolve satisfactorily his adjustive difficulties.

For a considerable period of time, practically all psychotherapy, with the exception of psychoanalysis, was exceedingly directive and authoritarian. The development of better understanding of the dynamics of behavior disorder, influenced primarily by psychoanalysis, gradually brought to light some of the dangers and ineffectiveness of the completely directive and authoritarian therapy. Because in many instances the therapist had developed a wrong or imperfect understanding of the patient's difficulties, his prescriptions were not helpful and in some instances were actually harmful to the patient. Even when the therapist's deductions were correct, they were sometimes presented to the patient too soon or in a way that made impossible any resolution of the difficulty. As a result, most therapists became gradually less directive in approach and allowed the patient more freedom in working out his problems. Finally Rogers proposed to press the responsibility for personality development almost entirely upon the patient and outlined a method of non-directive or client-centered therapy.

Nevertheless, for a large number of therapists, some direction is believed to be essential to most therapeutic situations. Such directive therapeutic sessions may be compared to any problem solving situation in which guidance is used. It is simply assumed that direction judicially and carefully given is an important part of the therapist's responsibility. The patient is therefore not absolutely free to use the therapeutic hour in any way that he sees fit. When the situation is not proceeding well, the therapist may raise questions for consideration, may interrogate the patient, offer suggestions, make tentative interpretations, or attempt to gain perspective by offering a variety of points of view. He may even relate cases that illustrate problems similar to those of the patient. In short, this type of therapy stresses the need for the interpretation of the patient's experiences in order to help him in making decisions and in learning how to face his anxieties.

Non-directive Therapy. Client-centered, or non-directive therapy is primarily an outgrowth of a position taken by Rogers (1132) in the development of a therapeutic relationship in which the focal interest is on the feelings of the client rather than on the symptoms he presents. The placing of focal interest on the patient, or the doctor-patient rela-

tionship, is not new in the history of psychotherapy, as is indicated by the methods of psychoanalysis. Rogers' turn to emphasis on the feelings of the patient presented a welcome relief, however, from many of the other therapies that had remained exceedingly directive.

Historical origins of this type of therapy are traced to the will therapy of Otto Rank (1133) and the relation therapy of Jessie Taft (1134). Rank believed that in the therapeutic situation a conflict existed between the two persons involved and that the client should be allowed free opportunity to exert his will in dominating the counselor. Taft took the position that the relationship between the counselor and the client was more important than the intellectual explanations presented, and therefore she stressed the need for a permissive situation in which the client was given free rein for the expression of his attitudes and positions. The importance of the permissive, non-directive attitude was further stressed by those who were interested in play or release therapy, but it was left to Rogers to organize and describe the non-directive techniques by avoiding the giving of advice or the use of assurance or persuasion. Similarly the counselor avoids the asking of questions, giving explanations or interpretations or the offering of criticism.

The technique consists primarily of an attempt on the part of the counselor to respond to the feeling expressed by the client rather than to the content of his statements. The therapy begins with an explanation of the roles of the client and the counselor which is called structuring. An attempt is made to develop an atmosphere of warmth and permissiveness. Since reassurance must be avoided so as to prevent overdependence, the counselor relies on the recognition of feeling as being itself reassuring and by tone of voice, choice of words and general bearing, attempts to establish the warmth of the relationship. While some counselors occasionally commend the client, the practice is not recommended. The counselor avoids giving information; when there is an expressed need for such information, the client is referred to a convenient source. The giving of such information is believed to alter the relationship and to put the client in too much of a dependent relationship to the counselor. Occasionally, however, in the face of the danger of a loss of rapport with the client, some generalized information may be directly supplied.

The therapy is conceived not as a problem solving situation but as a situation which emphasizes the growth of the individual so that he may deal in an adequate manner with his constantly recurring problems.

The interview usually lasts for an hour and occurs once or twice a

week. The scheduling and handling of the interview time is arranged so as to indicate that there are definite limitations upon the demands that may be made on the counselor. Extending the interview period or casually dropping in for an extra interview is not encouraged, and when the client is late, no effort is made to make up the lost time. In the time that is set for the interview, however, the counselor gives himself entirely to the hour and does not allow himself to be interrupted by telephone calls or other messages. The scheduled interview time is used according to the desires of the client. The counselor, however, avoids being drawn into any alteration of the client's environment such as the using of his influence to change conditions under which the client lives. Every effort is made to keep the relationship warm and permissive, but at the same time to put the dependence for growth on the client and on the understanding that develops in the interviews.

The progress of the treatments that develop satisfactorily is generally explained as follows: The first interview is given over to catharsis with the client pouring out his problems. At some time in the interview, the client usually asks what the counselor proposes to do about his difficulties. The counselor then structures the situation indicating that they may work out the difficulties together. In the next series of interviews the client usually states his problem, generally expressing many negative feelings toward himself and others. The counselor helps him recognize these feelings, after which there begin to appear tentative statements of positive attitudes towards situations previously described in negative terms. Insight develops gradually with understanding of the dynamics of the problem and the patient shows growth by a recognition of the step that is necessary to resolve the problem satisfactorily. There is then usually a minor retreat during which time the client's behavior is characterized by efforts to decide his course of action. Finally, he begins to initiate positive actions and gradually shows more accurate understanding of himself, and less fear in making choices. The resultant feeling of self-dependence and decreased need for help bring the therapeutic process to an end.

The best results in the use of the therapy have been reported in the counseling of college students, of people with marital problems, and vocational counseling when the vocational problem consists largely of emotional difficulties associated with the making of an adequate choice. Emotional problems of normal people and mild psychoneurotic disorders have responded satisfactorily to the method. People of advanced age have not responded well to the method; nor have those whose intelli-

gence is below average. The excessively dependent person makes poor use of the method, and little success has been had with those whose emotional difficulties are extreme.

For the greater number of therapeutic situations it would perhaps be a mistake to consider that it was necessary to select between directive and non-directive approaches. Each patient poses an individual and unique problem for the therapist, and one of his most important decisions must be with regard to the amount of direction that will be most profitable to the particular patient. This decision may vary all the way from no direction to rather complete direction.

PRIMARY PSYCHOTHERAPEUTIC TECHNIQUES

Psychoanalysis and Distributive Analysis and Synthesis may be examined as examples of primary psychotherapeutic techniques. In each of these, as well as in other techniques, the therapeutic situations may vary in the degree to which they are directive, and in the degree to which various devices, such as, catharsis, suggestion, persuasion, desensitization and reëducation, are utilized. Such variations will at times depend upon the type of patient being treated and at other times upon the beliefs and predispositions of the therapist.

PSYCHOANALYSIS

The confines and scope of this section make it impossible to give a complete and detailed discussion of psychoanalysis. The reader who is searching for a more thorough presentation of the topic is referred to the works of Freud (1135), Jung (1136), Adler (1137), Stekel (1138), Ferenczi (1139), Jones (1140), Brill (1141), Fenichel (1142), Alexander and French (1143), Rank (1144) and Horney (1145), and others.

The importance of the theory of psychoanalysis in the field of mental disorders is not to be doubted; indeed its value even to normal psychology has been so pronounced that many of its most extreme opponents have been called upon to mention it. Through the interpretation of psychoanalytic principles, much that was formerly completely mysterious and nonunderstandable has been given meaning. The theories have cast light not only on the problems of normal and morbid psychology but also on many of the other fields of science, especially anthropology. Not the least of the theoretical contributions of psychoanalytic theory is the emphasis placed on the influence of the early experiences of life upon the mental makeup and later reactions of the individual. It is true that the ardent adherents of the theory may have given these ex-

periences an exaggerated importance, but the credit for having stressed these important factors rightly belongs to them. However, psychoanalysis as a psychological system has been presented in an earlier chapter; and while some reference may be made here to psychoanalytic theory, attention is directed primarily to psychoanalysis as a therapeutic agent.

Psychoanalysis is a highly specialized form of therapy which attempts to get a deep understanding and satisfactory resolution of the pathological mental processes. The goal is to relieve the patient of the bad consequences of his pathogenic conflicts and to free the energies that have been bound in his conflict. This result is to be accomplished by making the patient's ego face what it has previously avoided. The principle procedure utilized for disclosing the content of the unconscious is that of free association.

The mastery of the technique can be obtained only by a thorough study of the many theoretical assumptions and points of view and from actual practice. Indeed, it is generally agreed that the first requisite is to be analyzed oneself. The technique of the classical analytical procedure begins with the selection of the patient, and while the treatment has been attempted with various types of mental patients, the transference neuroses, more particularly the hysterias, offer the best possibilities. One or more interviews are used to inform the patient of the general method of procedure, its purpose and aims. At this time it is explained to the patient that some of the behavior that he exhibits may be motivated by emotional factors of which he may be quite unaware. The purpose of the analysis is to allow him to discover these unconscious motives so that they can be elevated to the conscious plane and be resolved by assimilation into the personality as a whole, thereby losing their potency for disturbing his otherwise integrated activity. At this point usually very simple illustrative examples are utilized to make clear the theory. One of the dangers here is that the analyst may reveal too much of his own theory concerning the nature of the unconscious material generally responsible for the development of the symptoms. It is assumed, of course, that the analyst has already carefully reviewed with the patient the objective facts that have been discovered in the case history.

The analytic period is usually one hour a day, and complete analysis is always a matter of many months or even years. The patient reclines on a couch and is made as comfortable as possible. The analyst usually sits behind him out of direct vision and asks the patient to relax, allow

his thoughts to wander, and to relate whatever comes into his mind no matter how irrelevant it may seem or how objectionable it may be. Whenever an arrest in the free association of ideas or flow of talk occurs, it is said to be a resistance, that is a desire to withhold some unpalatable topic. In fact, in the older descriptions of the technique the analysts never interrupted except when the flow of talk was temporarily arrested. Actually, however, the analyst does at times make inferences which are interpreted for the patient. The material which the analyst interprets is based upon the general psychoanalytic theories such as the Oedipus situation. Although, for the most part, the analyst says nothing and allows the patient to occupy the hour in the way he chooses, sometimes, especially at the beginning of the hour, a stimulus of one of the symptoms of the illness is offered for the beginning of the association.

Sooner or later the analysis of dreams is introduced into the procedure, and the patient is required to report all dreams at the beginning of the analytic hour. The dreams are used to discover the content of the patient's unconscious and are frequently interpreted by use of the elaborate dream symbols worked out by Freud and his followers. The content of the dream which is remembered and reported by the dreamer is called the "manifest content", and the unconscious processes which give rise to it are termed the "latent content". Thus the psychoanalytic theory assumes that the manifest content is produced from the latent content in much the same way that symptoms (which are manifest) are produced from unconscious or latent factors. The latent content not acceptable to the ego is made more palatable by various methods of transformation and appears as the manifest content. The dream then is supposed to represent in more or less distorted form an ungratified wish. The way that this distortion or transformation takes place is termed by Freud (1146) "dream work" and includes condensation, displacement, secondary elaboration, dramatization, etc.

Through the process of condensation the dream is supposedly made shorter, that is, it becomes an abbreviated edition of the latent content. Thus the manifest content may be composed of several ideas or wishes in the latent content. Displacement is described as a process of transferring the emotional setting or affect from one idea to another. In this way an item which may appear quite important in the manifest content may be insignificant in the latent content and vice-versa. Secondary elaboration consists of welding the dream material into a coherent story. That is, the dream material undergoes alteration for the

purpose of making a coherent story out of an apparently disconnected series of events. Dramatization consists of transferring the thoughts of the dream into visual images. It is also pointed out in symbolization that certain objects which occur frequently in the manifest content stand regularly for the same unconscious content, that is, have a constant symbolic value, and according to Freud these symbols usually have sexual significance. The dream, then, as reported, is seen as a vague caricature of the latent content, and the task of analysis is to discover by free association the meanings of these elements.

One of the problems which offer considerable difficulty and which must be handled very carefully is the feeling of the patient toward the doctor. An intensive emotional relationship of the patient to the analyst often develops in the course of the analysis. Freud calls this relationship, transference or the reënactment of the child-parent relationship. The patient projects upon the analyst the emotions which were connected with the individual in discussion. This may take the form of an attitude of affection and dependence (positive transference) or an attitude of hostility (negative transference). The transference phase results in a shifting of the ground of the patient's conflict to the analytic situation itself. The patient becomes preoccupied with the life in the analyst's office and his immediate relations with the physician. The analyst is now the figure of discussion and represents to the patient various people who have played a rôle in his life, especially in childhood. Such identifications are believed to throw light on the nature and development of the ego-ideal. Thus by means of the transference relationship, the conflict between the patient and the analyst is substituted for the inner conflict. The transference situation may be said to have developed into the transference neurosis in which the whole infantile experience with all of its attitudes and taboos is repeated. The transference must be understood with its relation to resistance. The patient is said to be not only in a love relationship to the analyst, and therefore able to overcome his resistance, but he also feels protected and has the courage to find the repressed material. The transference is not immediately used for therapy but is itself analysed, that is, its true nature is demonstrated to the patient.

When the patient is unable to proceed, or concerns himself with the situation of the moment, the analyst points out that this is resistance and most likely has to do with the person of the analyst. There is some danger here of violating the analytic principle that the analyst should never urge the patient into the transference for fear of robbing

the situation of its essential character of spontaneity. Throughout, the analyst needs to scrutinize his own attitude and watch carefully the development of counter-transference. The transference topic should be fully discussed with the patient so that he may understand that the emotional reaction toward the analyst depends in a considerable degree upon the emotions associated with the topics under discussion at the time and the resistances to the discussion of these topics. It is explained then that affective attachments to other people may in this way be transferred to the analyst and a somewhat artificial situation created. In some cases the analyst attempts to keep the transference within bounds by, from time to time, steering the analysis into channels in which the topic of the patient's emotional reaction to the physician comes to light. Thus the analyst uses the transfer to gain the patient's confidence and then is faced with the task of ridding himself of this exaggerated affection.

Frequently the transference situation will show itself in the dream content, and the analysis of the dream may result in some resolution of the transference difficulties. Thus, the construction and analysis of the transference run coincidentally with the analysis of the neurosis, and the transference situation should be resolved at the time or shortly after the resolution of the neurosis.

The analysis cannot be considered complete until the transference situation has been properly handled. The theory assumes that eventually in this procedure the patient arrives at some satisfactory explanation and understanding of the symptoms, as a result of which they disappear. An improperly handled transference situation, however, may result in a return of the symptoms or an increase of symptoms, and requires a careful understanding and delicacy of technique if the patient is not to be left worse off than ever. Freud (1147) believes that the psychoneuroses allow for the development of the transference neurosis, while the psychoses, being of the narcissistic type, do not yield to the development of a manageable transference. Most of the psychoanalytic writings state that the terminal phase of the transference situation should not be hastened, since to the danger of separation patients often react with anxiety symptoms and new fantasies and resistances that need working through. It is believed that for safety this terminal phase may require from three months to a year.

It should be noted that the analytic procedure as a therapeutic technique is a special application of the principles of catharsis, desensitization and reëducation and that the entire situation carries within itself

a powerful element of suggestion, all of which cannot be ignored as a possible explanation of the successful termination of any analytic treatment.

The degree to which any or all of these devices become a part of psychoanalysis depends upon the analyst and the situation presented by the patient. The procedure need not follow classical lines in order to be called psychoanalysis. It becomes increasingly more evident that the classical method is frequently modified and that it matters little whether the patient lies or sits down or whether certain rituals of procedure are used or not. Freud himself once said that any treatment could be considered as psychoanalysis that worked by undoing resistances and interpreting transferences. The important necessity is to make the ego face its pathogenic conflicts in the full emotional value by undoing the opposing defensive forces, effective as resistances, through interpretation of derivatives and particularly the derivatives effective in the transference.

All types of illness do not lend themselves with equal facility to treatment by psychoanalysis, and there are a number of contraindications for analytic therapy. Since analysis consists of making the ego face its conflicts, low intelligence is a contraindication. It is generally agreed that the patient must be intelligent and have a certain amount of education and ethical development if favorable results are to be anticipated. In addition, the patient must not be too old, since near and above the fifties it becomes impossible to inspect the mass of psychological material, and the time required for recovery is too long. The ideal age is generally placed at someplace between fifteen and forty since psychoanalysis presupposes both a certain reasonableness and a certain flexibility of the personality. The young are presumed to be lacking in reasonableness, and the old persons may have lost the flexibility. The patient must be coöperative, anxious to get well, and consequently willing to attempt the treatment.

The triviality of the neurosis, the urgency of a neurotic symptom, and certain unfavorable life situations have also been mentioned as contraindications. Thus the time, money and energy necessary for the analysis may make certain trivial neuroses not worth the effort. In other instances, certain neurotic symptoms require immediate removal which is impossible in the analytic situation. In such situations it is possible that other therapeutic measures may be used until the immediate emergency is over and psychoanalysis is possible. In still other cases, it is possible that the unfavorable life situations, in which the

patient must continue to live, may give one the impression that a successful analysis may make the person more unhappy than he is in his neurosis.

The patient who is given to excessive introversion may run the risk of being taught the habit of turning inward more and more. He focuses his attention entirely on his own feelings and revives many painful memories which might be better left untouched. Some schizoid personalities give the impression that they might become psychotic if childhood conflicts are stirred up, and consequently the analysis for them may be dangerous.

Since the interpretation of the transference is the main tool of psychoanalysis, the transference neuroses offer the best possibility for analytic therapy. Psychoanalysis makes the assumption that in the neuroses the warded-off impulses are striving for an expression in connection with longing for objects and they, therefore, produced transferences. The psychotics, on the other hand, are assumed to have regressed to a phase before the establishment of objects and consequently have lost interest in contact with others and tend to withdraw. Successful analysis with the latter group would therefore require some reestablishment of at least a minimum of transference ability, and even then a modification of the technique is necessary.

In general, the hysterics, and particularly early cases of anxiety hysteria, may be said to have the best outlook. Compulsion neuroses and pregenital conversion neuroses, while somewhat less doubtful than hysterics, are considered by many analysts to be good risks for analytic therapy. This is believed to be particularly true of those cases in which the rigidity has been broken down and in which the anxiety and pathogenic conflicts have come to life again.

Neurotic depressions that are not too deep and that present a neurosis still aimed at objects may respond reasonably well. Character neuroses are generally agreed to be more difficult to approach than are symptom neuroses, but many analysts believe that character neuroses in which the depth of regression is not too great may be satisfactorily handled by analysis. In such cases where the personality is rigid and there appears to be an inability to cooperate, the results have been unsatisfactory. Similarly, perversions, addictions and impulse neuroses have not responded well to analysis. Psychotics, in general, have been the least favorable group for analytic therapy.

Not all psychoanalysts would agree with the above limitations. Some few have made expansive claims of cures of symptoms of organic con-

ditions and others, including Brill (1148), have claimed for the procedure a favorable outcome in schizophrenia and other psychoses. Such claims must be viewed with considerable reserve since most therapists, including analytic therapists, have found that the psychoses are not suited to this form of treatment. It is possible that some recurrences of manic-depressive states may be prevented by analysis and that early schizophrenics and paranoids may be aided, but in most instances, it is not the classical analysis that is employed but largely a program of catharsis, desensitization and reëducation. Any program of psychotherapy must utilize some of the principles propounded by psychoanalysis, but the classical psychoanalytic program, like other therapies, has many therapeutic restrictions.

The criticism of psychoanalysis has centered around the conceptions of the unconscious, repression, the libido, and the interpretation of dreams. The concept of the unconscious is still somewhat obscured by mystical terminology and does not lend itself well to scientific psychological study. The dispute regarding the strength of the sexual impulse centers around the failure to recognize that it has not been demonstrated that sex is any more basic than are other drives. There is general recognition of the importance of the sexual impulse as a causative factor in mental difficulties, but it has not been demonstrated that this is due to the strength of the impulse any more than to the fact that the impulse must frequently be suppressed as a result of our social conventions.

There appears also to be too wide spread a tendency to accept without sufficient evidence the actual existence of an inherent, instinctive drive of destructiveness or aggressiveness, which is expressed by hostility to various parts of the environment. Not all analysts agree with this instinctual concept of aggression. Horney (1149) has pointed out that the theory of a destructive instinct is not only unsubstantiated and contrary to the facts, but that it is harmful in its implications. The following quotation indicates that she has taken the position that hostility is provoked by frustration:

"If we want to injure or to kill, we do so because we are or feel endangered, humiliated, abused; because we are or feel rejected and treated unjustly; because we are or feel interfered with in wishes which are of vital importance to us. That is, if we wish to destroy, it is in order to defend our safety or our happiness or what appears to us as such. Generally speaking, it is for the sake of life and not for the sake of destruction."

Scientific progress is impeded by the acceptance of incontrovertible authority rather than the objective evaluation of concepts. The extent

to which the Oedipus complex has won a place in psychiatric thought is illustrative of this fact. While many other investigators have found evidences of the Oedipus situation, Freud's assumption of a universal Oedipus relationship has never been established. Sears (1150) has pointed out that the same tendency to generalize is present in various Freudian concepts:

"Several sources of evidence indicate, however, that Freud seriously overestimated the frequency of the castration complex and the importance of childhood sex aggressions. The castration complex, like theories of the origin of babies, is a function of the kinds of information children have. Freud's tendency to rely on cultural universals—which do not exist—has led him to postulate universal attitudes and complexes that can be demonstrated in but a part of the population."

The contention that all dreams are of wish fulfillment is certainly not borne out by the facts. Experiment has definitely shown that dreams can be produced by all sorts of external stimuli in the neighborhood of the sleeper. Klein (1151), in his work on the experimental production of dreams under hypnosis, has presented considerable evidence of this fact. For example, stroking the hand with absorbent cotton produced a dream of a cow licking the hand, a bottle of asafetida held in front of the nose brought a dream of a dead horse, pinching the hand between the thumb and forefinger caused a dream of being bitten by a rat, and holding a wax candle in the hand brought a dream of playing golf. Even the typical Freudian dream of falling, generally interpreted as of sexual significance, was produced on eleven occasions by external stimuli. Klein assumed that the falling dream must in some way be an integral part of the experience of having one's bodily equilibrium disturbed such, for example, as the sleeper's shifting of his position on the pillow or the mattress. The stimuli which produced falling dreams were slight pressures on various parts of the cot while the subject was hypnotized. In the same way, other stimuli, both perceptual and ideational, may determine the dreams of the night without any reference to the psychic traumata of childhood.

Many of the students of Freudian technique have proposed technical changes, both with regard to theory and to analytic procedure, in therapy.

The individual psychology of Adler (1152) is a good example of difference of opinion in theory. The relationship of Adler's theories to those of Freud and the emphasis placed by the former upon strivings for superiority have been presented in an earlier chapter. To understand Adler's system of therapy one needs to keep in mind the fact that

he believes a goal is set in early childhood to which all life is subordinated. He calls attention to the child's awareness of his own helplessness and his dependence on others. According to Adler the awareness of inferiority may be responsible for the development of many talents, but may also result in the appearance of unhealthy over compensations. In an effort to show the child's need to bring his desire for power into agreement with his social needs, Adler stresses the importance of the relationship of the child to the mother and to the family in general. The various relationships that may develop out of being the only child, the oldest child, or the youngest child are given special consideration.

Despite the fact that sexual factors are not given a prominent place in his theories, masculinity is viewed as a guiding principle. He differs with Freud by seeing masculinity in girls, not as envy of the male genitalia, but of the power that is given to men. Homosexuality might result from a refusal to accept the feminine rôle since the power resides in the male.

Thus, for Adler the neuroses are based on feelings of inferiority developed primarily out of insecurity and exaggerated ambition that cannot be satisfied in reality. The patient attempts to save his self esteem through self deception. He may be seen as an ambitious but discouraged person who, unwilling to accept defeat, deceives himself by becoming sick and thereby relieving himself of obligation. Analysis is used to gain an understanding of the reaction and to acquaint the patient with the relation of the reactions to his strivings and their goal. In the analysis Adler does not advise the use of authority but prefers a companion-like situation that, however, avoids the offering of solutions through concrete advice. Dream analysis is used in a modified form, stressing the relation of the dream to actual situations, and reëducation is given much attention in the final stages of the analysis.

Ferenczi (1153) differs with Freud in proposing an active therapy in which the patient is urged to carry out definite tasks in his daily life such as modifications in the relationship to his family and changes in his personal habits. He further recommends interfering with the flow of associations and directing them back to other topics when it is believed that the patient is unconsciously avoiding the problems. He believes that habitual day dreams should be interrupted, and to patients who are little inclined to produce fantasies he suggests subjects for fantasy. This position is disagreed with by most analysts who feel that passive therapy should be utilized to the utmost, as little interpretation as possible being offered.

In recent years both the theory and practice of psychoanalysis have been more extensively modified by many psychoanalysts. Not the least among these have been the efforts of Karen Horney (1154), who has stressed the fact that full potentialities of psychoanalysis cannot be realized without disavowal of some past heritage. Horney has taken the position that psychoanalysis should outgrow the limitations set by instinctual psychology. Behavior is not to be explained as being almost entirely the result of instinctual drives such as the Freudian libido but is better understood in terms of the individual's striving for various forms of security. When emphasis is placed upon the conditions of life which shape the personality, a broader concept for the development of the neurosis is possible. Thus the Oedipus complex is not seen as the principal factor in the development of the neurosis but rather those forces which make the child feel rejected, insecure and afraid. "Narcissistic, masochistic, perfectionistic trends seen in this light are not derivatives of instinctual forces, but represent primarily an individual's attempt to find paths through a wilderness of unknown dangers." In this broader concept of the neurosis the therapy is not designed to enable the patient to gain mastery over his instincts, but rather to help him to reduce his anxiety.

Horney has criticized the therapeutic approach which attempts to arrive at a direct understanding of the patient's personality organization without first having a satisfactory understanding of the situation in which the patient finds himself. She has also called attention to the dangers attendant upon the tendency to relate a patient's present peculiarities to specific childhood experiences and to establish definite causal connections. She has rather stressed the importance of ascertaining the neurotic trends and then discovering the purpose served by the neurotic symptoms. Perhaps the most significant difference between Horney and Freud is that after having recognized the neurotic trends Freud would have investigated their origin while Horney would investigate their more immediate functions and consequences.

DISTRIBUTIVE ANALYSIS AND SYNTHESIS

The goal of this therapy, which was developed by Adolph Meyer, is a synthesis of the various factors and strivings which will offer the patient security.

Although the pathologic reactions which bring a patient to the doctor may be given special significance, the material for the synthesis is obtained by analysis of all of the factors and situations which are of im-

portance in the study of human personality. The analysis is distributed along the lines of psychobiological integration, and the treatment is guided by the need to achieve a wholesome integration of the total personality as well as of various functions. In contradistinction to psychoanalysis, a constant effort to gain synthesis is maintained. Consequently, at the close of each consultation, an attempt is made to formulate constructively the material obtained by the analysis. The treatment is elastic enough to be applied to psychotic as well as psychoneurotic and minor personality disorders. The patient's complaints are seriously investigated and, though never minimized, are reduced to their actual value by careful formulation.

This form of therapy is not carried out along preconceived lines of leading situations, but emphasizes plasticity in procedure. No rigid, systematic outline is followed, the therapeutic attacks being directed according to the opportunities that present themselves in the course of treatment. All situations are investigated regardless of whether they deal with present, past or possible future of the patient. The therapy also recognizes the possible destructiveness of mere analysis without the physician's taking a guiding hand.

In analysis one becomes aware of shortcomings and failures; and there is a tendency to study failure in detail, while success is frequently accepted without search for reason. While we may expect well organized personalities to make constructive use of what has been obtained through a dissecting procedure, it is quite likely that others whose illness does not permit the ready functioning of associative healing tendencies may be left with material which they cannot use constructively. Therefore, after every analysis the patient needs to be directed to a synthetic review in which the physician should play an active rôle.

Suggestion, hypnosis, catharsis, reëducation and desensitization may all be utilized in this therapy. In fact, the therapy not only recognizes the need for frank reëducation procedures with some patients, but offers in the procedure itself some reëducative values. The procedure stresses the wisdom of putting the patient under responsibility to produce something new in each consultation. This is designed not only to give the patient a better understanding of himself, but to serve as a reëducation of faulty habits of thinking and of tendencies to evasion and procrastination.

The illness is treated as a whole, and the doctor decides whether he should attempt to eliminate symptoms at a particular time or to neglect

them and utilize their disagreeable influence as incentives for the patient to get well. The therapy emphasizes the need of securing early in the course of treatment a careful account of the development of the illness, the life setting and a preliminary understanding of the personality. Emphasis is also placed on the need for each therapist to have a good knowledge of his own personality so that he may better understand his patients and be able to avoid the many pitfalls that will present themselves, particularly the tendency to become emotionally involved in the patient or his problems.

Distributive analysis is usually carried out in a direct approach, the patient and doctor discussing problems in the form of ordinary conversation. In view of the fact that there is usually a greater tolerance for the past than for the present, the objective attitude is more easily established by beginning with analysis of past occurrences.

The direct method may be supplemented by indirect procedures in which dream material, symptomatic acts, association tests and Rorschach's ink blot tests may be utilized. Interpretations are fundamental to the treatment, but are avoided until the patient has proceeded far enough in the understanding of the problem to be able to accept them as possibilities which he has to consider. Although the treatment is one in which the doctor plays an active rôle, the method is exceptionally elastic, and its type is determined by the patient's problems and personality. The analysis and synthesis are terminated when it seems wisest, a brief analysis sometimes being sufficient to achieve personality synthesis.

In such instances much attention may then need to be paid to outside adjustment. When it appears evident that a more or less permanent relationship between patient and doctor is to be necessary, an attempt is made to put this relationship on the basis of coöperation and collaboration rather than on dependence upon the doctor. The above statement indicates one of the fundamental differences between this therapy and the Freudian analytic treatment. The help-seeking attitude of the patient is recognized and treated, but is not encouraged, and an attempt is made from the beginning to prevent the attitude of dependence upon the doctor. An actual fostering and utilization of the transference in the sense of the psychoanalytic transference neurosis is considered undesirable and particularly so in the sexual realm.

While the contributions of the psychoanalytic school are recognized, the detection of unconscious attitudes and mechanisms is secondary to an interest in the actual situation and symptoms. The analysis is

not arranged for a search of repression, regression and resistance, but these factors are recognized and dealt with when they appear. The contributions of Freudian psychoanalysis are not minimized and are utilized for what value they may have, but this therapy is not one designed to make the search for unconscious motivation its primary purpose. The presence of sexual perversions, for example, does not necessarily prove their fundamental dynamic importance. They may be merely incidental. Diethelm (1155) says:

The ultimate goal of the treatment is to establish in the patient a feeling of security based on self-dependence, combined, however, with the ability and willingness to be an integrated part of the group in which he lives and of society in its broadest sense.

PSYCHOTHERAPEUTIC DEVICES

Psychotherapeutic devices such as suggestion, persuasion, catharsis and reëducation etc., have been used for a long time to rid patients of their neurotic symptoms and to help them face the exigencies of living. In some instances any one of these devices may be used as a specific form of therapy, but more frequently they are used in various combinations as a part of a primary therapeutic technique.

Methods of suggestion

There is, in all probability, no therapeutic situation, psychiatric or otherwise, which is completely devoid of suggestion of one form or another. The general practitioner suggests to his patient that the medicine he has just prescribed for him will have the desired result; the surgeon is using suggestion when he prepares his patient for the operation by reassuring him that the situation is in the hands of dependable, capable individuals and that success is to be expected. This utilization of suggestion is not new, but actually older than medical science or any form of medical treatment. Although suggestion is here discussed apart from other therapeutic measures, it is to be fully recognized that it is continually being combined with other forms of therapy.

Direct measures. One of the best known and most universally used methods of the general practitioner is reassurance. The advantages of encouraging the patient, in fact, are so well known that they may seem to have no place in this discussion. Nevertheless, the intelligent utilization of this weapon, which in itself is rarely sufficient to bring about a resolution of the behavior difficulties of the magnitude usually encountered in psychiatric cases, is frequently neglected. The adoption of a "Pollyanna" attitude, the shallow statements of encouragement and

statements such as "forget about it and everything will be all right" will not serve the necessary purpose and, in fact, may do more harm than good. The tendency of many physicians to dismiss the patient's symptoms as imaginary is not infrequently harmful, especially in view of the fact that the lack of any demonstrable organic or physical cause for the symptoms does not necessarily mean that they do not possess the quality of reality. The symptoms usually complained of are subjective, such as worry, fear and anxiety, and consequently are difficult for the observer to understand. It is better, therefore, to accept them as real, but of psychogenic origin, rather than dismiss them as imaginary. Even the fact that the symptoms disappear when the attention is otherwise engaged is not sufficient evidence for the assumption that the symptoms are imaginary. The athlete frequently does not complain of the pain in his injured arm during the heat of the game, but finds it unbearable when the interest of the contest has passed and it becomes necessary for him to do less interesting things. In the same way, a girl does not complain of her corns when she is dancing and having a good time. It is only when she is sitting out the dance with someone who bores her that the pain becomes marked. In either of these instances one would be seriously misled if he called the discomforts imaginary. The encouragement in such instances should be aimed more at convincing the patient that no irreparable damage has been done and that his coöperation in the designed program of therapy will facilitate the recovery. As aids to other forms of therapy, reassurance and encouragement of the simplest type may be quite valuable, especially when they are paralleled by actual improvement in the patient. A depressed patient who is gradually improving in activity and interest will frequently respond to the doctor's calling attention to his improvement and will begin to look forward to complete recovery even at a time when, owing to his depressed condition, he is not able to realize that he is actually improving.

Auto-suggestion, or suggestion with the emphasis upon subjective elements, enjoyed a wave of popularity some years ago, when it was practiced by Coué and several of his followers with some success. It is the attempt of the patient to secure the continued application of encouragement to himself, even in the absence of the physician. Coué had his patients repeat over and over again such sentences as, "Day by day in every way I am getting better and better," with the idea that by so doing they would actually become better. This amounts to the patient's carrying out of a suggestion or command which has been given to him and which he has accepted. The potency of the repetition is due

to the fact that it revives over and over again the original suggestion. Very few people would continue to repeat such a program unless they had been convinced from the start that it would help them materially. The superficiality and monotony of the system quickly rendered it an absurdity, a fad of considerable intensity but short duration. We should not, however, because of an absurd application of a principle, disregard it entirely or refuse to practice it within its limits of usefulness.

The growth and stability of Christian Science is indicative of its value and significance, and although it cannot be considered as a psychotherapeutic device, its value, particularly as a preventive, should not be overlooked. The essence of the theory founded by Mary Baker Eddy (1156) is stated in the formulation "Unity of God and unreality of evil," which means that nothing exists but God and if this God is goodness, there can be no such thing as evil. The theory is, therefore, the denial of all evil. Pain, worry and illness are impossible, and if they appear to exist, they are illusions that result from the errors of the senses. Only so long as man cherishes the false illusion of illness, pain and old age; only so long as he entertains a mental picture of their existence, is it possible for them to trouble him. Since the illness is only an illusion, the art of healing is, therefore, directed not against what appears to be the disease, but against this dangerous and contagious illusion. The practice of the theory consists in an attempt to suggest away the unpleasant denied realities. Its profound hold upon a large number of people is due to several causes. In the first place, its appeal is clothed in mystery. Even in the name, there is an attempt at a synthesis of the two concepts most in favor in the Western World; namely, Christianity and Science. Since the appeal is to the emotions rather than to reason, it is unimportant to point to the lack of a valid foundation for the concept, either in Christian doctrine or scientific knowledge. The sharp conflict between the doctrine and reality prevents many people from utilizing the Christian Science philosophy as a basic approach to life. It is not surprising that a doctrine so much at variance with our actual experiences and continuously under the assault of the testimony of our senses must as a rule fail in the major crises of life and leave the individual not only unequipped to meet the new emergency, but with all the problems recurring and clamoring for solution. It is true, on the other hand, that a number of people may approach life successfully from this basic viewpoint; indeed many individuals may find it difficult to achieve adjustment on any other basis.

Zilboorg (1157) has referred to the history of spiritual healing in

which practically all religious groups have participated. It is unnecessary here to go at great length into the well known fact that from the earliest times, there has existed a profound belief in the power of spiritual forces to cure and correct physical abnormalities. Aside from biblical and religious testimony, there is no evidence that this is true. Nevertheless, in situations when certain physical phenomena such as convulsions, seizures, fainting spells, paralysis and sensory losses are the direct effects of disturbances of psychobiological integration, the advent of a powerful suggestion may bring about an alteration in the physical manifestations. The mere fact that the patient expects the miracle situation to result in the cure of his symptoms is a powerful force operating in favor of such a result, and the knowledge of others successfully treated when suffering from similar disturbances is frequently conducive to the same end. The patient is often treated publicly before a large audience, and most of us are sufficiently dramatic in our inclinations to dread appearing ridiculous before a large group or to disappoint an audience expectantly awaiting our performance. To the individual who is ready to move in a new direction it now becomes better to be the subject for a miraculous cure than to go on with his symptoms. We have found few applications in scientific psychotherapy of this technique, and it has been relegated, whether justly or otherwise, largely to the hands of the evangelists. The nearest approach to it on any large scale in the scientific handling of behavior problems has been, perhaps, Forel's (1158) attempt to treat alcoholism by religious conversion. In fairness, it must be said that if the claims made by Forel and his students can be substantiated, the results of treatment of chronic alcoholics by this method compare favorably with the results of any other technique applied. Our skepticism, however, has prevented the general application of this type of treatment to this type of patient because the evaluation of results in treating alcoholics is especially difficult. In general, we feel we have much better techniques of suggestive therapy than this, and we should like, if possible, to apply more intelligently the underlying principles involved.

The phenomena of Mesmerism¹ were largely those of direct suggestion. Whether we look upon Mesmer as a charlatan or as a sincere worker attempting to explain, as best he could, the phenomena he encountered in life, we, nevertheless, are faced with the fact that he was a very brilliant showman and took advantage of stage settings, special arrangements and

¹ Tourneur, N.: A prince of medical charlatans. *Med. Rev. of Rev.*, N. Y., 1915, 21, 216-219.

the powerfully suggestive influence of group responses in working out the various modes of application of his technique. The Mesmeric seance partook in many respects of the religious ecstasy of the miracle and the religious conversion, but running through it was an element of unintentional suggestion on the basis of which was built up the technique of hypnosis. Mesmerism is also closely linked by its antecedents and its offspring with the various indirect measures, such as the use of Perkins' tractors, but this connection takes place more through the theory of Mesmerism than in its actual technique of application. The fact remains that Mesmer found the application of magnets to certain diseased individuals brought about cures of symptoms, and in extending his applications of this principle he found he could do away with the magnets. That he should attribute the results to some external force such as animal magnetism is not surprising in the light of the knowledge of those times, but that he should have missed so completely the phenomena of suggestibility is quite striking. No one would think of applying Mesmerism as such to the treatment of mental illness today since it was a strange mixture of various principles, the reason for and modus operandi of each being poorly understood. Today we attempt to apply these various principles more specifically and more appropriately to the condition we are dealing with and so bring together, in treating the patient, various techniques of hypnosis, religion, suggestion, etc., as seem most proper.

Hypnosis

Hypnosis, the legitimate descendant in direct line from Mesmerism, has already been discussed in an earlier chapter. In this section we are concerned primarily with its possible uses as a therapeutic agent.

There exists a difference of opinion regarding the depth of the hypnotic state that is most effective for therapeutic measures. Some experimenters (Sidis (1159) and Travis (1160)) prefer only a light degree or a semi-waking state; others prefer the somnambulistic state in which amnesia and hallucinations are readily induced. The writers prefer the latter state since a wide variety of suggestions are more likely to be accepted without question. Caution should be exerted, however, to prevent the subject from going over into a natural sleep.

Hypnosis is frequently of value in detecting the feigner of organic diseases. Most functional disorders such as blindness, deafness and cutaneous loss of sensation can be discovered through hypnotic suggestion. Sources of emotional conflict and other causal factors may be discovered and restored to the waking state through the use of post-hypnotic sug-

gestion. In this way also various unhealthy symptoms may be removed. For example, the patient who believes he is paralyzed and has been unable to use his legs may be induced to arise and walk about the room during the hypnotic period. The suggestion can further be made that he will continue to be able to walk after he awakens, and in some instances he may actually do so. The range of application is particularly wide. The cigarette smoker who wishes to cease the habit may find the post-hypnotic suggestion that he will no longer desire to smoke effective, but relapses are likely to follow if no further precautions are taken. It is desirable to have the suggestion effective for only a limited time at first and through repeated post-hypnotic suggestion gradually to extend the time. This procedure tends to bolster the individual's self-confidence and thus establish faith in the therapy. Some investigators prefer to condition the undesirable habit with unpleasant consequences, for example, nausea. In one case of alcoholism treated under hypnosis, the suggestion was made that the smell of any alcoholic drink would bring about a state of nausea and vomiting. The effect of this suggestion was so powerful that for a long time the patient could not find himself in the presence of alcohol without having to vomit. However, the patient found the cure not an unmixed blessing, and becoming provoked at the situation, eventually determined to overcome the cure. He entered a bar room and drank and vomited alternately for a sufficient number of times to fatigue the vomiting reflex, so that, at the end, he got gloriously drunk and from that time on was able to intoxicate himself as frequently and as easily as he had in the beginning. Moreover, the physician was never able to produce a similar post-hypnotic reaction in this case. This type of application does not prove to be particularly useful in view of the fact that the post-hypnotic suggestion is likely to disappear spontaneously after a short period of time. Freud (1161) attributes such a disappearance as this to an attenuation of the transference situation on which the hypnotic effect depended. Whatever the cause, the fact remains that the permanent removal of symptoms in this way is apparently very rare. Another danger that is frequently encountered is the possibility that one may be curing symptoms without affecting the underlying causes. In such cases the patient is likely to develop another set of symptoms which may be even more annoying.

Hypnosis has had its widest and most effective use in the recovery of material lost during periods of amnesia due to functional causes. Many patients with hysterical fugues, totally unable to recover the material of the fugue periods consciously, have been able, when hypnotized, to

reconstruct completely several of the fugue episodes together with their psychological content. In this way a clear understanding of the mechanism of the fugue has been made accessible. This ability to recover lost memories has proved to be especially valuable. It should be called to mind here that although the general popular idea of hypnosis is that memory for the hypnotic seance is not retained following the period, this is by no means uniformly the case and need never be so if during the hypnotic seance it is suggested that the patient will remember everything that has taken place. In this way material brought into consciousness during the hypnotic state may be retained in consciousness subsequently.

Somewhat akin to the above, hypnosis may prove valuable in the recovery of early dream memories and early life associations considered to be of great value by the psychoanalysts.

The influence of psychogenic factors in certain types of epilepsy has been admitted by many medical men, and hypnosis may have a place in the treatment of some of these patients. Although the etiology of epilepsy is usually explained in terms of instability of nervous tissue or constitutional defects of the brain, neurological and histological studies do not confirm the theory except in certain types. Jacksonian epilepsy is one of the types that is caused by an irritative lesion of the motor area of the brain. Aside from the cases of epilepsy caused by brain lesions, there are a great number for which no causal explanation is adequate. These patients have seizures which correspond in some respects to hysterical seizures but in other respects are almost identical with the seizure of so-called true or idiopathic epileptics. These convulsions occur at irregular intervals and with different intensities in the same patient. They occur frequently following some emotional upset of the patient. One patient seen by the authors has had severe convulsions following an attempted theft of his personal property and also after dancing with a woman.

Following the general theory advanced by Dunlap on the effectiveness of repetition in the breaking of habits, Dorcus and Stone² have carried on some experiments with patients diagnosed as epileptics. Some of the patients were unquestionably of the idiopathic type, while certain of the others, although diagnosed as epileptics, were probably hysteria patients or hysterio-epileptics. Since the attacks are supposedly involuntary, the experimenters have tried to bring them under voluntary

² The paper by Dorcus and Stone dealing with these experiments has not been published.

control by repeated induction under hypnosis. They hoped that one of two results could be obtained: (a) That the attacks could be timed in such a way through repetition that they would occur only at a given time, or (b) that by a repeated discharge of the motor phenomena under hypnosis, the irritating agent would be drained off so that the tendency for the seizure to occur at other times would be lessened.

Unusual success has been encountered in the induction of the seizures. The series of pictures in plate V will give some indication of this fact. The results are sufficiently encouraging to warrant the initiation of a more intensive program of experimentation.

The use of hypnosis as a therapeutic agent requires considerable caution especially with regard to the selection of the patients to be treated by it.

Some patients show a very high resistance to hypnotic suggestion and are at times thrown into panics by the attempts to hypnotize them. They may also use this experience as a focus around which to develop their delusions and other abnormal symptoms. Obviously hypnosis should be avoided in schizophrenic patients who are verging on a catatonic episode and who are occasionally susceptible to the induction of the hypnotic state.

The use of hypnosis as a therapeutic agent by inexperienced persons is dangerous. If suggestions are not properly given and removed, the patient may be inadvertently influenced later in his behavior. Then, too, some patients have mystical attitudes concerning the nature of hypnosis which should be dissipated by careful explanation. When this is properly done, no harmful results can follow.

Hypnotherapy. Recently various combinations of hypnosis and psychoanalysis have stirred the interest of many therapists and have resulted in the development of a technique known as hypnotherapy.

It will be recalled that Freud's early method was that of having the patient talk out his difficulties under hypnosis but that he concluded that the superficial nature of the outcome was due in part to the fact that although direct access to the unconscious was possible, the ego was completely excluded from the process.

Various techniques for the directing of associations have convinced many investigators that it is possible to get participation of the patient's ego-defense system in hypnoanalysis, and consequently the method enjoys increasing use. Success with the method has sometimes been attained by regressing the neurotic patient to the level of the beginning of his difficulties. The material verbalized during such induced regressions must then be integrated with his conscious personality. Others have

had considerable success by inducing dreams during the hypnoidal state. The technique is much more direct than is usual in psychoanalysis, but it appears to be more and more evident that it is not only possible to get at early experiences and dreams but that the past and present may be interweaved in such a way as to bring about the reintegration of the repressed past into the conscious ego.

Hypnagogic reverie. Kubie (1162) has discussed a device called hypnagogic reverie in which a dream-like state is induced by having the patient listen to the amplified sounds of his own breathing. The therapist may then ask the patient what he is thinking about or he may give suggestions to the patient. It is thus assumed that information may be secured without dependence upon the interpretation of dreams. Further advantage claimed for the method is that there is less use of symbolic representation and that the reverie is easier to interpret than the dream since it is not concerned with multiple meanings. It is also assumed that guilt and anxiety are less active in the reverie state and consequently traumatic material is more readily accessible.

Oneirosis. Another modification of the light form of hypnosis has been described by Winn (1163). The subject is prepared for the experience by the establishment of a very permissive atmosphere. Before the light hypnosis is induced, the subject is relieved of any anxiety regarding hypnosis and is told that he may signal for a termination of the state at any time. He is encouraged to realize that he will be aware of everything that is going on and that all of his experiences during the trance will be subsequently recalled. It is Winn's position that in the light trance so structured one gets better ego participation, rather than mechanical obedience of the subject.

Indirect Suggestion

Formerly in psychiatric and neurological practice it was customary to utilize suggestion of an indirect nature in the treatment of the psychoneuroses. The patient's illness was ostensibly accepted by the physician as being due to some physical cause, and the cause was treated. A number of rather brilliant symptomatic recoveries have been reported on this basis, especially with hysteria patients.

The chief items of importance in the type of therapeutic agent administered have usually been, first of all, a certain spectacular aspect, secondly, a certain amount of unpleasantness to the patient in the treatment administered, and thirdly, some rationalized relationship between the agent employed and the patient's idea of his own illness.

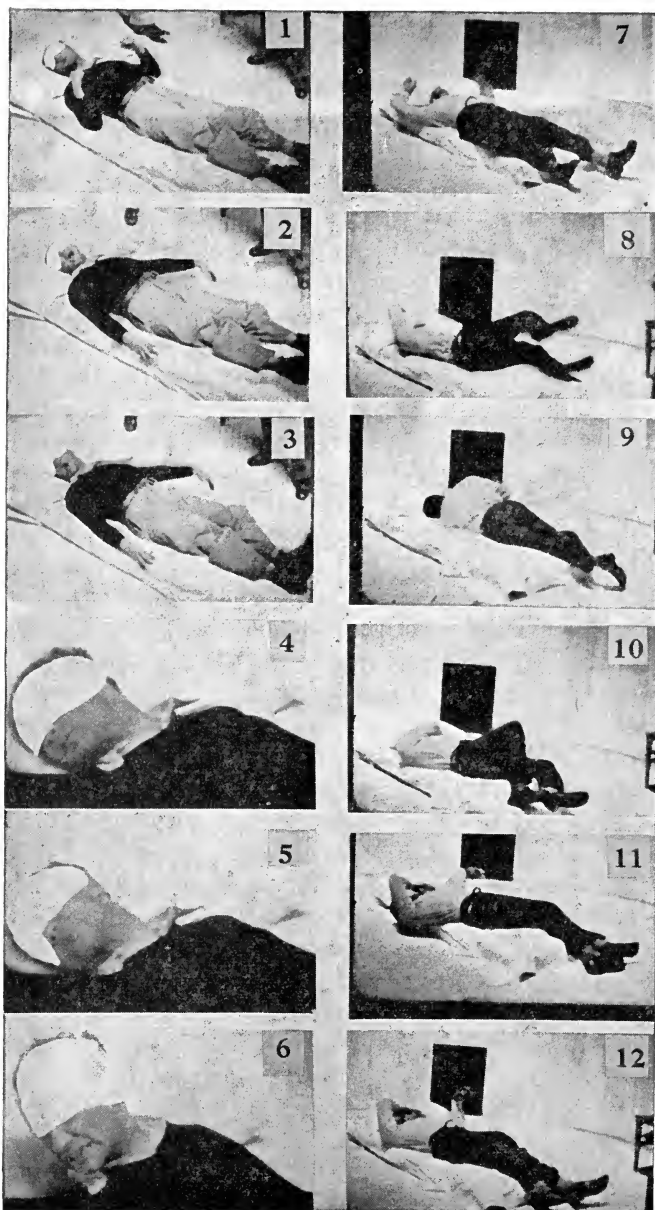


PLATE V

The pictures show partially the motor discharge during hypnotically induced epileptic seizures. Painting out the upper portion of the face in the first six photographs destroys some of the detail. In the first picture the arms are contracted; the mouth is opened in the second; and in the third, the tongue is protruding between the teeth. The close-ups in pictures 4, 5 and 6 show respectively, the face relaxed, a slight contraction of the muscles of the mouth and nose; and complete contraction of the muscles of the mouth and jaw. There is also an indication of teeth gritting in picture 6. The other patient shown in photographs 7 to 12 exhibited marked movements of extremities and turned from side to side. Note the turn to the right followed by a reversal of the position to the left.

Examples of the application of electricity will undoubtedly illustrate the method much better than discussion.

A patient who was suffering from a paralyzed right arm without any neurological basis for it came into the neurological clinic where he was examined and the nature of his disorder discovered. He was not told the facts (that there was no organic basis for his illness) but was simply assured that the physician knew what was wrong with him, that the nerves to his arm were blocked in some way and that it would be necessary to force an impulse through the nerves to the muscles in order to remove the block from the nerves. He was then taken over to the electrical apparatus and given a series of severe and painful electric shocks over the nerves of the arm and hand. These electrical stimuli, of course, produced violent and rigid contraction of the muscles involved, which the patient could see. He was then assured that the electrical impulse had removed the block from the nerves and that he could now use the muscles, which he proceeded to do. He was further told that if there was any sign of returning paralysis, he should come back immediately to the clinic for further treatment of the same kind, but that if the muscles continued to function well, this would probably not be necessary. While ostensibly done in a kindly way, the treatment was made as painful and as unpleasant as possible, so that the patient would have no desire to return for further treatment. Thus the cure was made more painful and disturbing than the illness itself. This particular patient has had no return of this symptom over a period of several years, but has from time to time developed other symptoms of hysteria, such as blindness, fainting spells and loss of voice. All of these were treated along similar lines, sometimes with success and sometimes without. It was the opinion of the physician in charge that this particular case never merited any more intensive treatment than was administered.

In a similar way, a colored girl, who had over a period of years a series of convulsive seizures gradually becoming worse and more frequent and occurring whenever she had any unpleasant duty to perform, was completely cured of her symptoms in a period of a few weeks by the following method. She was told that her condition was due to her nerves and was given a bottle of asafetida which was described as a powerful nerve tonic that would build up her nerves very rapidly. She was to take a teaspoonful of it three times a day for a week and should cease having any seizures within that time. It was explained that they probably would not come back, but that if any time she felt a seizure coming on, she should take another teaspoonful of the medicine, which would prevent

its occurrence. If she failed to do this and a seizure did occur, it would then be necessary for her to take it three times a day for a week as in the beginning. Again it will be noted that the treatment was made both spectacular and unpleasant to the degree that the patient was impressed by it. Seizures stopped within three days, and she has never had a recurrence of this symptom.

A patient with neurotic vomiting of pregnancy was seen in consultation in a general hospital. Circumstances precluded any intensive psychotherapy. The physician told the patient that he knew what was wrong with her, that her stomach was irritable and upset and that he could give her some medicine that would relax her stomach and stop the vomiting immediately but this would have to be given in her vein. A 10-cc. Luer syringe with a very dull needle was used to inject 10 cc. of normal saline solution intravenously. The neurotic vomiting stopped and did not recur.

This technique is somewhat valuable in diagnosis, since it offers a quick method of distinguishing organic from functional symptoms. It may also be valuable as a medico-legal aid to show or remove cause for suit for damages. It is important, however, to keep in mind the fact that the technique is not always successful. One should also consider the fact that people with organic brain lesions frequently have superimposed a structure of functional symptoms not to be accounted for on the basis of the lesion. A railroad employee who was crossing the tracks one night, fell suddenly, and although he showed no external signs of injury, he was slightly confused. Examination in the hospital revealed a conflicting group of symptoms. The reflexes were all normal, both deep and cutaneous. There was no impairment of the intellectual functions with the exception of a subjective complaint of poor memory. The chief complaint, and the one on which the conflicting results were obtained, was one of blindness. In the first place, the vision was tubular in character, being confined within very narrow limits to the central field. In some of the examinations, however, the vision was normal within the limits of this tubular field on both sides. In other examinations there was, in addition to this concentric contraction, a hemianopsia on the left in both eyes, while others showed a hemianopsia on the right in both eyes. Aside from evidence of generalized arteriosclerosis and some increase in blood pressure, this visual disturbance was the most important objective evidence obtainable, and the patient was thought to be an hysteric by every physician who examined him until one thought he detected a consistent hemianopsia on the left without any evidence of

tubular vision. An attempt was made to cure him of his symptoms by giving him a series of electric shocks over the fibers of the orbicularis oculi muscles. Following this there was evidence of a consistent hemianopsia to the left without concentric contraction of the field. This served as a basis for diagnosis of a hemorrhage into the occipital pole of the right hemisphere. The suggestive therapy in this case sufficed to remove the hysterical superstructure built up on the organic basis.

Operative procedures have also been utilized in a similar way to bring recovery from functional symptoms. For example, a patient who had suffered slight injury to her back in a railroad accident, developed paralysis of both legs on a purely functional basis. Being very wealthy, she toured the country and prided herself that no physician had been able to diagnose her trouble. She eventually wound up at a large eastern clinic where they had been prepared for her coming by notification from a previous clinic she had attended. Upon her arrival, she was examined and told there was a small clot of blood on the meninges over the spinal cord, and that it would be necessary to operate and remove the spot of blood. She was taken to the operating room where incision was made under anesthesia; the incision was stitched up and she was returned to the ward. Recovery from the operation was succeeded by prompt recovery from the paralysis. Many people of the neurotic type, however, are likely to become addicted to the operative procedure, and, for this reason, we are, in general, opposed to the use of the method.

For the same reason suggestive therapy by the administration of sedative, soporific, analgesic or narcotic drugs is opposed. Many psychoneurotic patients have developed bromide intoxication or methemoglobinemia on the basis of acetanilid poisoning or poisoning by the barbituric acid derivatives.

In general the best suggestive therapy of this type is electricity or the administration of bad-tasting medicines. The use of some form of violet ray, the sun lamp or hydrotherapeutic measures, such as packs, sitz baths and douches and other spectacular, but harmless, agents, sometimes may be helpful.

Despite the fact that many symptoms may be removed by these measures, they are not always successful, and at best are likely to be transient, resulting in the shifting of the symptoms from one place to another. Therefore, although these applications are still used by many neurologists, they have been generally discarded by psychiatrists. There may be a definite field of usefulness for these measures, but it is very limited in extent. The treatment is likely to be quite successful in

mental defectives with hysterical symptoms and occasionally successful in mental defectives with anxiety or psychasthenic-like syndromes or individuals of normal intelligence with hysterical manifestations.

The Weir Mitchell treatment may be considered as a treatment along these lines, in view of the fact that there is no evidence that the patients treated really suffered from exhaustion. The theory underlying the treatment was that the patients suffered from a nervous exhaustion, which depleted the lipoid elements of the central nervous system and required absolute rest and a diet containing a high percentage of fats for the purpose of recovery and rehabilitation. The method required the patient to be isolated in a darkened room and kept in bed for six weeks, during which time he had no contact with anyone except his physician and nurse. Passive massage of the entire body had to be carried on vigorously for 15 to 30 minutes twice a day to prevent weakening of the muscles and regression of the physical status. The diet was kept very high in fats and the patients frequently put on weight with considerable rapidity. At the end of six weeks of this treatment, the patient was placed gradually upon an extending program of activity until his physical strength was restored. If one application of the treatment failed to bring recovery, a second and third were instituted. The proponents of the theory believe it to be particularly valuable to asthenic conditions (particularly neurasthenia or psychasthenia). The general criticism of the theory is that the recovery is only temporary, the patient finally lapsing back to his previous condition. In addition to this fact, there is no absolute evidence of a true exhaustion of the nervous system in these asthenic conditions and no evidence for the theory of loss of lipoid substance of the brain. Observation of the results of the treatment indicates no real improvement in the mental condition of the patients, and there is always the danger that such patients may become confirmed in the belief of a physical basis for their illness so that other forms of treatment become difficult or impossible.

PERSUASION

The development of psychotherapy was greatly influenced by Dubois and Déjerine whose therapeutic theories, although not identical, laid the groundwork for therapy by persuasion. Dubois' (1164) position, described in a book that was published in 1907, was in opposition to the suggestion therapy, which had become popular mainly through the efforts of Bernheim. Dubois took the position that the patient should develop critical mindedness and a sense of independence as defenses

against suggestibility. He was aware of the danger of the treatment of symptoms and concerned himself with a rational approach of appeal to the intellect and the will. He emphasized the importance of encouraging and moralizing conversations and reasoning as to the nature of the symptoms. This therapy was directed to enlightening the patient concerning false ideas and bad mental habits on which the symptoms depended.

Appel (1165) has pointed out that this theoretical emphasis on rational and moral factors makes it more logical to refer to his therapy as rational psychotherapy or moral suasion. Dubois did not give much attention to emotion in this theory, and his rational and logical shortcuts to emotional problems were far from adequate. Despite this fact, he was eminently successful with his patients, and to some extent this success was apparently related to facts outside of his theory. Although his theory insisted that one should concentrate on changing the system of ideas through moral suasion, he also said that the possibility of the cure must be emphasized from the beginning of the treatment. It is obvious that in practice his success was not due entirely to his appeal to reason but that he appealed to emotions and unconscious factors and that his personal influence and emotional support were of considerable value.

Déjerine (1166) pressed the point that the psychoneuroses were not developed through suggestibility, wrong ideas and weakened will, but that they depended rather upon emotional shocks. His therapy was aimed at the liberation of the personality from the harmful emotions. As with Dubois, the patient was given assurance that he would be cured and he was questioned about special emotional difficulties or traumatic incidents. Déjerine insisted, however, that the patient was not cured by reasoning and logic, but by the affective relationship with the therapist. This emotional relationship resulting in confidence in the physician was, for him, the factor that implemented persuasion. His therapy gave attention to the reëducation of bad habits, and encouragement was employed to give the patient confidence. Catharsis was important since confession was necessary for the liberation of the emotion. Thus, while in suggestive therapy, the patient may get well because the doctor says he should and for Dubois he recovers because he believes he can, in Déjerine's persuasion, the patient gets well because he has been convinced there is no reason why he should not be well.

These therapies are primarily directive and authoritarian and provide the basis for the use of catharsis, desensitization and reëducation.

Although the therapies developed in opposition to suggestion, the therapists did not hesitate to use suggestion when it might be helpful.

The regular predisposition of the physician to prescribe a treatment, coupled with the success of clinicians like Dubois and Déjerine through the use of a primarily directive therapy, set the stage for a further development of treatment by authority, will, direction, and regulation. Payat (1167), Walsh (1168), Vittoz (1169) and Barrett (1170) have described therapies in which will, direction, and regulation have been given prominence. Attention will be given to the further development of these principles in the discussion of reëducation and psychotherapeutic aids.

Methods of catharsis

Practically all intelligent individuals are well aware of the fact that the mere verbalization of their problems serves the purpose of making them more objective and offers the additional possibility of producing a perspective. We are all somewhat aware of the relief obtained by merely talking out a situation. In the treatment of mental patients, however, it early becomes evident that the principal problems associated with the illness are frequently those of which the patient is intensely ashamed, and which he, therefore, finds great difficulty in discussing. This is somewhat due to the fact that many of the things which have worried the patients are precisely those things concerning which people in general have been taught to be ashamed or at least to be discreet in discussing. In spite of this, the patients reach a point at which they are so much bothered by their worries on these topics that they are literally flooding over with the need of talking them out or telling someone about them. Under such circumstances some provision should be made to allow the patient to aerate this material freely and fully. This is true, in general, regardless of the type of therapy to be employed, and, as a matter of fact, the facilitation of such ventilation of conflict material is coming to be recognized as the beginning point of any intensive psychotherapeutic program.

The elementary facts of catharsis are not new and were undoubtedly recognized by many philosophers and physicians long ago. It is certainly true that the Catholic Church recognized their value, as is evidenced by the development and perpetuation of the technique of confession. In connection with this, it is interesting to note the value of the confession in freeing the individual from feelings of guilt. The term catharsis was used by Freud (1171) in relation to this technique in his

original studies in hysteria in collaboration with Breuer. He found his patient under the influence of hypnosis, bringing to light a great deal of material with which she had been preoccupied and which she had been unable to tell anyone about under other circumstances. After such an experience, he noticed that his patient was much improved.

It should also be noted that because of the nature of the material worrying the patient, there is a marked tendency for him to present conventional reasons for his illness. Moreover, people in general tend to be "mind-shy" so that they hesitate to ascribe their illnesses to mental or emotional causes. Thus, in the beginning almost every patient is prone to attribute his difficulties to overwork, physical disabilities of all kinds and to various sex experiences. Not infrequently, after the illness has been ascribed to such experiences and an attempt has been made to objectify the problems and work them out, it is discovered that the real problem is something else which has been kept from the physician deliberately because the patient was ashamed of it. In other instances it may not have appeared because the patient was unaware of the traumatic material. Consequently, one must be very careful about accepting these reasons as being the basic causes of the illness. Nevertheless, it would be a serious mistake to insist that the principal reasons for an illness must always be hidden from the physician unless some special technique is utilized to bring them forth. Experience serves the purpose of teaching one to discriminate between cases in which the submerged motivations are of great importance and cases in which the presented worries and difficulties are paramount.

It is contended by some physicians, mainly those of the psychoanalytic school, that all traumatic experience capable of producing psychoses must exist in the field of sex. The point of view to be defended here is that prolonged frustrations of any kind involving the fundamental desires or urges are equally important in producing behavior disturbances, and it is only necessary to review the behaviour disturbances manifested in a group of children subjected to economic, social or emotional difficulties to become aware of the absurdity of the first point of view. Moreover, there is no psychological evidence of the strength of the sex desire over other elementary urges. The field of sex offers facility for the development of traumatic experiences and emotional conflicts over them, and it should receive at least the same quality and intensity of interest exhibited in other fields. It is necessary to be somewhat cautious about accepting conventional statements at their face value in the field of sex, but this is also true regarding stealing in

childhood and any other experiences which the individual may be ashamed of or unwilling to admit.

Nothing facilitates the obtaining of essential information so much as the establishment of confidence in the physician and particularly in his discretion and tolerance. There are times when it may be a serious error in technique to indicate in any way during the early interviews with the patient that the physician does not accept his statements at their face value. The necessary relationship between the patient and the physician may be greatly facilitated by frequent contacts during the patient's early hospitalization and a somewhat non-committal attitude toward what the patient says and does. Then by means of adroit questioning, the patient may be induced to communicate some experience over which he has great tension, if he finds the physician's attitude receptive, tolerant and uncritical. It is necessary to learn to detect points of stress and developing tensions in the patient and to stop short of attempting to force from him communications which to him seem indiscreet or intolerable. Pressure brought to bear on such points will frequently produce resistance and negativism and may lead to the physician's attaining a status in the patient's mind that will render him no longer useful in the case. A boy, who in his first interview was able to discuss a great number of delinquencies and sex experiences without the exhibition of tension or fear, suddenly became negativistic and exhibited fear and hatred for the physician. The question, which one of the children was preferred by the mother, had been asked. The boy had made the conventional answer that the mother treated and liked all of the children the same. It was suggested to him that this was an extremely unlikely thing since it was so difficult to like two people in exactly the same way. The boy reiterated his statement, became silent and would no longer answer the most indifferent questions. Moreover, in subsequent attempts at interviews he maintained the same attitude of negativism and resistance and had to be turned over to another physician for treatment. While it is true that treatment is expedited by forcing each interview to the point of maximum tolerance of the patient, it is much better to stop short of this rather than go beyond it.

This direct objective approach, which is generally frowned upon by members of the psychoanalytic school, must, of course, vary considerably in its actual working out, and one learns of his limitations only through experience.

As was noted in Freud's case of hysteria, catharsis may at times be greatly facilitated by inducing hypnosis, and this method has been used

by many people with considerable success. The technique of hypnosis has at times been combined with the psychoanalytic approach with the idea of using the hypnotic state for the acquisition of material to be reviewed with the patient later from a psychoanalytic standpoint. The material recovered under hypnosis has also been used with success for a more direct and objective interpretation of the illness. In some instances the technique is applicable to the bringing to light of conflict material upon which the symptoms are directly dependent.

A case of a woman of 35 who was treated for amnesia will serve the purpose of illustration. The patient had experienced several periods of from a half hour to several hours in duration for which she retained no memory whatever. She would start to town, for example, then sometime later would suddenly come to herself at a distant point without any memory for the events that took place in the interval. Attempts were made to recover the continuity of her consciousness over these periods, first by a program of direct questioning and later by a program of free association somewhat on the basis of the psychoanalytic procedure. These attempts were unavailing, and additional episodes of amnesia occurred. The patient lost confidence and ceased to come for interviews. She was induced to return, however, for a clinical demonstration to a class in medical school. Preceding the class hour she was interviewed briefly and it was decided to hypnotize her. In twenty minutes under hypnosis sufficient material was recovered to reconstruct almost completely several of the amnesic episodes, all of which occurred in relation to a love fantasy with a man other than her husband. It was suggested during the hypnotic state that these memories would be retained following it. She was then awakened, and the entire production reviewed with her. At this time she recognized the need of forgetting these episodes and everything connected with them because the idea of infidelity to her husband, even in fantasy, was intolerable to her. In this case there have been no recurrences for several years.

It is obvious that catharsis is also an essential element of the psychoanalytic procedure, although the complete analysis is more like a purging than a catharsis. Here, as will be discussed later, the attempt is to unearth all unconscious traumatic experiences and readjust the patient's attitude toward them by making them conscious.

In order to understand the functional mental illness, it is necessary to find answers to the following questions: (*a*) Why did the patient have a mental illness at this time? (*b*) Why did the mental illness take the particular form exhibited and (*c*) What accounts for the symptoms

manifested? The first of these questions is usually answered on the basis of the detailed history of the situation surrounding the advent of the mental illness, that is, the precipitating factors. In some cases these factors are existent over a long period of time and achieve their effect through cumulative tensions in response to them, while in other cases the series of traumatic events may take place in close chronological order and constitute a burden in terms of which the integrative break is more or less understandable. The type of illness manifested is more generally to be explained in terms of constitutional predisposition (if this can be demonstrated) and special habit patterns of reaction manifested throughout the life of the patient. The history given by friends or relatives proves to be particularly valuable in this connection. The answer to the third question, which is much more difficult, is intimately associated with the life experiences of the individual and can usually be obtained only through him. In view of the fact that the symptom is quite definitely an acquired pattern, it becomes necessary to search for situations of tension in which a similar reaction has led to solution by the patient. Not infrequently a series of such reactions can be reconstructed from early life, usually beginning with mild tendencies that develop progressively into more and more elaborate and more fixed reaction patterns. If the pattern is one that persists from infancy, the evidences of development of the trend may be inconspicuous, its increased importance being due to its progressively greater incongruity with the level of adjustment expected from the patient. It is precisely this series of life experiences in which we are interested in attempting catharsis, since they may leave undischarged tensions in their wake and serve to increase the insecurity of the individual. The catharsis may be considered to be complete if we have succeeded in getting the patient to discuss his life experiences intimately enough to answer these three questions. It should be clearly understood, however, that the experiences to be etiologically valid for symptom formation must have a definite associative connection with the symptom and must be adequately accounted for without too much interpretation or distortion.

If this material is obtained, it becomes of great value for further treatment by desensitization and reëducation.

Desensitization and reëducation

Since desensitization consists of attempts to get the patient to face the feared situations and reëducation implies a retraining of his habits of response, the two processes become practically inseparable. Conse-

quently, a separate consideration of these two therapeutic agents would result in considerable duplication of material and the setting up of a purely artificial line of demarcation.

The concept underlying desensitization is concerned with the theory of emotions and the training of habit responses. It is a well known fact that the traumatic experiences of a particular patient are frequently traumatic only to him. That is, the experience to which he reacts with great sensitivity is frequently one to which most of us would react with indifference or at least with considerably less emotional disturbance.

The reason for the excessive reaction on the part of the patient is usually some specific life experience which has been very painful. He, therefore, finds himself unable to view the experience objectively, or, if he is able to do so, is unable to change his reaction to the experience, even in the face of good insight. We are probably all somewhat familiar with degrees of this latter instance. We recognize fully on a rational and purely intellectual basis that our reactions should follow certain lines, but find that our emotions refuse to be so governed. These persistent reactions have all of the characteristics of a habit; in fact, they have been called by Meyer, habit patterns of reaction. These habit patterns in mental illness most frequently constitute methods either of evading, a memory of the primary experience or of avoiding reliving a similar one in new reality experience. Therefore, they are frequently called forth either by situations that are reminiscent of the primary traumatic experience directly or by a chain of association.

The idea we deal with here is best exemplified in the fear reaction. A horse grazing for the first time near a railroad track is suddenly frightened by the noise, smoke and speed of the oncoming train. If he is suddenly aware of its proximity, he becomes badly frightened and stampedes. His tendency thereafter is to remove himself from that situation before the train arrives and to keep at what he considers a safe distance from it at all times. Gradually, however, if nothing untoward occurs to revive his fear, he may become quite accustomed to the train and graze peacefully by it, particularly if the confines of his pasture are such that he is unable to remove himself to any great distance from it; in other words he becomes desensitized to it. Any one who has trained horses knows that one can break a horse of fear of trains by standing close to him and encouraging and petting him as the train goes past. In a case of absolute freedom, if the horse is allowed to bolt the first time, he will tend to bolt that much harder the second, and the more the reaction is repeated, the more fixed it will become.

Moreover, the reaction can be associated later on with neutral elements of the situation in which it occurs. From this, the reaction can spread by association processes and eventually be called forth by stimuli only remotely and indirectly connected with the primary experience. In addition to this, each of the subsequent fear reactions may persist in its own right and may not be removed by simply desensitizing the horse to the presence of trains.

In the psychotherapeutic sense then, desensitization consists essentially in having the patient face the painful experiences over and over again in such a way that his emotional response to them is gradually attenuated. The term and the method apply both to overt experiences and to memories of traumatic experiences. Consequently, if the patient is afraid of closed places, he is encouraged to enter them and to live through the experience without giving way to the fear reaction. The attempt here is to build up a new response to the specific situation and thus remove the patient's symptoms. In the same way frequent repetitions of the memories of experiences which the patient has feared may desensitize him to them.

Although the maximum benefit to the patient will be attained in those cases where one is successful in desensitizing to the primary experience, much can be done by desensitizing to derived stimuli. In view of the tendency toward spread and diffusion it is not good technique to wait until one acquires information regarding the primary experience, but one should from the beginning carry on a program of desensitization. This is especially true in view of the fact that the primary experience may never be discovered.

The general attack is then a double one, aimed at desensitization of each symptomatic reaction as it is manifested and at the same time a probing to discover the original source of the trouble with a view to desensitization to it. The difficulty with the program is that as the desensitization against symptoms progresses, the patient may gradually find himself sufficiently comfortable, as a result of the loss of most of his overt symptoms, to refuse to participate further in psychotherapeutic efforts. Because of this possibility such an objective approach is generally considered to be more or less incompatible with the psychoanalytic approach.

Reëducation implies a retraining of the individual in his habits of response to both situations and ideas. The process involves the same principles as other kinds of education and in its broadest sense is a replacement of bad habits with better habits or the formation of new

habits to replace habits which have been lost. In many instances this program may not be reëducation at all but education. That is, it may be merely the attempt to substitute adult for more infantile reactions. Reëducation in its simplest form may best be indicated by an example. If we attempt to stir our coffee holding the spoon in the right hand, we find that the movements occur with ease and grace, whereas clumsy, uncoördinated movements result if the attempt is made with the left hand. These divergent reactions are due to the formation of a habit in one case and the nonformation of a habit in the other. If, however, practice in the use of the left hand is indulged in, we may train this hand to perform the activity smoothly. In the same way habits once acquired and subsequently lost may be regained through a process of re-training. Space does not permit us to go into the great amount of experimental work in reëducation; for this information the reader is referred to the writings of Franz (1172), Lashley (1173) and others. Here one will find considerable discussion of reëducation where there has been anatomical loss. Under these conditions reëducation is the formation of a new set of habits by one side or one part of the body to take the place of old habits that were lost because of the loss of another part of the body. We are interested here in the use of reëducation in the treatment of the metnally ill, that is, in individuals whose habits of reacting have been replaced by such bizarre or perverted habits as to make them differ widely from the normals. Such an individual gets well, or at least, makes a social recovery whenever his habits become like the habits of the others in his environment. The process of reëducation of the mentally ill consists in the replacement of these perverted, unsocial methods of reactions by habits which are conventional and social.

Franz (1174) points to a number of conditions which he believes to be essential to the utilization of a program of reëducation for the mentally ill. The first of these is insight or the capability of the individual to recognize his deficiency or abnormality. In Franz's opinion without this recognition that in some respects he is abnormal or different from others, it is practically useless to attempt the reëducation program with any patient. It is to be observed, however, that there is a wide variance in the matter of insight and also that insight may be developed in the course of the treatment. The second necessary condition laid down by Franz is the desire, on the patient's part, to get well. This is especially true in individuals who have developed delusions of grandeur and who, glorying in their position of superiority, do not want to become like other people. In this connection, it may be noted that many procedures

may be carried out which may eventuate in a social recovery. Through manipulation of environmental factors, a desire to become normal may be developed in the individual. The third condition is that of self-confidence in the patient both in his ability to get well and in his physician and advisor to help him overcome his difficulties. This confidence, though not present at the beginning, may be developed through the care and ingeniousness of the physician. Finally Franz pointed out that in addition to a realization on the part of the patient that he was ill, a desire to get well and a belief in his ability to overcome his difficulty, it is necessary that the program be directed toward the formation of those habits of action and of thought which are necessary for the normal individual.

One important point that has frequently gone unrecognized is the indirect value of the reëducation program. This is especially true with regard to possible reëducation of the patient's family. Anyone who has been engaged in the treatment of the mentally ill is thoroughly cognizant of the fact that it is frequently necessary to change the mental attitude of the patient's family; in fact in some instances reëducation is more sorely needed here than in the patient. It was the realization of this fact that led a physician in a mental hospital to remark, "We take the patients in and treat their relatives."

Reëducation is frequently used along with other therapeutic devices and is practically inseparable from desensitization. In fact desensitization is usually a part of or a form of reëducation. Thus, a man who is functionally impotent for sexual relations with his wife will commonly have considerable emotional tension to which he must be desensitized. With the emotional barriers removed, he may be retrained in a technique of sexual relations that will permit him to regain his potency. In addition to this, the individual may be educated regarding the frequency of incidence of such sex problems, their origin, meanings and causes, all of which may aid materially in desensitizing him and at the same time furnish the theoretical basis for the practical program of training in an adequate sexual technique. In the same way problems of homosexuality, masturbation, physical inferiority, school failures, financial and business reverses may require both a desensitizing program and a constructive reëducation program.

In general, as is indicated by the elementary desire of conformity, people do not like to differ widely from their fellow creatures. Indeed, the boasts of individuality are frequently attempts to make a virtue out of a necessity. As we continually gather more statistics, there is a grow-

ing belief that the life experiences with which we are concerned do not differ so widely in different individuals. It is true, of course, that in the field of sex particularly we have been somewhat lost due to the difficulty of obtaining information. General restrictions on the dissemination of literature and particularly questionnaires have made it almost impossible to learn what is average or normal with regard to sex life. Indeed, we have no accurate way of estimating the incidence of various sexual practices. We have learned, however, from life histories of social workers, college and medical students that homosexual and perverted sexual acts are far more common in the life of the average normal individual than most people are willing to admit. Most questionnaires of this type indicate that masturbation takes place in 90 to 100 percent males and 75 to 100 percent females. People have been taught to view such experiences with considerable shame and therefore have hesitated to tell others about them. In addition, one who accepts the standard moralistic attitude regarding these matters will almost always underestimate their incidence, and if he lacks a sufficient diversity of contact with others, is likely to view the conventional discretion of his friends as evidences of their innocence. In this way his own acts become magnified, and he begins to consider himself different from others and develops ideas of shame and guilt. He begins to feel that others may be able to tell about these practices and will shun his association. This is true not only regarding sex experiences but is the case with a number of other experiences of equal significance such as lying and stealing. Perhaps information such as that recently presented by Kinsey³ will help clarify such problems.

The whole process of desensitization and reëducation may be furthered by a frank presentation of such facts in one of the early interviews with the patient. Not infrequently one finds the patient unable to discuss his problems in the beginning because of the emotional tension accompanying them. In such instances when the objective approach is being used and we have some good ideas of the sources of his difficulties from the history, it may prove profitable to introduce these specific topics for a discussion with the patient. In this way we may present the opportunity to the patient for the opening up of his own life experiences. This inability to discuss the important material is often mistaken by those using the subjective approach for evidence that the material was originally unconscious. In general the programs of desensitization and

³ Kinsey, Pomeroy and Martin: *The Sexual Behavior in the Human Male*, W. B. Saunders, Philadelphia, 1948.

reëducation are attempts to enable the patient to face his problems frankly and to give him the necessary data on which a solution may be built, at the same time encouraging him and assisting him in formulating some tangible, practical plan that may solve his problems.

A boy of 22 with marked conflict over masturbation had been able until late adolescence, to diminish his sexual tension and to compensate for his feelings of inferiority and difference from others by means of an obsessional interest in athletics. A detached semi-lunar cartilage acquired in a football game sent him to bed for a considerable period of time and precluded further participation in active athletic outlets. Denied his compensating associations with others and his athletic triumphs and left more or less to his own devices for amusement, the problem of masturbation became acute. He was precipitated into a state of acute fear by the sudden appearance of a heavily bearded, markedly masculine individual in the doorway of a barber-shop where the boy was waiting for a haircut. Following this incident such fear reactions recurred frequently, and he became progressively withdrawn because he feared people could detect his sexual habit by looking at him (he had been told this by his father when he was very young). He became obsessive, ritualistic and restricted to such an extent that he could no longer pursue his school work and a program for a career had to be abandoned. Much of the material of primary rumination was obtained from the father and from physicians who had treated him previously. Since he was relatively unable to discuss his problems, selected items of interest from the history were taken up with him and discussed quite fully so that eventually he had a fairly complete knowledge of the anatomy, physiology and psychology of sex and the prevalence of the more common sex experiences. Simultaneously with this he was encouraged on a gradually extending program of socialization. In the course of a few months he was able to obtain employment, become self-supporting and more or less free from the panic states. Practically all of his rituals were dropped, and the fear reactions occurred at progressively longer intervals and were continuously milder and of shorter duration. This program was maintained until while staying at a Young Men's Christian Association he was assigned a room with an evangelical minister who moralized with him regarding such sexual practices. A rather serious fear reaction was precipitated thereby but disappeared rather promptly after a few psychiatric interviews in which the situation was again reviewed with him.

An adolescent boy, next to the youngest member of a large family,

became much preoccupied, withdrawn from contact, irritable and cross and began to fail at school. Investigation showed a marked antagonistic family attitude toward this child and a lack of understanding of his emotional needs and drives. The primary topic of concern on the part of the boy was masturbation which he had feared would ruin his physical health and strength and which other people would be able to detect in him. In addition to this material, which he discussed with great tension, was material concerning the parents' dislike for him and his feeling of generally being repudiated by the family. He was encouraged to talk out each topic of concern frequently. Shortly after these interviews were started, a program of education or reëducation was instituted. The family relationships were talked over with him (the problems of the parents adjusting to each other and to their increased burdens by the advent of more children) and it was suggested that their reactions were as much a part and product of their life experience as his were of his own life experience. Several interviews were held with the parents in which it was possible to get them to see the boy's problems more in terms of his needs and to secure some coöperation, at least, in his program of treatment. Likewise the whole subject of sex was discussed with him beginning with a consideration of the anatomical and physiological factors and passing on to a fairly detailed exposition of the psychosexual conditioning experiences and their implications. At the same time his environment was so manipulated that employment was obtained for him at a library. He developed sufficient insight into his problem to be willing to coöperate, and a program of gradually extending social contacts was arranged. He became desensitized to his fear of others' detecting his masturbation, developed some self-assurance, made good in the group and although he continued to masturbate from time to time, he shed all of his tension about it and became a productive, happy, successful boy at school. A plan of mutual tolerance at home permitted him to adjust without too much difficulty there. The above outline of treatment is sketchy, but the general principle is fairly clear.

An attractive woman of 30, the mother of four children, had been precipitated into a psychosis by the birth of her second child. As the psychotic trends crystallized, she developed a somewhat systematized paranoid reaction which enabled her to adjust outside of a hospital between her pregnancies. Following the birth of each of the children she became more diffuse and more disturbed. After the birth of the fourth child she attempted suicide by cutting her throat as a result of

which she became a patient in a psychopathic hospital. Her primary topics of preoccupation were concerned with, first of all, the loss of her beauty through giving birth to a series of children although she had managed to keep a rather good figure; second, she was much disturbed by numerous amorous advances made to her by men other than her husband who was himself a handsome, narcissistic, aggressive individual; third, she felt that through her original mental illness she had lost the love and confidence of her husband; fourth, the husband was over-dependent emotionally upon his parents and there had been many conflicts between the patient and the in-laws; fifth, she felt by her suicidal attempts she had somehow authenticated her inferiority and had established it more or less indelibly. All of these topics were talked over with her in great detail. In the beginning she had marked emotional reactions to them, but frequency of repetition and thorough discussion with a psychiatrist who accepted them objectively and without criticism enabled her eventually to come to a point where she could talk about them without undue emotion. At the same time it was pointed out to her that she had not lost materially her physical charms. This aspect of the situation was reënforced by an operation for repair of the perineum which had been somewhat relaxed and by a sterilizing operation which assured her that there would be no further pregnancies. The amorous advances by men were discussed with her in terms of their being, in a sense, highly complimentary to her in that they indicated her physical attractiveness, charm of personality and femininity. It was also discussed in terms of situations which she could handle fairly readily as she had demonstrated by her management of them in the past. The delusions of infidelity regarding her husband she was able to discuss in terms of a projection of her own fear of being unfaithful to him. It was pointed out that he was equally attractive as a man as she was as a woman and that neither one should stand much danger of losing the other. The husband certainly had some reaction to her mental illness, but separate interviews with the patient and with her husband led eventually to a joint interview in which a general attitude was established that a mental illness was similar to any other illness and that it need not be considered hopeless as far as recovery was concerned, nor did it of necessity carry any implication of psychotic stigma to the children. The family relationships were discussed with the patient and her husband separately and in joint interview, and they were able to work out a sensible program of separation from the domination of his parents. After all of this had

been accomplished, it was possible for her to accept her attempt at suicide as a symptom of the illness she had been through and as not, of necessity, indicating any fixity of that illness nor any evidence of personal inferiority. The entire program of treatment occupied many months and consumed much time, but the end result was that an illness which had lasted approximately six years was concluded by a return of the patient to normal life. This level of adjustment has been maintained for many years. It was considered a very fortunate circumstance that the scar resulting from her suicidal attempt was in such a position as to be scarcely discernible under any circumstances and easily covered by the collars of her dresses or by beads or other ornament.

The above cases will serve to indicate the type of therapy employed. It is recognized that the explanations appear to be simplicity itself, for it is difficult, if not impossible, to give an inkling of the numerous occasions in which emotional and behavior crises in the patients had to be avoided.

In general it is necessary to fit the therapeutic régime to the individual case rather than to the case as a type of reaction, although certain generalities may be mentioned. Hysteria and cases of anxiety neuroses are frequently amenable to the type of treatment described, but those with elaborate psychasthenic syndromes are apt to be more difficult and long drawn out. In cases of recurrent manic episodes the patient can sometimes be taught to recognize the beginnings of the attack by learning to understand the dynamics of the situations, though the constitutional factor of recurrence can be little modified. It is important that such individuals be taught to arrange their activities so that no new major interests are attempted until those they are engaged in are well organized and integrated. Careful control of the situations with psychiatric advice may, in this way, prevent many outbreaks of psychotic episodes. The socializing program of such individuals should be designed to provide considerable outlet, but the patients should not be allowed to push themselves to the limit of their ability. The schizophrenic and paranoid types may be uncomfortable in groups and get along well in isolation, but they must be made to understand the need of preserving their reality contacts.

Explanatory and interpretive therapy.

In reëducative therapy, one sometimes distinguishes between explanatory and interpretive therapy. Explanatory therapy attempts to show the patient the mechanism of his symptoms, whereas interpre-

tive therapy tries to give understanding of the meaning or purpose of the condition. The latter is, therefore, more dynamic and biographical and the former more symptomatic, with emphasis on the present. Explanatory therapy, then, is an attempt to explain to the patient how the psychological mechanism works. The therapist may actively expound the principles, or he may merely guide the patient's reading and help him to understand them. Austin Riggs' (1175) explanations of this type of therapy are illuminating and he was eminently successful in the treatment of a particular type of patient.

Since interpretive therapy attempts to get at the significance or meaning of the symptoms, it has greater depth and consequently better opportunities for the understanding and organizing of the personality. Since the possibility of error is increased by such a method, great skill is required in its use. Such therapeutic approaches have been most successful when the therapist has not been too formal or directive. In skillful usage the patient is given free opportunity to discuss whatever comes to mind and is encouraged to make his own interpretations. The therapist helps him guard against his rationalizations and faulty reasoning but not at the expense of the development of initiative and self-expression.

Bibliotherapy. In a variety of situations therapists have found that selected readings may be of assistance in the treatment of the patient. The reading may be used as a supplementary device in acquainting the patient with the psychology and physiology of behavior. The patient is thus able to extend the therapeutic situation beyond the actual conference hour. In many situations bibliotherapy may result in considerable saving of time. If the reading is carefully and intelligently done, it may make unnecessary much of the question and answer technique and provide natural starting points for discussion that is initiated by the patient. The patient is not left with one source of reference for the understanding of behavior and receives much of his information in an impersonal way. It is also frequently helpful for the patient to discover for himself that many others are beset with the same difficulties.

Despite the fact that bibliotherapy may be a useful therapeutic aid, it is important to recognize the dangers of its use and the limitations that must be expected. Many people cannot read with understanding, and such people may develop confusing misunderstandings. Others may develop cumulative sensitivities from their reading. In any case, the reading must be carefully selected and wisely used. It must fit the needs and abilities of the particular person.

Appel (1176) has presented a preferred order of psychiatric reading which he has found to be most effective and Twyeffort (1177) provides a useful bibliography for bibliotherapy.

Negative practice

A somewhat radical departure from the therapeutic methods usually employed is that propounded by Dunlap. The basis of his therapeutic technique is linked with his theoretical considerations of the rôle of repetition in learning. He has questioned the dictum that a response to a given stimulus pattern increases the probability of the recurrence of approximately the same response upon the appearance of approximately the same stimulus pattern. This theory was outlined in an article which appeared in *Science* in 1928 (1178) and has been amplified in his book on habits (1179). He admits that responses must occur for habit formation but denies that they serve any useful purpose other than a vehicle. Dunlap points to the fact that the function of practice is to modify the response and that the particular responses which are employed in practice may be fixed by the practice, or may be modified by it. A given response may be more probable, or less probable, in the future, according to the conditions actually employed in the response. These determining conditions are thoughts, desires and ideals. In the case of such a habit as stammering the attempt would be to teach the patient to stammer voluntarily, as nearly as possible in the way in which he stammers involuntarily. This stammering must then be practiced under the conditions of thought and desire appropriate to the destruction of the habit. Thus the author of the theory broke himself of the habit of typing "hte" for "the" by practicing typing "hte" with the idea that this was what he was not going to do in the future. The simplicity of the theory is easily recognized, but Dunlap points to the many difficulties of application and stresses the fact that the procedure must be directed by an expert psychologist specifically trained in the technique. Some success has been reported in cases of stammering, thumbsucking, finger-nail biting, tics of various sorts, masturbation, etc. For a thorough discussion of the procedure the reader is referred to Dunlap's book on habits.

SPECIAL PSYCHOTHERAPIES

Psychodrama. The notion that the drama might be used as a form of mental healing is an extremely old one, there being some evidence that at the ancient theatre at Epidaurus, plays were produced for their

therapeutic effect. Many early philosophers gave evidence of recognition of the therapeutic value of the drama. Aristotle (1180) in *Poetics* says, "The task of the tragedy is to produce through exercise of fear and pity liberation from such emotions." It is true that he referred to the effect on the spectator which is similar to the use of drama in group psychotherapy today. Moreno (1181), on the other hand, has presented a highly specialized psychodrama in which the effort is to produce the effect in the actor—that is, the one who is suffering from the tragedy. Moreno has taken the position that the difficulty with the ordinary psychotherapeutic situation is that the rôles and situations must remain in the patient's mind and that he does not have a chance to act them out. The patient is treated in isolation and describes with words how he feels. In the psychodrama he may use gestures and movements, as well, and opportunity is provided for a more complete and real reliving of experiences. The patient, or subject, is asked to come upon the stage and portray his private world. In this situation he has an advantage over the actor since he does not have to sacrifice his own private world to a rôle imposed upon him by an author. Moreno has pointed out that the patient must live through situations painful and undesirable. No limitations are imposed upon him, and he is encouraged to act freely and spontaneously. He is required to act out situations he has met in life as well as those he has never met but has rather feared and evaded. The director acts as the producer, therapist and social analyst and has about him a staff of therapeutic actors who are both extensions of the director and the patient. They portray the rôles required by the patient's world and thus guide the drama and the therapy. In some situations there is no audience. In other situations the audience may be present and either aid the patient or themselves be helped by the drama. In the latter case the audience is, in part, an object of the therapy.

Usually the therapy begins by having the patient act out situations that are a part of his daily life. He is aided by members of the staff in getting started and is required to take the rôles of all of the persons near him or his problem. Thus a patient may be required to take the rôle of his father, mother or wife. Every situation is analyzed and explained immediately after the performance. In the course of the treatment, it may then be noted that the patient avoids certain scenes and rôles that are unpleasant to him, and he must then be told in what situations he should act.

Moreno has insisted that the insight which one person has about what

goes on in another's mind is most incomplete. He has emphasized the point that we live simultaneously in different worlds and that the intercommunications are sketchy. He, therefore, proposes the use of the soliloquy to bring the deeper levels of the interpersonal world to expression. The patient is directed not only to reënact a scene as it happened but to act out also the feelings and thoughts which he had at the time but did not express. These he speaks out now in a lower voice—in soliloquy.

One of the great difficulties with the method is that it requires a particularly well trained staff, and even under the best circumstances many patients cannot be persuaded to participate in the procedure.

Some of the most interesting results have been obtained by the use of variations of the original technique. One of the more striking is reported by Herriott (1182) at St. Elizabeth's Hospital. She has reported on one of the very serious problems of mental patients, namely the difficulty of explaining their mental illness after they have been discharged from the hospital. The project was developed around imagined scenes in a small town postoffice, drug store, grocery store or employment agency. Action in the scenes was at first general and then came the dreaded question—"Where have you been since V-J day, or some other day?" Discussion following these scenes frequently revealed personal fears that needed to be explored. In some of the scenes the rôles were reversed, the patient, for example, playing the rôle of the employer and the staff member (with directions to parallel the patient's history) applying for the position. It was found that the reversal of the rôles often gave a more complete picture of the patient's attitude toward his own illness than when he played himself, and at the same time helped him to realize some of the employer's responsibilities. Interesting dramatizations were worked through and the patient gradually developed satisfactory ways of dealing with this difficult problem.

Group therapy. The long time required for individual therapy, along with the recognition of the importance of the socialization of the patient, has led to the development of a technique designated as group therapy. Through a variety of group methods it has been found possible to deal with feelings of isolation and rejection, the modifying of a too strict conscience, the developing of a sense of acceptance and in general more satisfactory and normal interpersonal relationships.

Schilder (1183) has reported excellent success by having the patients read aloud and discuss autobiographies they had written.

Solomon and Fentress (1184) have also reported success in group

therapy by dramatization of material developed, in part, through autobiographies.

Play and release therapy. Play therapy includes a variety of techniques such as drawing, finger painting, play with toys, puppet shows and many other activities. The child who will not or can not verbalize his problems in the first person may frequently reveal much of his inner world if he is allowed to play freely with toys. Skillful handling of such a situation may enable the child to give free expression to his conflicts and repressions. Puppets have also been used to enable children to find release by talking about themselves in the third person and by projecting their conflicts and antagonisms. All of the techniques enable the child to reveal his strivings, his tensions and his reactions to family influences.

The release therapy depends primarily on abreaction for its therapeutic effect and is perhaps most successful when used in conjunction with other approaches. Levy (1185) has referred to the valuable catharsis that may be obtained and has considered the therapy best suited to very young children who present a definite symptom picture of relatively short duration.

The therapy may be varied with regard to the amount of guidance, control and interpretation assumed by the therapist. That is, the therapy may be directive or non-directive in type. Axline (1186) has described the non-directive play therapy calling particular attention to the complete acceptance and permissiveness of the situation. The child is allowed to play as he pleases and is accepted completely. He can be fast, slow, can hate, love, or be indifferent with complete freedom. The absence of adult suggestions, mandates, rebukes, restraints, support and criticisms is a unique experience for the child and becomes the ground upon which he may act out his own world with complete acceptance.

Some difference of opinion exists among therapists with regard to the amount of direction and guidance in the therapeutic situation. The need for complete acceptance of the child's behavior is generally recognized. It may, however, be necessary to guide the child to some understanding of the needs, rights and privileges of others so that he may have some realistic basis for the development of satisfactory interpersonal relationships.

PSYCHOTHERAPEUTIC AIDS

Psychological studies. Just as the case history provides information that is valuable for the understanding and treatment of the patient,

so a great variety of types of psychological studies have proved to be valuable aids to psychotherapy. Any device which provides us with evidence of an individual's characteristic attitudes and modes of adjustment will aid us in our efforts to help him meet the responsibilities of living. The various aspects of personality are, however, so elaborately interlocked in the functioning of the total organism that it has been difficult to develop methods of measurement that are comparable to the existing scales for the measurement of intelligence. Personality inventories such as the Bernreuter, Guilford and Minnesota Multiphasic have been useful, but the greatest help has come from the so-called projective tests. The problem has been to get persons to describe themselves and what they are thinking and feeling in a manner that prohibits either conscious or unconscious falsification and defensive twisting of facts. Questionnaires have usually not been satisfactory since the person who takes the test is on guard, and consequently the situation allows for falsification.

The projective tests are usually referred to as depth tests, since it is assumed that they provide for the possibility of probing the substrata or unconscious processes of the subject. Freud's free association and his interpretation of dreams are illustrative of the projective technique and probably represent the starting point for the development of such methods.

From this beginning have developed a number of personality studies which involve the presentation of a stimulus situation chosen because it will mean to the subject, not what the examiner has arbitrarily chosen it to mean, but rather what ever it may mean to the person who views it. The person who takes the test may, therefore, impose upon it his own private meaning. Thus the subject is presented with neutral stimulus material which he defines according to the personal meaning to him. In such a situation he may project himself and his inner world upon the neutral stimulus material. No limitations are placed on the subject. He is in a situation which involves no rules, no correct or incorrect answers and consequently his naiveté permits for the projection of implicit material.

The best known of these techniques was developed by Hermann Rorschach and is called the Rorschach or ink-blot test. The test consists of 10 ink-blots which are shown to the subject in definite order. Although the subject is required to tell what he sees, the interpretation of the results gives more importance to method than to content. Thus attention is directed to such questions as where, how and why he sees what he reports. Was the whole blot or some small part of the blot

used, was he influenced by color, shape, movement etc.? It is believed that the manner in which the subject deals with the blot is analogous to the manner in which he organizes the elements of his own environment, or in which he perceives his world and thinks about it. The interpretation of the test results, therefore, provides some understanding of the basic personality. Thus the test results may indicate where the person stands with regard to the balance between spontaneity and control. This may range all the way from rigid constriction of all spontaneity to disintegrating impulsiveness. The relative dominance between inner and outer promptings (introversial and extraversial tendencies) may also be ascertained. The relationship between imaginative and rational functions, deductive vs. inductive reasoning, degree of originality, the way the emotions are tied to inner-life and outer reality and various other aspects of the personality may also be inferred from the test results.

Another projective test which has been very helpful is the picture test called by Murray, Thematic Apperception. The value of this test is primarily the light it sheds on the content of the personality. The test consists of a number of pictures which the subject uses as starting points for the relating of a story. It is assumed that in the interpretation of an ambiguous social situation one is apt to expose his own personality. The subject becomes absorbed in his task and consequently is less defensively vigilant about himself. He frequently identifies himself with the main character and projects his own conflicts, inadequacies, wishes and fantasies. By studying such things as the characters presented in the story, the main themes (and particularly recurring ones), the types of endings and the dynamic sequence of events one gets a good picture of the subject and his problems. In this way one may gain some understanding of the subject's dominant preoccupations; his areas of hostility; his needs and the environmental factors which evoke them; his attitudes towards parents, marriage, sex and a variety of other topics. The therapeutic value of the test has been described by Shaffer (1187) in the treatment of a manic excitement.

Other picture tests that have been useful for the understanding of dynamics and personality structure are the Picture Frustration Test and the Szondi test. Word association and sentence completion tests have also been valuable aids to dynamic understanding. Various other psychological tests have been useful for the understanding of the patient's perceptual or conceptual ability; as aids to diagnosis, and for the spotting of organic factors. Included among the most useful ones

are the Sorting test, the Hanfmann-Kasanin Block Test, the Wechsler-Bellevue scale, the Babcock test, the Shipley-Hartford Scale, and many others.

Psychiatry has gradually shifted its interest from detailed descriptions and precise classifications of symptoms to an understanding of developmental and etiological conditions. This developmental approach has stimulated an interest in the personality study as a therapeutic aid. For the patient who is able to participate, the systematic personality study may make clear the forces at work in the present personality as well as shed light on etiological considerations.

Such a personality study may begin with the review of the family history and may proceed through the examination of such topics as: development and growth, medical history, work experience, school experience, social relationships, religious experience, interests and recreations. These may be followed by consideration of personality assets and liabilities, intellectual resources, biological drives, mood and emotional characteristics, somatic factors, and personality needs. In conclusion a final survey is written in which an attempt is made to see the personality in action. For many the exercise provides an excellent opportunity to review objectively the development of the personality. Material is also provided for therapeutic discussion, and any part of the material may be used as a starting point for free association.

OCCUPATIONAL AND RECREATIONAL PROGRAMS

Occupational and recreational activities have definite values as therapeutic aids to all types of patients and especially to mental patients since most of the mental hospitals (especially the state hospitals), are inadequately staffed, making intensive individual treatment impossible. It is entirely unnecessary to distinguish between occupational and recreational activities and by so doing become involved in the ageworn attempts to distinguish between work and play. The term "recreational therapy" probably best describes all of these activities since the hope is to get the patients to participate spontaneously and for the sake of the activity itself. In general, however, these activities have been broadly grouped under the term "occupational therapy", since the earliest of these activities were in the nature of crafts, and "recreation" has been used to specify physical games and such other recreational activities as dramatics and singing.

Occupational therapy may be said to have been operative even in ancient times. As a specific technique it was given considerable at-

tention over 100 years ago at the Pennsylvania State Hospital and in its elementary form it was recognized by ancient physicians. Even the particular form, referred to as recreational therapy, was given special attention by the physical education worker 150 years ago.

The principles, themselves not new, have been more widely adopted and gradually perfected so as to occupy at the present time a much more prominent place in the mental hospital. Indeed, from every school of thought, no matter how divergent the opinions otherwise, we find a recognition of their value and importance in any program of recovery. Even Freud (1188), who speaks of the development of capacities for sublimation, as well as other psychoanalysts, finds in these activities something of great value. Alexander (1189) speaks of the attainment of the conscious or ego satisfactions and Saunders (1190) points to the value of replacing the psychotic dissatisfactions with real activity. Shaffer (1191) has discussed recreation, not only as a therapy, but as a preventive of social maladjustments.

One of the greatest advantages of this therapeutic aid is its non-medical approach and the opportunity it offers to treat the individuals as if they were normal and expected to behave so. During recreation the patient may be spared, if the program is intelligently handled, the unending barrage of questions regarding his health. It is noticed that our occupational therapists and sometimes our attendants establish rapport with the patients much more easily than the doctors and nurses whose approach is frequently too medical.

Occupational therapy is not a cure-all, but is one of the many aids to the recovery of the patient and when carefully handled may benefit practically all patients. It is not unusual to hear the mental patient who has recovered point to the recreational activities as the most important agent in his recovery. Despite recent advances in psychiatry, intensive treatment is still not available to a large percentage of our hospitalized patients, and consequently, occupational therapy takes its place as the most important therapeutic agent we have. We are all familiar with the fact that the sick man, regardless of the type of illness, is likely to be below what is considered the normal minded attitude. He misses his accustomed daily routine, becomes discontented, loses his appetite and suffers from digestive and excretive difficulties. This is especially true of the mental patient, so that our problem is to give him an interest outside of himself and thus in some measure provide contentment. A careful study of the patient's history and personality may aid in the selection of the type of recreation, but often it is found

necessary to provide a new recreation or occupation because the familiar ones become unattractive under the conditions of the illness.

Dunton (1192) has clearly described the general types of activities that are prescribed to the excited, depressed and apathetic personalities. During periods of excitement when the patient is restless, easily distractible and over active, the attempt is to interest him in some one thing so that his attention may be concentrated and his motor restlessness decreased. A sedative occupation is selected. The rhythmic, repeated movements have a lulling effect, and the absence of variety prevents distractibility while at the same time concentration of attention is required. Loom weaving, knitting, sawing, plowing and polishing metal work have proved valuable with these patients since there is little to stimulate the emotions, and the required concentration has a quieting effect. These activities are valuable, not only to the typical manic patient, but also to certain periods in paresis, catatonic excitement, hysteria, delirium and toxic states.

Since the behavior of the depressed patient is almost an antithesis to that of the manic, it is necessary to choose a stimulating activity with a minimum of stereotyped action. In cases of marked depression, it may be necessary to start with a sedative occupation in order to gain the patient's attention and confidence, but this should be followed with more stimulating activities. We are all somewhat familiar with the way that our own feelings of "blueness" may be dispelled by some stimulating ideas of happier content and need only apply these same principles to the depressed patient. The feelings of depression and inferiority must be carefully dealt with by the occupational therapist, or rapport with the patient will not be established and nothing can be accomplished. The utilization of tact and understanding on the part of the therapist cannot be too strongly mentioned here, for the pitfalls are numerous. Dramatics and games have been especially valuable in the rehabilitation of these people.

Since the schizophrenic patient is an asocial, introverted day dreamer, the attempt should be to obtain a contact with reality. The patient should be given the socializing effect of group participation as soon as it is possible to do so. It may be necessary to work the patient gradually from isolated activities to group participation by having him work on something that will contribute to a broad program. This has sometimes been accomplished in the dramatic program by having him make a piece of furniture for the stage or part of the scenery for the play. Eventually he may be drawn more generally into the group activity and

the tactful therapist finds physical games, dancing and dramatics to be of great value in his socialization. The habit of day dreaming is overcome in the reality of a strenuous game which requires his attention, and he is brought to the reality of the situation. This situation of reality, along with the fact that the activity is a group one and requires cooperation, may be of unlimited value to the patient. Dunton (1193) offers the example of the use of a small scroll saw in making picture puzzles, as a means of overcoming day dreaming. He calls attention to the need of close attention, since the small blade is easily broken and describes this as an alarm which brings the patient back to reality.

The paranoid patient has not infrequently been aided by the cultivation of a hobby, since the interest so developed leaves less time to ruminate upon his delusions. In this way a number of patients have made good hospital adjustments and many have received positions that make them useful to the hospital and quite comfortable. Some have even developed their hobbies to such an extent that they have made it possible for them to live in the outside world again.

The entire program is aimed at desensitization to the patient's painful experiences and an attempt to find some level at which his energies can be directed into channels of real activity. In this way phantasy may be replaced by satisfying activity and recreation. The patient may gain a better understanding of himself, the realization of new interests and capacities may appear, and a more wholesome adjustment to the entire situation may be obtained. The program should be arranged to establish a normal rhythm of work, rest and play, and in such an attempt the occupational therapist has a distinct advantage over the physician and other medical representatives of the hospital. Unencumbered with the implications of authority which are usually associated with the doctor and nurse, the occupational therapist, as well as the attendant, is in a position to establish the normal atmosphere which brings comfort to the fearful, insecure patient.

Physiotherapy

The treatment of the mental patient may frequently be supplemented by the use of physical agencies such as hydrotherapy, electrotherapy and massage. The direct metabolic stimulating and sedative effects of baths, packs, heat and massage have long been recognized. In addition to the physical benefits the treatments may be of psychological value since the physical contact which the treatment requires may help

establish social rapport and diminish feelings of isolation and interrupt autistic reveries. The hours of rest provided for the excited patient are psychologically as well as physically advantageous.

Broadly defined, hydrotherapy is the remedial use of water in any of its forms (liquid, ice or vapor). The better mental hospitals are equipped to give treatment by baths or by chambers that can be heated to various temperatures. By the use of various devices the desired effects, sedative, hypnotic, anodyne, eliminative or stimulating are obtained. These effects will be dependent upon the temperature of the water, the period of time over which it is applied, the force with which it is administered. Thus hydriatic applications may be given at hot, cold or neutral temperatures, hot and cold combined or alternated, and with or without friction. No attempt will be made here to present a full explanation of the techniques but it is important to note that a number of the conditions present in mental illnesses may be greatly improved by the expertly managed hydrotherapy. Such conditions as delirium, agitation, psychomotor excitement, insomnia, arterial hypertension, cerebral congestion, suppression, retention or incontinence of urine, etc., may be definitely aided by hydrotherapy. An example of the value of hydrotherapy is indicated by the general sedative effect obtained by use of the cold, wet sheet pack or the neutral continuous bath. These two methods are the most used ones in subduing the motor and psychical excitements of patients. The excited patient can be quieted during periods of great tension and in this way his physical strength is maintained through a period which might otherwise be followed by exhaustion. The hours of rest obtained by comfortable suspension in water at a neutral temperature have thus proven to be of inestimable value. In the same way through variations of the treatment one may secure stimulating, eliminative, tonic or hypnotic effects. Thus the tonic procedures are used to build up patients who have poor circulation or suffer from lowered vitality from any cause.

In addition to hydrotherapy the patient may be treated by massage or by electrotherapy which includes the use of diathermy, heat lamps and pads and electric heat boxes.

Basic habit training

A large number of the hospitalized patients have been sick for a long time before any treatment is attempted and have deteriorated to such a level that it is necessary to retrain them in basic habits of living. This

procedure requires considerable hospital experience and involves the entire hospital staff of administrators, physicians, nurses, occupational workers and attendants. The attempt is to correct disturbances at the lower integrative levels which may secondarily affect the psychological level and to increase the general efficiency of the patient. The reader is not to assume that since the procedure is not discussed at length here, it is of minor importance. Indeed, in many cases any worthwhile rapport with the patient is impossible until such training has materially progressed. Feeding, elimination, dressing and other basic habits must be regulated before anything else can be attempted.

Treatment of environment

It would not be fitting to leave the discussion of treatment without mentioning attempts to give psychotherapeutic aid to individuals who constitute some of the stimuli to which the patient must react in life situations. Changes in environmental attitudes are necessary and vital to most of the patients; indeed, in many instances a reconstruction of the environment which includes actual reëducation of relatives and others close to the patient is of primary importance. The therapeutic program must not be entirely designed to make the patient conform to his environment but must include some attempt to make the environment of such a type that he is able to conform to it.

CONCLUSION

In conclusion it should be noted that, while some specific device or therapeutic technique may be the best choice for a particular case, in many instances a variety of types of approach may be equally efficacious. The techniques described are not mutually exclusive and several of them may be used in connection with each other. Flexibility and adaptation to the individual needs of the patient are essential for good clinical practice. Combinations of various therapeutic methods, may, therefore, be expected to be used by the experienced clinician even though he regards some methods to be more fundamental than others.

In general, any psychotherapeutic program involves primarily an early recognition of the disorder. This is particularly true of the major psychoses, and consequently the emphasis is to be laid on prevention rather than cure. The program of mental hygiene, therefore, assumes especial importance, for it is hoped that in this way the development of unfortunate behavior patterns may be recognized in their beginnings and through a process of education and training be prevented from

maturing. For information regarding this program the reader is referred to Klein (1194), Shaffer (1195), Stevenson (1196), Stevenson and Smith (1197), Wilbur (1198), Witmer (1199), and Lemkau (1200).

The authors recognize the lack of specificity and objectivity of the material reviewed, but the program is of such a nature that much of it is difficult to put adequately into words, and a real understanding of the actual practice of psychotherapy can be gleaned only from experience.

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GLOSSARY

- ABERRATION:** any deviation from the normal
- ABLATION:** removal of a portion of the body or of a growth
- ABOULIA (ABULIA):** literally, loss of "will power"; inability to make up one's mind or to reach a decision
- ACALCULIA:** loss of ability to calculate or perform arithmetical operations
- ACHLOPHOBIA:** fear of crowds
- ACHROMOPIC:** totally color blind
- ACIDOSIS:** decreased alkalinity of the blood and tissues
- ACOASMA (AKOASMA):** tinnitus, or ringing in the ears
- ACRAL:** peripheral
- ACROMEGALY:** a disorder accompanied by progressive enlargement of the bones of the head and face, hands and feet, probably due to pituitary dysfunction
- ACROPHOBIA:** fear of high places
- ADDISON'S DISEASE:** a diseased condition of the adrenal cortex resulting in a bronze color of the skin, debility, anemia, feeble heart action, and irritable stomach
- ADIPSIA:** lack of thirst
- ADRENALECTOMY:** removal of the adrenal glands
- ADRENINE:** preparation made from the medulla of the suprarenal gland
- AGEUSIA:** lack of ability to taste
- AGNOSIA:** lack of ability to recognize familiar forms, people and things
- AGORAPHOBIA:** fear of open spaces
- AGRAPHIA:** loss of ability to write, though speech and other motor functions may be unimpaired
- AKINESIS:** loss of voluntary motor functions
- ALCOHOLIC, CHRONIC:** one who habitually uses alcohol in poisonous amounts
- ALGESIA:** hypersensitivity to pain
- ALGETIC:** painful
- ALEXIA:** loss of ability to comprehend words; word-blindness
- ALEXIA, ACOUSTICAL:** inability to comprehend spoken words
- ALEXIA, OPTICAL:** inability to comprehend written words
- ALKALOSIS:** alkaline condition of the blood, accompanied by dizziness and jerky muscular action
- AMARONSIS:** Blindness without apparent disease of the optic nerve or of the retina.
- AMAUSIS:** loss of vision without organic defect in the eye or optic nerve
- AMBIVALENT:** possessing simultaneous positive and negative feelings toward some person or event or object
- AMBLYOPIA:** dimness of vision without organic defect in eye or optic nerve
- AMENORRHEA:** absence of menses without natural causes such as menopause or pregnancy
- AMENTIA:** intellectual deficiency
- AMIMIA:** loss of ability to express ideas by gesture
- AMINOPHYLLIN:** used for the promotion of coronary flow; a vasodilator

- AMNESIA:** loss of ability to remember past experiences
- AMNESIA, ANTEROGRADE:** amnesia for occurrences after a traumatic event or an experience which produces temporary loss of consciousness
- AMNESIA, RETROGRADE:** amnesia for occurrences before a traumatic event or an experience which produces temporary loss of consciousness
- AMNIOTIC:** relating to the amnion, or inner membranes of the fetal sac
- AMUSIA:** loss of musical ability
- ANABOLIC:** relating to the building-up processes of metabolism
- ANACUSIA:** loss of ability to hear; deafness
- ANALGESIA:** loss of sensitivity to pain
- ANALGESIC:** (noun), a pain-killing drug
- ANALYTIC THERAPY:** therapy guided by psychoanalytic theory
- ANARTHRIA:** loss of ability to articulate words
- ANASTOMOSIS:** union of two hollow structures by operation
- ANDROGEN:** male sex hormone
- ANEMIA:** deficiency in amount of blood or in red blood cells or hemoglobin
- ANESTHESIA:** loss of sensation, especially tactile sensations
- ANESTHESIA, GLOVE:** loss of sensation in the hand (not corresponding to the distribution of nerves)
- ANESTHESIA, STOCKING:** loss of sensation in the leg (not corresponding to the distribution of nerves)
- ANESTHESIA SEXUALIS:** frigidity
- ANEURYSM:** blood-containing tumor directly connected with an artery
- ANGINA PECTORIS:** severe pain in the chest due to aneurysm of the aorta or spasm of coronary arteries
- ANGINAL SYNDROME:** symptoms of angina, particularly angina pectoris, accompanied by fear of death
- ANISEIKONIA:** a visual defect in which the two retinal images do not fuse
- ANKYLOSED:** stiffened, especially a stiffened joint
- ANODYNE:** an agent which relieves pain
- ANOMALY:** deviation from the normal
- ANOPSIA:** loss or dimness of vision, not due to organic factors
- ANOREXIA:** loss of appetite
- ANOREXIA NERVOSA:** a neurotic condition accompanied by loss of appetite and emaciation
- ANOXEMIA:** insufficient oxygenation of the blood
- ANOXIA:** oxygen lack
- ANTHROPOMETRY:** measurement of parts of the human body
- ANURESIS:** complete suppression of urine
- ANXIETY NEUROSIS:** extreme and persistent anxiety of a neurotic character
- ANXIETY STATE:** anxiety neurosis
- AORTA:** main trunk of the arterial system, arising from the base of the left ventricle of the heart
- APHAKIA:** absence of the crystalline lens
- APHASIA:** complete or partial loss of the power of expressing ideas by means of writing or speech
- APHASIA, CONDUCTION:** a form of aphasia in which the patient can speak or write but skips, repeats or substitutes words
- APHASIA, CORTICAL:** aphasia in which there is presumed to be a cortical lesion

- APHASIA, MOTOR:** aphasia in which the power of expression is lost but not the power of comprehension
- APHASIA, SENSORY:** failure of the power to comprehend words, gestures or signs
- APHASIA, SUBCORTICAL:** loss of ability to articulate speech
- APHASIA, TACTILE:** inability to recognize objects by touch
- APHASIA, TRANSCORTICAL:** aphasia due to damage to tracts leading from "speech areas" to other cortical regions
- APHONIA:** loss of speech; inability to speak above a whisper.
- APLASIA:** congenital absence of a part of the body
- APNOEA:** inability to get one's breath
- APOMORPHINE:** a morphine derivative; produces nausea, sweating and salivation when injected hypodermically
- APOPLEXY:** loss of consciousness due to cerebral hemorrhage or blocking of a cerebral artery
- APPET:** the physiological substratum of a desire
- APRAXIA:** inability to perform purposeful movements
- ARCHETYPES:** original ideas, models, or types
- ARMY ALPHA:** a form of intelligence test used in the army during World War I
- ARMY BETA:** a non-language form of intelligence test used in the army during World War I
- ARRHYTHMOKINESIS:** irregular rhythm of movements
- ARTERIOLE:** terminal artery continuous with capillaries
- ARTERIOSCLEROSIS:** thickening of arterial walls with loss of elasticity
- ARTHRITIS:** inflammation of a joint
- ASAFETIDA:** a root having antispasmodic and expectorant qualities, sometimes used in bronchial disturbances
- ASTHENIA:** general muscular weakness
- ASTHENIC:** weak
- ASTHENOPIA:** eye-strain, weak eyesight
- ASTIGMATISM:** a condition of the eye in which rays from a point are spread out on the retina
- ASTROCYTE:** a neuroglia cell
- ASYMPTOMATIC:** not having the typical symptoms, or free from symptoms
- ASYNCHRONISM:** lack of concurrence in time
- ATAVISTIC:** reversion to a primitive form
- ATAXIA:** loss of muscular coordination
- ATAXIAGRAPH:** a device for recording body sway
- ATAXIA, STATIC:** loss of ability to maintain balance when standing
- ATAXIA, VASOMOTOR:** incoordination of sympathetic and parasympathetic nervous systems in relation to vasomotor phenomena
- ATHETOSIS:** a constant slow succession of tentacle-like movements of fingers and hands and sometimes of toes and feet
- ATONIA:** lack of normal muscular tonus
- ATROPHY:** wasting away of the tissues of a part of the body
- ATROPINE:** an alkaloid derived from belladonna which is a mild stimulant for the sympathetic nervous system when used in small doses; produces paralysis of eye muscles
- AURA:** a peculiar and characteristic sensation felt immediately prior to an epileptic attack
- AUTACOID:** an internal secretion passed by an organ into the circulating fluids which influences the behavior of other organs
- AUTISTIC:** relating to day-dreaming, or wishful thinking, in contrast to realistic thinking

- AUTO-EROTISM:** self-gratification of sexual desire
- AUTO-HYPNOSIS:** self hypnosis
- AUTOMATIC SPEECH:** speech without volition
- AUTOMATIC WRITING:** writing without volition
- AUTOMATISM:** action without volition
- AUTOPAGNOSIA:** loss of ability to recognize parts of the body
- AVITAMINOSIS:** any deficiency disease due to lack of any of the vitamins
- BABCOCK TEST:** a mental test devised by Babcock for measuring organic brain damage
- BABINSKI REFLEX:** extension of the great toe, sometimes with flexion of other toes, usually indicative of organic difficulty in the pyramidal motor system
- BARBITURATE:** a sedative
- BARETHETIC:** pertaining to pressure
- BASAL GANGLIA:** a group of nerve cells and fibers forming a subsidiary nerve center, located at the base of the cerebrum
- BASILAR MEMBRANE:** membrane in the cochlea which forms the floor of the cochlear duct and supports the organ of Corti
- BASOPHILE CELLS:** cells which show an affinity for basic dyes rather than acid ones
- BENZEDRINE SULPHATE:** a central nervous system stimulant, used in the treatment of mild psychogenic depressive states
- BESTIALITY:** sexual relations with an animal
- BETAERYTHROIDIN:** an ammonium base drug having curare-like action
- BINET-SIMON:** an intelligence test of the performance type, devised by Binet-Simon
- BIRTH TRAUMA:** physical injury during delivery, or presumed psychological injury incident to birth
- BLOCKING:** periodic brief gaps in some continuing psychological function
- BRACHYCARDIA:** abnormally slow heart beat
- BROMIDE:** a salt used to allay nervous excitement or employed as a sedative
- BULIMIA:** hyperorexia, voracious appetite
- BURSITIS:** inflammation of a fluid-containing sac found between joints or where a tendon slips over a bone
- CALCIFICATION:** deposit of insoluble salts in degenerated or weakened tissues
- CALCULI:** pebbles formed in any part of the body, usually made of inorganic material deposited around an organic nucleus
- CALORIC STIMULATION:** stimulation by temperature change, as in using hot or cold water to stimulate the semicircular canals
- CAMPIMETER:** an instrument for measuring the extent of the field of vision
- CARBON DIOXIDE:** gaseous product composed of CO_2 . Has been used as a respiratory stimulant in the treatment of schizophrenia
- CARCINOMA:** cancer
- CARDIAZOL:** a powerful heart stimulant
- CARUNCLE:** a small fleshy protruberance
- CASEIN:** chief proteid of milk
- CASTRATION COMPLEX:** fear of being castrated
- CATABOLIC:** pertaining to destructive metabolic processes
- CATELEPSY:** a waxy rigidity of the limbs which may be placed in various positions in which they will remain for some time

- CATARACT:** a clouding or loss of transparency of the crystalline lens or its capsule
- CATATONIA:** a form of schizophrenia (dementia praecox) marked by excited or stuporous phases and impulsive or stereotyped behavior
- CATHARSIS:** the unburdening of disturbing conflicts with the expression of all the emotional content
- CAUDAL:** posterior, or tailward
- CEREA FLEXIBILITAS:** a cataleptic state in which the limbs maintain for a time any position in which they are placed
- CEREBRAL ANEMIA:** inadequate blood supply to the cerebrum
- CEREBRAL PALSY:** paralysis due to cerebral injury
- CERUMEN:** ear wax
- CHOREA:** a disorder characterized by spasmodic involuntary movements of the limbs and face
- CHOROIDITIS:** inflammation of the chorioid coat of the eye
- CHROMESTHESIA:** a condition in which some other sense is stimulated by the perception of color
- CHROMOPHILIC:** staining readily
- CHRONIC:** long continued, opposite of acute
- CILIARY BODY:** ciliary muscle and processes, which change the shape of the lens in accommodation
- CIRRHOISIS:** atrophy of the specific cells of an organ with hypertrophy of the connective tissue
- CLAUSTROPHOBIA:** fear of closed places
- CLIMACTERIC:** a supposed critical period in life, especially the menopause in women
- CLONIC:** alternate contracting and relaxing of a muscle
- CLOSTRIDIUM TETANI:** a bacillus, the cause of tetanus
- COCAINE:** an alkaloid derived from coca; a strong narcotic
- COITUS:** sexual union
- COLLECTIVE UNCONSCIOUS:** a Jungian concept, a presumed common group of unconscious desires which everyone shares
- COLLOID:** a gelatinous body substance which exhibits the properties of permeability and indiffusibility through animal or vegetable membranes
- COMMISSURES:** nerve fibers uniting hemispheres of the brain
- COMPENSATION:** adjustment to an undesirable trait by emphasis of a desirable trait
- COMPULSION:** an irresistible desire to perform some act
- CONFABULATION:** making ready answers without regard for the truth
- CONSANGUINITY:** blood relationship
- CONTRACTURE:** a permanent muscular contraction
- CONTRALATERAL:** of the opposite side
- CONVERSION SYMPTOMS:** transformation of emotional difficulties into physical symptoms
- CONVULSIONS:** violent involuntary muscular contractions
- CONVULSIVE SEIZURES:** periodic attacks of convulsions
- CHORIORETINITIS:** inflammation of choroid and retina
- CORIAMYRTIN:** a poisonous glucoside obtained from a plant and used as a cardiac stimulant
- CORONAL SUTURE:** junction of the frontal and parietal bones of the skull
- CORONARY INFARCTION:** a region of necrosis and hemorrhage in the heart
- CORONARY OCCLUSION:** closing of the coronary artery
- CORPORA QUADRIGEMINA:** the optic lobes of the brain

- COUEISM:** therapy by autosuggestion
- CRANIOTOMY:** incision through one of the cranial bones
- CRETINISM:** congenital deficiency in thyroid functioning, resulting in arrested physical and mental development
- CRISTA:** an elevation in each ampulla of the semicircular canals
- CRYPTOGENIC:** of obscure origin
- CURARE:** a plant extract which produces paralysis of the voluntary muscles and the motor nerves
- CURARIZE:** to induce motor paralysis by administration of curare
- CURETTAGE:** scraping the interior of a cavity of the body with a curette
- CUTANEOUS:** pertaining to the skin
- CYANOSIS:** a bluish hue of the skin due to insufficient oxygenation of the blood
- CYCLOTHYMIC:** alternating elated and depressed states
- CYSTITIS:** inflammation of the bladder
- CYTOARCHITECTURAL:** relating to the arrangement of cells in a tissue
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- DECIBEL:** a logarithmic scale of auditory intensity in which each successive unit represents an increase of 26% over that preceding
- DECUSSIONS:** X-shaped crossings of nerve fibers or nerve tracts
- DEJA VU:** the impression of having seen something which has not been seen before; false familiarity
- DELIRIUM:** a confused state characterized by excitement, clouding of consciousness, and hallucinations
- DELIRIUM TREMENS:** a form of acute alcoholism characterized by hallucinations, confusion, anxiety, tremor and restlessness
- DELUSION:** false belief which is not in accord with objective fact, but which is so firmly entrenched that it cannot be removed by reason or logic
- DEMENTIA:** more or less complete loss of abilities to reason, remember, etc.
- DEMENTIA PARALYTICA:** general paresis; a psychosis due to syphilis of the brain, characterized by progressive dementia, tremor and often by delusions of grandeur
- DEPRESSIVE STUPOR:** a depression so deep as to cause lethargy or unconsciousness
- DERMAL:** pertaining to the skin
- DERMATITIS:** inflammation of the skin
- DERMOGRAPHIA:** a form of hives in which wheals follow the marks made on the skin by a stylus
- DESENSITIZATION:** treatment of immunizing patients against feared situations by repeated exposure to those situations
- DETACHED RETINA:** separation of all or part of the retina from the chorioid
- DEUTERANOPE:** an individual who shows color-weakness in the green region of the spectrum
- DEXTRO-SINISTRAL:** an individual whose handedness has been changed by training
- DIABETES:** usually means diabetes mellitus, a condition in which sugar is present in the blood and is secreted in the urine and there is excessive thirst and polyurea
- DIENCEPHALON:** the part of the brain between the prosencephalon and the mesencephalon; it includes the thalami and the third ventricle
- DILANTIN:** depressant, used in the treatment of epilepsy
- DIPLEGIA:** paralysis of corresponding parts of both sides of the body
- DIPLOPIA:** double vision, due to paralysis of ocular muscles

- DIPSOMANIA:** a recurring compulsion to drink alcoholic beverages to excess
- DIZYGOTIC:** applied to twins; fraternal twins, product of two zygotes or ova
- "DRY" SHOCK:** a type of shock exhibited by some patients undergoing insulin therapy, consisting of convulsions
- DUODENAL:** relating to the duodenum or first eleven inches of the small intestine
- DYNAMOMETER:** device for measuring the strength of muscle contraction
- DYSCHIASIA:** abnormal localization of bodily sensations
- DYSFUNCTION:** abnormal or incomplete functioning of an organ
- DYSLEXIA:** inability to read
- DYSMENORRHEA:** painful or difficult menses
- DYSPAREUNIA:** pain during coitus
- DYSPLASTIC:** descriptive of a body type in which the parts of the body are unharmonious or not in proper proportion with one another
- DYSRHYTHMIA:** irregular rhythm
- ECHOLALIA:** meaningless repetition of words, or of what is spoken to an individual
- ECLAMPSIA:** convulsions
- ECTODERMAL:** pertaining to the outer layer of cells formed from the inner cell
- ECTROPION:** a rolling outward of the margin of the eyelid
- ECZEMA:** an inflammation of the skin characterized by moist or dry lesions and accompanied by itching and burning sensations
- EDEMA:** an abnormal accumulation of fluid in the lymph spaces of the tissues
- EGO:** the self; in Freudian theory that part of the self which is in contact with the real world
- EGO-DYSTONIC:** anything unacceptable to the ego
- EGO-SYNTONIC:** anything compatible with the standards of the ego
- ELECTROCOAGULATION:** the hardening of a tissue by means of an electric current
- ELECTRA COMPLEX:** a Freudian concept descriptive of the love of a daughter for her father with hostility toward her mother
- ELECTROCARDIOGRAM:** a record of the electrical activity of the heart
- ELECTROENCEPHALOGRAPH:** an apparatus for recording brain waves
- ELECTRO-SHOCK:** application of electric shock through the head
- ELECTRO-THERAPY:** therapy by use of electro-shock
- EMBOLI:** plural of embolus, a clot or foreign object occluding a blood vessel
- EMBOLISM, CENTRAL:** obstruction of an artery or blood vessel of the brain by a fragment of matter in the blood stream
- EMETICS:** agents that produce vomiting
- EMPHYEMA:** presence of pus within the pleural cavity
- ENCEPHALITIS:** inflammation of the brain
- ENCEPHALITIS LETHARGICA:** an epidemic form of encephalitis, due to a filterable virus, characterized by apathy, weakness and somnolence
- ENCEPHALON:** the brain
- ENDARTERITIS:** inflammation of the inner coat of an artery
- ENDOCRINE:** pertaining to a gland of internal secretion or the internal secretion of such a gland
- ENDOGENOUS:** produced within the organism
- ENDOMETRITIS:** inflammation of the lining of the uterus
- ENDOMETRIUM:** the mucous membrane lining the uterus

- ENURESIS:** incontinence of urine
EPHEDRINE: an alkaloid used as a cardiac depressant
EPIGASTRIC: relating to the pit of the stomach
EPILEPSY: a chronic nervous disorder characterized by attacks of convulsions or unconsciousness or both
EPILEPSY, ASYMPTOMATIC: epilepsy detectable only by the abnormal electroencephalographic record
EPILEPTIFORM: similar to epilepsy
EPINEPHRIN (E): the active principle of the suprarenal capsule
EPITHELIUM: the outer skin, the non-vascular layer
EPIVAL: a trade name for one of the barbituates
ERGOGRAF: an instrument which records the extent of a contracting muscle movement or the amount of work it is capable of doing
EROS: psychoanalytical term signifying love instinct
EROTICISM: sexual excitement
EROTICISM, ANAL: sexual excitement derived from anal activities
EROTICISM, ORAL: sexual excitement derived from oral activities
EROTISM: sexual excitement or desire
EROTOGENIC: causing sexual excitement
ERYSIPELAS: a spreading inflammation of the skin and subcutaneous tissues due to infection of lymph spaces, accompanied by severe constitutional symptoms
ESOPHORIA: convergent squint
ESTHESIOMETERS: devices for measuring the skin sensitivity to punctiform stimulation
ESTROGEN: a female sex hormone
ESTRUS RHYTHM: the periodic occurrence of estrus, or heat in lower animals
ETIOLOGY: causation
EUPHORIA: a buoyant sense of well-being, also exaggerated feelings of well-being and exaltation
EUSTACHIAN TUBES: tubes leading from the tympanic cavity to the nasopharynx
EXCORIATED: rubbed away or abraded, as in the case of the skin
EXHIBITIONISM: public display of the sex organs for purposes of sexual excitement
EXOGENETIC: pertaining to an external cause, one arising from outside the organism
EXOGENOUS: produced outside the body
EXOPHTHALMIC GOITER: an enlargement of the thyroid gland characterized by protruding eyeballs, tremor and rapid heart rate
EXOPHTHALMOS: protrusion of the eyeballs
EXTRAPYRAMIDAL: motor part of the nervous system exclusive of the pyramidal system
EXTRASYSTOLE: the premature contraction of one or more chambers of the heart without disturbance of the fundamental rhythm
EXUDATIVE DERMATOSIS: any oozing skin disease

FALLOPIAN TUBE: oviduct
FASCICULUS: a small bundle of fibers, usually muscle fibers
FATIGUE NEUROSIS: neurasthenia
FEMUR: thigh bone
FESTINATING GAIT: a peculiar accelerated gait typical of paralysis agitans cases
FETISHISM: the act of worshipping some inanimate object; undue sexual interest in a part of the female body or female attire

- FETUS:** unborn offspring; in man designates the offspring from the end of the third month until birth
- FEVER THERAPY:** therapy in which the patient's temperature is elevated
- FIBRILLARY:** pertaining to a minute fiber
- FIXATION:** the arrest of emotional development at a pre-mature level
- FLACCID:** relaxed, flabby
- FLICKER-FUSION FREQUENCY:** a visual concept; in the rapid alternation of light and dark phases, the point at which flicker just disappears and fusion to form a uniform gray surface occurs
- FLIGHT OF IDEAS:** rapid succession of unconnected ideas
- FLUORIC ACID:** a member of the chlorine family
- FONTANELLE:** membrane-covered gap in the skull of the infant
- FOVEAL VISION:** central vision as opposed to peripheral vision; point at which light falls on the retina; region of clearest vision
- FRIGIDITY:** absence of sexual desire
- FROHLICH'S SYNDROME:** a deficiency in pituitary functioning resulting in increase in fat, loss of sexual powers, atrophy of external genitals, and loss of hair
- FUGUE:** an episode of amnesia in which the individual usually wanders away from home
- FUNCTIONAL:** non-structural; refers to a disorder in which no structural damage can be found
- FURUNCLE:** a boil
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- GALVANOMETER:** electrical device for measuring minute amounts of current
- GANGLION, PL. GANGLIA:** a small mass of nerve cell bodies
- GARGALESTHETIC:** ticklish
- GASTRIC:** pertaining to the stomach
- GASTRITIS:** inflammation of the stomach
- GLAUCOMA:** a disorder involving increase in fluids in the eye
- GLIA CELLS:** supporting cells in the nervous system
- GLOTTIS:** the vocal apparatus of the larynx
- GLUCOSE:** form of sugar found in fruits
- GLYCOGEN:** substance formed from carbohydrates which is converted by the liver into glucose
- GNOSIA:** ability to recognize the forms of things
- GRAND MAL:** an epileptic attack in which there are severe convulsions and coma
- GRAPHOMANIA:** the tendency to write great quantities of material
- GUMMA:** a characteristic lesion of late syphilis
- GYNECOLOGY:** branch of medicine dealing with female pelvic disorders
- GYRUS:** a convolution of the brain
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- HALLUCINATION:** a perception which has no basis in reality
- HAPTIC:** pertaining to the sense of touch
- HEBEPHRENIC:** a term descriptive of one type of schizophrenia, characterized by silly behavior, and incoherence
- HELLEBORE:** a plant which has emetic and cathartic properties when taken internally
- HEMATOPHOBIA:** fear of blood
- HEMERALOPSIA:** day-blindness; inability to see clearly in bright light
- HEMI-ANESTHESIA:** anesthesia on one side of the body
- HEMIANOPSIA:** loss of vision in one half of the visual field

- HEMIPLEGIA:** paralysis one one side of the body
- HEMOGLOBIN:** a conjugated protein which absorbs gases readily and which colors the blood
- HEMORRHAGE, PUNCTATE:** a minute hemorrhage
- HEMORRHAGE, SUBCONJUNCTIVAL:** a hemorrhage beneath the mucous membrane of the eye
- HEMOTOXIN:** a substance secreted by bacteria, capable of destroying red blood corpuscles
- HEPATITIS:** inflammation of the liver
- HERMAPHRODITISM, PSEUDO:** a condition in which the internal sex organs are female but the external organs are male
- HERPES:** an eruption of small, deep-seated elevations containing fluid, accompanied by redness
- HERPES SIMPLEX:** an herpetic eruption on the borders of the lips, external nares, glans, prepuce or vulva
- HERPES ZOSTER:** shingles; an herpetic eruption along the course of a cutaneous nerve, accompanied by itching, burning or pain
- HERPETIFORM:** resembling herpes
- HETEROPHORIA:** any divergence from parallelism in the relation of the visual lines of the eyes
- HISTAMINE DESENSITIZATION:** a procedure designed to render the patient less sensitive to the release of histamine in his body
- HISTOLOGY:** microscopic anatomy
- HISTOPATHOLOGY:** histology of diseased tissues
- HOMEOSTASIS:** maintenance of optimal physiological condition within the body
- HOMOCAMFIN:** a convulsive agent
- HOMOEROTICISM:** desire for a member of the same sex
- HOMOLATERAL:** pertaining to the same side
- HORMONE:** a chemical substance released by a gland and carried to another part where it stimulates activity
- HUMERUS:** the bone of the upper arm
- HYDROCEPHALUS:** a condition characterized by increase in fluid in the cerebral ventricles
- HYDROTHERAPY:** the use of water in the treatment of disease
- HYDROTHERAPY, SEDATIVE:** treatment by use of neutral or warm baths, or cold wet sheet pack, etc.
- HYDROTHERAPY, STIMULATING:** hydrotherapy designed to stimulate the patient; may be cold pack, alternating hot and cold packs, etc.
- HYPERACUSIS:** abnormal auditory acuity
- HYPERACUTE MANIA:** extreme excited state
- HYPEREMIA:** an increased amount of blood in a part of the body
- HYPERESTHESIA:** extreme sensitivity to sensory stimuli
- HYPERIDROSIS:** excessive sweating
- HYPERKINESIS:** excessive motility
- HYPERMETROPIA:** fat-sightedness
- HYPERMIMIA:** excessive use of gestures
- HYPERMNESIA:** extreme retentiveness
- HYPEROPIA:** far-sightedness
- HYPERPLASIA:** increase in the number of cells in a part or organ
- HYPERSEXUALITY:** greater than normal sexual drive
- HYPERTENSION:** extreme tension; often, incorrectly, used as a synonym for high blood pressure
- HYPERTHYROID:** excessive activity of the thyroid gland

HYPERTONIA: extreme tension of muscles

HYPERTROPHY: excessive growth

HYPSTHESIA: decreased sensitivity to sensory stimuli

HYPNO-ANALYSIS: therapeutic analysis of any kind carried out while the patient is under hypnosis

HYPNAGOGIC REVERIE: a hypnotic or sleeplike state.

HYPNOIDAL: resembling the hypnotic state; specifically, a very light state of hypnosis

HYPNOSIS: a trance-like condition in which the subject is extremely suggestible

HYPNOTIC (NOUN): a sleep-inducing agent

HYPPOCHONDRIASIS: abnormal concern for one's health and exaggerated attention to symptoms and minor ills

HYPGLOSSAL: pertaining to the region underneath the tongue

HYPOLYCEMIA: an abnormally small amount of sugar in the blood

HYPOKINESIS: decreased ability to move one's limbs

HYPOMANIA: a mild degree of mania or excitement

HYPOLASTIC: incompletely developed or atrophied

HYPOTHALAMUS: group of ganglia lying beneath the thalamus; mediates emotional activity

HYPOTONIA: decreased muscular tonicity

HYSTERIA: a neurosis in which the individual may manifest any of a number of symptoms: tics, tremors, contractures, amnesia, fugues, anesthetics, paresthesias, paralyses, etc.

ID: a Freudian concept; that part of the self which is concerned only with desires and urges, and has no contact with reality

IDEAS OF REFERENCE: belief that casual occurrences in the world at large are intended to refer to the patient

IDEOMOTOR: the tendency for anything that is thought about to be translated into action

IDIOPATHIC: without apparent organic cause

ILLUSION: misinterpretation of a real sensory impression, as when one mistakes a twig for a worm

IMPOTENCE: weakness, particularly inability of the male to copulate

INANITION: exhaustion from lack of food or lack of proper assimilation of food

INFILTRATION: the passing of fluids or gases into a tissue

INGUINAL REGION: the groin or iliac region

INSPECTIONISM: a compulsive desire to view the bodies of others

INSULIN: the active principle of internal secretion in the Isles of Langerhans (pancreas)

INSULIN SHOCK: shock induced by administration of insulin when blood sugar is suddenly reduced; symptoms are: sweating, tremor, convulsions, coma, etc.

INTERSTITIAL KERATITIS: a chronic inflammation of the middle and posterior layers of the cornea

INTRACTABLE PAIN: pain which cannot be alleviated by usual means, such as the use of analgesics

INTRAPERITONEAL: within the peritoneal cavity

INVERTS: people attracted to the same sex

INVOLUTIONAL MELANCHOLIA: an organic psychosis developing late in life, presumably as the result of the climacteric

IRITIS: inflammation of the iris

- IRREMINISCENCE:** faulty reminiscence
- KENOTOXIN:** fatigue toxin
- KERATINIZING:** becoming horny
- KETOGENIC DIET:** a diet producing acetone; one rich in fats
- KINESTHETIC:** pertaining to the muscle sense
- KLEPTOMANIA:** a compulsion to steal, often without real use for the articles stolen
- KORSAKOW'S PSYCHOSIS:** a psychosis, usually resulting from chronic alcoholism, characterized by falsification of memory, hallucinations, disorientation and polyneuritis
- LABYRINTHINE:** the internal ear, consisting of cochlea, semicircular canals and vestibule
- LACTIC ACID:** liquid obtained from the fermentation of milk
- LATENT:** psychoanalytic term referring to the hidden significance of dreams
- LESION:** an injury or wound, or a more or less restricted pathological change in tissues
- LETHARGICA:** lethargic; a condition of stupor or drowsiness. Often a concomitant of encephalitis
- LEUCOCYTE:** a white blood corpuscle
- LEUCOTOMY:** operative removal of a series of small cores of brain tissue
- LEUCOTOMY, PREFRONTAL:** section of the fibers connecting the frontal lobe of the brain with the thalamus
- LEUKEMIA:** a disease of the blood characterized by persistent leucocytosis
- LIBIDO:** sexual desire, especially in the Freudian sense, which encompasses all kinds of love
- LICHEN PLANUS:** an eruption of flattened pimples, usually on the flexor surfaces of the extremities, sometimes on the mucous membranes or trunk
- LICHENIFICATION:** a hardening and thickening of the skin due to long-continued irritation
- LIPOID:** substance having fatty or oily characteristics, found in the cell membrane
- LOBECTOMY:** excision of a lobe, often a lobe of the brain
- LOBOTOMY:** cutting of fibers connecting a lobe of the brain with other areas; ordinarily used to mean prefrontal lobotomy
- LOCOMOTOR ATAXIA:** incoordination in locomotion; sometimes used as a synonym for tabes dorsalis, a progressive, chronic hardening of the posterior spinal ganglia, posterior columns in the spinal cord and peripheral nerves; symptoms are ataxia, anesthesia and neuralgia, with paralysis a later symptom; often a sequel of syphilis
- LUES:** a plague, particularly syphilis
- LUETIC:** syphilitic
- LUETIC ULCERS:** ulcers arising from syphilis
- LUMINAL:** trade name for phenylethylbarbituric acid; a sedative
- LUMINOSITY:** emission of light
- LYMPHOCYTE:** a white blood corpuscle with no granules in its cytoplasm
- LYMPHOID TISSUE:** a connective tissue with lymph cells in it
- MACROCEPHALIC:** relating to an abnormally large head
- MACROPSIA:** the visual perception of objects as larger than they are
- MACULA:** usually means macula lutea, or yellow spot, at the back of the eye, coincident with but larger than the fovea, the center of clearest vision
- MALINGERING:** shamming illness
- MANDIBLE:** the lower jaw
- MANIA, ACUTE:** a violent and not too prolonged attack of extreme excitement

- MANIACAL EXCITEMENT:** an excited state amounting to mania
- MANIC-DEPRESSIVE PSYCHOSIS:** a psychosis in which excited and depressed states alternate; one of the phases may be absent or less obvious than the other
- MASOCHISM:** sexual pleasure derived from receiving injury or pain from another; loosely, any enjoyment of pain
- MASTOIDECTOMY:** an operation in which the mastoid process is hollowed out
- MASTOIDITIS:** inflammation of the mastoid process, a projection on the temporal bone of the skull
- MEDIASTINAL INFLAMMATION:** inflammation of the mediastinum, or median wall dividing the thoracic cavity
- MELANCHOLIA:** a mental disorder characterized by extreme depression; often used for any severe depression
- MENIERE'S SYNDROME:** a disorder characterized by vertigo, nausea, vomiting, tinnitus and progressive deafness
- MENINGES:** the membranes of the brain and spinal cord
- MENINGITIS:** inflammation of the meninges or membranes covering the brain and spinal cord
- MENOPAUSE:** termination of the menses
- MENTAL DEFICIENCY:** lack of normal mental ability
- MENTAL DISORDER:** a profound disturbance of psychological functioning
- MESENTERY:** the fold of peritoneum enclosing much of the small intestine and attaching it to the abdominal wall
- MESMERISM:** hypnotism; a form of suggestion named after Mesmer
- METABOLISM:** the changes in tissues by means of which nutrition is carried out
- METACARPAL:** pertaining to the five bones in the hand between the wrist and the fingers
- METHEMOGLOBINEMIA:** the presence of methemoglobin in the blood; methemoglobin is a transformation of hemoglobin found after certain poisonings
- METRAZOL:** a convulsant; a strong central nervous system stimulant
- METRAZOL SHOCK:** therapeutic use of metrazol (cardiazol) which produces convulsions
- MICROCEPHALY:** abnormal smallness of the head
- MICROGLIA:** supportive tissue in the nervous system containing spider cells
- MICROPSIA:** visual perception of objects as smaller than they are
- MIGRAINE:** severe recurring headaches, often accompanied by nausea, vomiting, vertigo and photophobia; usually unilateral
- MIRROR WRITING:** writing backward; appears as though written in a mirror
- MISOPHOBIA:** fear of contamination
- MNESIA:** memory
- MONGOLIAN IDIOCY:** idiocy accompanied by flattened skull and slanting eyes
- MONO-IDEIC:** persistent concern with one idea
- MONOPLEGIA:** paralysis of one limb
- MONOZYGOTIC:** refers to twins developed from a single zygote or ovum; identical twins
- MORPHINE:** crystalline alkaloid obtained from opium
- MUCOSA COLITIS (MUCOUS COLITIS):** a neurotic disorder of the mucous membrane of the colon, accompanied by pain, diarrhea and/or constipation.
- MULTIPLE SCLEROSIS:** patches of hardening of tissue in the brain and spinal cord; causes paralysis, tremor, nystagmus, disturbances of speech, etc., depending on the locus of the lesions
- MULTIPLE PERSONALITY:** two or more personalities which are evident at different times, often with amnesia for each other

- MUTISM:** inability or unwillingness to talk
- MYASTHENIA GRAVIS:** chronic progressive muscular weakness
- MYELITIS:** inflammation of spinal cord or bone marrow
- MYOCLONUS:** clonic spasm, or twitching of a muscle
- MYOCLONIC REFLEX:** clonic spasm of a muscle
- MYOPIA:** near-sightedness
- MYOSITIS OSSIFICANS:** progressive ossification of the muscles
- MYXEDEMA:** a disorder due to deficiency of thyroid secretion, characterized by dryness of skin and hair, loss of hair, and lethargy
- NARCISSISM:** love of the self
- NARCOLEPSY:** compulsive desire for sleep
- NARCOSIS:** general anesthesia produced by some narcotic agent
- NECROPHILIA:** a love of dead bodies, or sexual excitement from dead bodies
- NEGATIVISM:** tendency to the opposite of what is suggested
- NEMBUTAL:** trade name for sodium ethylmethylbutal barbiturate; used for anesthesia
- NEOLOGISM:** a coined word
- NEOPALLIUM:** the cerebral hemisphere, excluding the rhinencephalon
- NEOPLASM:** a new growth or tumor
- NEPHRITIS:** inflammation of the kidneys
- NERVE BLOCK:** temporary or permanent arresting of the passage of nervous impulses by chemical or mechanical means
- NERVE SECTION:** the cutting of a nerve
- NEURASTHENIA:** a neurotic condition characterized by chronic exhaustion, irritability and various aches and pains
- NEURECTOMY:** excision of a segment of a nerve
- NEURITIS:** inflammation of a nerve, characterized by neuralgia, hyperesthesia, anesthesia or paresthesia, or paralysis
- NEUROGLIA:** supporting cells of the nervous system
- NEUROGRAMS:** a presumed trace in the central nervous system left by previous activity
- NEUROMA:** a tumor formed in cells of the type of sympathetic ganglion cells or in a nerve sheath
- NEUROTIC:** referring to a neurosis or psychoneurosis, a functional mental disorder presumably based largely upon severe conflicts
- NICOTINIC ACID:** part of the vitamin B complex, used specifically in the treatment of pellagra
- NIHILISTIC DELUSIONS:** a belief that everything has ceased to exist
- NYCTALOPIA:** night blindness
- NYPHOMANIA:** extreme sexual desire in women
- NYSTAGMUS:** a rhythmic oscillation of the eyes
- OBLIVESCENCE:** forgetting
- OBSESSIVE-COMPULSIVE:** relating to a compelling desire to perform repeatedly some ritualistic act
- OBSESSIVE-RUMINATIVE:** relating to a compelling absorption with certain restricted trains of thought
- OCCIPUT:** back of the head
- OCULOGYRIC:** relating to movements of the eye

- OCCUPATIONAL NEUROSES:** a neurosis associated with one's occupation, as a telegrapher's cramp
- OCCUPATIONAL THERAPY:** therapy by means of various activities designed to hold the patient's interest or to improve his motor coordination, etc., such as basket-making, folk dancing, gardening
- OEDIPUS COMPLEX:** a Freudian concept, involving incestuous desire of a son for his mother, accompanied by hostility toward his father
- ONIEROSIS:** Pertaining to dreams.
- OPHTHALMOPLÉGIA:** paralysis of one or more of the muscles of the eye
- OPHTHALMOPLÉGIC MIGRAINE:** headache caused by ophthalmoplegia
- OPTIC CHIASSMA:** the point of crossing of some of the fibers of the optic nerve
- OPTICOKINETIC:** relating to eye movements
- ORBICULARIS OCULI:** the orbicular muscle of the eye
- ORGANIC:** structural; often used as the opposite of functional, and meaning related to a demonstrable bodily defect as opposed to a defect in psychological processes
- ORGANIC PSYCHOSIS:** a psychosis resulting from a demonstrated bodily defect, such as general paresis
- ORTHOSYMPATHETIC:** sympathetic as opposed to parasympathetic
- OSCILLOGRAPH:** a short-period galvanometer used for recording electrical current
- OSTEITIS DEFORMANS:** a chronic inflammation of many of the bones of the body, with a softening and bending of them
- OSTEOMYELITIS:** inflammation of the marrow of the bones
- OTITIS EXTERNA:** inflammation of the external auditory canal
- OTITIS INTERNA:** inflammation of the lining membrane of the labyrinth
- OTITIS MEDIA:** inflammation of the middle ear
- OTOLITH:** a calcareous formation within the membranous labyrinth of the ear
- OTOSCLEROSIS:** the formation of bony tissue around the oval window and stapes of the middle ear, resulting in progressive deafness
- OVARIECTOMY:** removal of one or both ovaries
- OVARIOTOMY:** ovariectomy
- OXYCEPHALIC:** pertaining to a head with a sharp peaked crown
- PACHYMEINGITIS:** inflammation of the dura mater, or outer membrane of the brain
- PACHYMEINGITIS, HEMORRHAGIC:** an effusion of blood on the dura of the brain or spinal cord
- PALMESTHETIC:** relating to the sense of vibration
- PALPITATION:** a forcible heartbeat perceptible to the patient
- PANCREATECTOMIZE:** to excise the pancreas
- PANTOTHENIA:** trade name of a vitamin which is part of the B complex, supposedly useful in preventing some types of dermatitis
- PAPILLA:** a small nipple-like process, occurring on skin or tongue
- PARACHROMOPIC:** color blind
- PARAESTHESIA:** peculiar cutaneous sensations such as burning, prickling, etc., in the absence of any physical stimulus
- PARALYSIS AGITANS:** Parkinson's disease; shaking palsy
- PARAMIMIA:** use of unsuitable gestures
- PARAMNESIA:** false recollection
- PARANOIA:** a psychosis marked by systematized delusions
- PARANOIAC:** one who has paranoia

- PARANOID:** referring to systematized delusions
- PARAPLEGIA:** paralysis of both legs and more or less of the trunk
- PARATHYROID:** a gland lying beside the thyroid gland
- PARATHROIDECTOMY:** excision of the parathyroid glands
- PARESIS:** partial paralysis
- PARETIC:** relating to paresis
- PARKINSON'S DISEASE:** paralysis agitans; a disease showing clonic muscular activity.
The movements are little influenced by voluntary motion.
- PAROXYSMAL CEREBRAL DYSRHYTHMIA:** epilepsy
- PAROREXIA:** perverted appetite
- PARTURITION:** childbirth
- PASSIVE THERAPY:** psychotherapy in which the therapist interferes as little as possible
- PATHOLOGY:** a medical science which deals with functional and structural changes in the body due to disease
- PAVOR NOCTURNUS:** night-terrors
- PEDERASTY:** anal sexual intercourse among men
- PEDEPHILIAEROTICA:** abnormal desire for sexual play with children
- PELLAGRA:** a disease caused by insufficiency of vitamins, notably vitamin B₃, and characterized by debility, digestive disturbances, drying and exfoliation of skin. May be accompanied by psychosis.
- PENOLOGY:** the science of treatment of crime, punishment, and prisons
- PEPTIC ULCER:** ulcer of the stomach due to erosion of the mucous membrane
- PERINEUM:** the tissue between the vagina and the rectum in the female, and between the root of the penis and the rectum in the male
- PERIOSTEUM:** a fibrous membrane on the bone surfaces
- PERISTALSIS:** rhythmic contraction of the smooth muscles of the gastro-intestinal tract
- PERITONEUM:** the membrane lining the abdominal cavity and surrounding the contained viscera
- PERKINS' TRACTORS:** instruments used in the treatment of affected parts by drawing two rods of different metals over the areas involved
- PERSEVERATION:** repetition or continuance of thought, speech, or action
- PERVERSION:** a deviation from normal desire or behavior
- PETIT MAL:** mild epileptic attack with momentary laps of consciousness
- PHANTOM LIMB:** continued false localization of sensation in an amputated limb
- PHARMACOLOGICAL:** pertaining to the science of drugs
- PHENOBARBITAL:** same as luminal
- PHENYL-THIO-CARBAMIDE:** substance that is tasteless only for certain individuals
- PHLEBITIS:** inflammation of a vein
- PHOBIA:** intense, morbid fear
- PHOTOPHOBIA:** intolerance or fear of light
- PHOTOPIC (PHOTOPTIC):** relating to subjective sensations of light flashes
- PHRICTOPATHIC:** in general, unpleasant or unnatural sensations; specifically, pertaining to the sensation of shuddering or shivering
- PHTHISIS BULBI:** shrinking of the eyeball
- PHYLOGENETIC:** relating to the evolution of the species, as compared with the evolution of the individual (ontogeny)
- PICTOPOXIN:** a substance that stimulates the respiratory and vagus centers; may produce convulsions by irritation of the motor cortex

- PILOCARPINE:** an alkaloid that produces salivation, perspiration, and pupillary contraction if taken internally
- PILOMOTOR:** causing movement of body hair
- PITUITARY:** a small gland within the skull having to do with growth, sex characteristics
- PLACEBO:** any medicine or treatment given with the purpose of placating the patient, rather than for therapeutic reasons
- PLETHYSMOGRAPHIC:** pertaining to a plethysmograph, an instrument for measuring change in volume of blood in the organs of the body
- PLEURA:** the membranes which envelop the lung
- PNEUMOGRAPH:** an instrument which records chest movements in respiration
- POLIOMYELITIS:** inflammation of gray matter of the spinal cord
- POLYDIPSIA:** excessive thirst
- POLYMORPH PERVERSE LEVEL:** a type of behavior in which the adult reverts to an infantile level characterized by a lack of any specific sex interest
- POLYNEURITIS:** simultaneous inflammation of several nerve trunks
- POLYPI, NASAL:** outgrowths from the nasal mucosa
- POLYRHYTHMIC:** many or varied rhythms
- POMPHOLYX:** a disease in which bubble-like eruptions occur on the palms of the hands and between the fingers
- PRAXIA:** knowledge; learned habits
- PREPUCE:** the foreskin of the penis
- PRESBYOPHRENIC:** senile dementia
- PRESBYOPIA:** farsightedness, especially relating to old age
- PRODROMAL:** symptomatic of an approaching disease
- PROGNOSIS:** a judgment concerning the duration and probable outcome of a disease
- PROJECTION:** the process of projecting one's attitudes and motives away from the self.
- PROJECTION FIBERS:** nerve fibers joining two areas in the same cerebral hemisphere
- PROPHYLACTIC:** pertaining to prevention of disease as contrasted with the cure (therapeutic)
- PROSEXIA:** restoration of sexual function
- PROSTATE:** a gland surrounding the neck of the bladder and beginning of the urethra in the male
- PROSTIGMIN:** (also "prostigmine") a trade name for neostigmine; a dimethylcarbamine ester, producing muscle tonus
- PROTANOPE:** an individual with a defect of color vision in which the extreme red end of the spectrum is not visible
- PROTOCOL:** steps in a clinical history
- PRURIGO SIMPLEX:** a chronic inflammatory skin disease with severe itching
- PRURITIS:** itching due to irritation of peripheral sensory nerves
- PRURITIS ANI:** itching sensation in the anus
- PRURITIS VULVAE:** itching produced by hyperesthesia of the nerves of the vulvae
- PSEUDOGRAPHIA:** the production of meaningless written symbols
- PSEUDOLALIA:** production of meaningless sounds
- PSORIASIS:** a chronic inflammatory skin disease characterized by the development of red patches with white scales
- PSYCHASTHENIA:** a neurosis characterized by mental lethargy, indecision, phobias, and anxieties
- PSYCHIATRY:** a branch of medicine dealing with mental hygiene and mental disorder
- PSYCHOANALYSIS:** therapy and theory of personality structure which derives from Freud-

ian theory and its offshoots and stresses unconscious motivation and the influence of early experiences

PSYCHODRAMA: the acting out of life situations for purpose of psychotherapy.

PSYCHOGALVANIC: pertaining to an instrument (psychogalvanometer) which measures skin resistance changes

PSYCHOGENIC: of mental or psychic origin

PSYCHOMOTOR: motor activity aroused through ideational processes

PSYCHONEUROSIS: functional mental disorder involving part of the personality structure, unaccompanied by permanent intellectual or emotional deterioration

PSYCHOPATH: a person who is considered morally irresponsible and who shows emotional immaturity, volitional instability, and inadequate control of impulses

PSYCHOPATHOLOGY: the pathology of mental disorder

PSYCHOSEXUAL: pertaining to the interrelation of ideational factors with sexual functions

PSYCHOSIS: deep-seated mental disorder characterized generally by delusions, hallucinations, and withdrawal from reality

PSYCHOSIS, ALCOHOLIC: psychosis produced by alcohol, characterized by tremor, hallucinations, loss of memory, impairment of judgment, gastrointestinal disturbance, and sometimes disorientation

PSYCHOSIS, ORGANIC: a deep-seated mental disorder with organic or structural involvement

PSYCHOSIS, SENILE: psychosis of old age, accompanied by loss of recent memory, impairment of retentive ability, and confusion

PSYCHOSIS, SEPTIC: psychosis due to absorption of internal or external poisonous substances

PSYCHOSIS, TRAUMATIC: psychosis due to wound or injury of the cerebral areas

PSYCHOSOMATIC: relating to mind and body as an integral unit; specifically, relating to changes in organic structure and physiological functions, produced by emotional disturbances

PSYCHOSURGERY: surgical lesion of neural tracts for the treatment of certain mental disorders, commonly termed: prefrontal lobotomy, leucotomy, and lobectomy

PSYCHOTHERAPY: treatment by analysis and reorganization of mental reactions and emotional reactions

PTOSIS (EYELID): upper eyelid droop resultant from paralysis or atrophy of a muscle; in general, a prolapse of some organ

PYKNIC TYPE: a categorical term introduced by Kretschmer referring to a physical type having a rounded body, expansive chest, broad face, and thick neck

PYELITIS: inflammation of the pelvis of the kidney

PYLORIC STENOSIS: contraction of the pylorus, the circular stomach opening into the duodenum

PYRAMIDAL: pertaining to the pyramidal tract which is a continuation in the spinal cord of the pyramid oblongata

PYROMANIA: obsessional impulse to commit arson

RACHITIC: pertaining to a deficiency disease produced by lack of vitamin D

RAMUS, PL. RAMI: a branch, usually of a vein, artery, or nerve; a thin bone process projecting from a large bone

RAPPORT: (general) emotional harmony between patient and therapist, often in the patient this comprises deep affection; (hypnosis) heightened susceptibility to hypnotic suggestion

- RATIONALIZATION**: mental process of fallacious justification or defense of an act
- REGRESSION**: reversion to infantile emotions or behavior
- RENAL**: pertaining to the kidney
- REPRESSION**: unconscious rejection of those desires and thoughts the awareness of which would be painful
- RESISTANCE**: tenacious guarding of repressed experiences which the therapist is attempting to uncover
- RETINITIS**: inflammation of the retina
- RHIGOTIC**: pertaining to sensory perception of cold stimuli
- RHODOPSIN**: visual purple
- ROMBERG SIGN**: swaying of the body and inability to stand with the eyes closed
- RORSCHACH**: the name of the man who devised a projective personality test which has many features in common with the "ink blot" test
- ROSACEA**: inflammatory skin weals or patches, usually of the face or neck
- RUBRO-SPINAL TRACTS**: nerve fibers arising in the opposite red nucleus in the midbrain and terminating at cells in the ventral horn of the spinal cord
- SACCADIC**: the involuntary, short, quick component in eye nystagmus
- SACCULUS**: nodular area of the semi-circular canals of the ear
- SADISM**: feeling of pleasure from inflicting pain on others; specifically, in the sexual act
- SADISTIC**: sexual perversion in which pleasure is derived from inflicting pain on another
- SANTONIN**: a neutral crystalline principle, producing in overdose vertigo, stupor, convulsions, and sometimes death; used as a vermicide
- SARCOMA**: non-malignant tumor
- SATYRIASIS**: excessive and abnormal sexual desire in the male
- SCLERA**: the exterior coat of the eyeball; in general, a thickened membrane
- SCLEROSIS**: hardening or thickening of a membrane
- SCHIZOID**: resembling schizophrenia
- SCHIZOPHRENIA**: a functional psychosis marked by withdrawal from reality, emotional blunting, delusions, hallucinations
- SCHIZOTHYMIC**: a term originated by Kretschmer, meaning a predisposition toward schizophrenia in persons of frail build
- SEROLOGICAL**: pertaining to serum or fluids
- SCOPOLAMINE**: an alkaloid apparently identical with hyoscine, used with morphine to produce anesthesia; sometimes called "truth serum"
- SCOPOLAMINE HYDROBROMIDE**: hydropscopic crystals used as a sedative and for dilatation of the eye pupil
- SCOTOMA**: a dark spot in the visual field
- SCROTUM**: the testicle pouch
- SEBACEOUS**: pertaining to the secretions of the glands associated with hair follicles
- SEDATION**: the production of lessened activity by the use of drugs or other means
- SELLA TURCICA**: the depression in the sphenoid bone containing the pituitary gland
- SEMINAL VESICLES**: reservoir sacs for semen
- SENESCENCE**: the state or condition of ageing
- SENILE DEMENTIA**: deterioration of mental faculties due to old age
- SEPTIC LESIONS**: morbid structural change in tissue due to a poisonous substance
- SITZ BATH**: a bath taken in a sitting position
- SOMA**: the body, with special reference to organs, tissues, and cells

- SOMNAMBULISM:** sleep-walking
- SOMNIFERIN:** a narcotic
- SOMNOLENCE:** a drowsy or sleep-like condition
- SOPORIFIC:** an agent tending to produce lethargy or sleep
- SPASM NUTANS:** nodding spasms
- SPASMOPHILIA:** a tendency toward spasms or convulsions
- SPASTIC:** pertaining to or characterized by spasm
- SPASTICITY:** a state of spasm marked by hypertonus of muscles, producing rigidity
- SPASTIC COLITIS:** tonic contraction of the muscles of the colon
- SPASTIC PARALYSIS:** continuous tonic muscle contraction
- SPECTROMETER:** an instrument for determining the wave-length of light rays or diffraction deviations
- SPIROCHETE:** a bacteria characterized by flexible filaments of a spiral shape
- STAMMER:** blocking of speech
- STANFORD-REVISION TEST:** revision of the Binet-Simon intelligence test made at Stanford University
- STASIS:** a retardation of physiological movement, especially of the blood or the intestinal tract
- STATUS EPILEPTICUS:** a state of rapid successive epileptic attacks
- STEREOTYPY:** repetition of senseless words, gestures, or actions
- STRABISMUS:** eye squint
- STRYCHNINE:** one of the nux vomica alkaloids; a powerful stimulant
- STUTTER:** irregular repetition of initial syllables of words
- SUBLIMATION:** substitution of activity of a socially acceptable nature for blocked impulses or desires
- SUBLIMINAL:** below the threshold of perception
- SUCROSE:** refined sugar obtained from species of sorghum
- SUGGESTIVE THERAPY:** treatment of disorder by means of direct or indirect suggestion
- SULCI:** fissures of the brain
- SUPER-EGO:** a supposedly unconscious part of the psyche which resembles the conscience
- SUPPURATION:** pus formation
- SYMPTOMATOLOGY:** characteristics of a disease
- SYDENHAM'S CHOREA:** a functional nerve disorder characterized by involuntary and irregular muscle contraction of the extremities; St. Vitus' dance
- SYNCOPE:** temporary suspension of circulation and respiration resulting in fainting
- SYNDROME:** the system or pattern of symptoms in a disease
- SYNECHIA:** an abnormal adhesion of parts, especially of the iris to an adjacent area of the eye
- SYNESTHESIA:** the rather regular appearance of sensations in one sense modality together with sensations in a second sense modality when the latter is stimulated; e.g., colored hearing
- SYRINGOBULBIA:** the presence of cavities in the medulla oblongata
- SYRINGOMYELIA:** softening and conversion of spinal cord substance to connective tissue
- TABES DORSALIS:** locomotor ataxia; syphilitic disease of the spinal cord and ganglia characterized by loss of motor coordination, disorders of vision, cutaneous anesthesia
- TACHYCARDIA:** excessive rapid heart beat due to functional disturbance of the sympathetic nervous system

- TECTO-SPINAL TRACTS:** fibers arising in the superior colliculi of the midbrain and ending at cells in the ventral horn of the spinal cord
- TELEOLOGICAL:** pertaining to the final cause of things; purposeful
- TETANY:** a disease characterized by intermittent tonic spasms of the muscles, generally upper extremities, due to some toxic agent
- THALPOTIC:** pertaining to the sense modality of warmth
- THEMATIC APPERCEPTIVE:** a projective personality test devised by Murray and coworkers. The stimulus pictures are composed of structured material
- THERAPEUTIC:** pertaining to the treatment of disease
- THERAPY:** treatment of disease by various methods
- THROMBI:** blood clots within the heart or blood-vessels, due usually to a decrease in circulation or to changes in the blood or vessel walls
- THROMBOSIS:** formation of a blood clot in the heart or blood-vessels
- THUJONE:** an organic substance which increases irritability of the motor cortex
- THYROIDITIS:** inflammation of the thyroid gland
- THYROXIN:** the iodine compound produced by the thyroid gland
- TIC:** involuntary twitching of muscles, in particular the facial muscles; may be habitual or of neurotic origin
- TIC DOULOUREUX:** neuralgia of the facial nerves
- TINNITUS:** a ringing, roaring, or hissing sound in the ear
- TINNITUS AURIUM:** see, tinnitus
- TONIC:** of normal tone or tension; a continuous tension or contraction, as a "tonic spasm"
- TOPOGRAPHICAL:** relating to a study of the regions occupied by a part, or in which anything occurs
- TRANCE:** a sleep-like state characterized by decrease in vital functions and a limiting of conscious activity and voluntary movements; used to mean a deep hypnotic state
- TRANSFERENCE:** establishment of an emotional relationship on the part of the patient for the therapist
- TRAUMA:** injury or wound of the body; profound emotional shock
- TREPINATION:** the operation of cutting out a circular piece of bone, usually from the skull, with a special instrument (trephine)
- TREPONEMA PALLIDUM:** the syphilitic parasite
- TRICHINOSIS:** disease produced by ingestion of pork containing the parasite "trichina spiralis"
- TRIGEMINAL NEURALGIA:** see, tic douloureux
- TUBERIAN REGION:** the region of the tuber cinereum in the hypothalamus
- TUBULAR VISION:** see, tunnel vision
- TUMESCENCE:** the condition of swelling
- TUMOR:** a swelling; a new abnormal growth of tissue
- TUNNEL VISION:** concentric narrowing of the field of vision
- TURBINATE BONES:** three bony projections on the outer wall of the nasal fossa
- TURGESCENT:** swelling
- UREMIA:** a poisoning due to retention in the bloodstream of substances normally excreted by the kidneys
- URETHRA:** the urinal canal
- URTICARIA:** a skin disease appearing as burning or itching weals; hives

UTRICULUS: a small membranous sac communicating with the semicircular canals of the ear

UVULA ARCH: the arch supporting the conical appendage hanging from the soft palate

VASCULAR TONUS: state of tension of the blood vessels

VAS DEFERENS: the excretory duct of the testes

VASCULARIZATION: formation and extension of capillaries

VASODILATED: dilatation of blood-vessels

VASOMOTOR SYSTEM: regulating the tension of blood-vessels

VASOSPASTIC: pertaining to a spasm of the muscles controlling the blood-vessels

VEGETATIVE SYSTEM: those bodily functions concerned with metabolism

VERBIGATION: repetition of incoherent words or expressions

VERBOMANIA: abnormal talkativeness

VERRUCAE: warts

VERTIGO: dizziness

VESICATION: formation of a blister

VESTIBULAR: relating to the semi-circular canals and accessory organs of the ear

VIBRISSA: stiff hairs about the nostrils and mouth of many animals

VITILIGO: a disease involving loss of skin pigmentation in patches

VOYEURISM: abnormal desire of viewing either the sex organs or sexual intercourse

WEIR MITCHELL METHOD: a treatment for functional nervous disorders, requiring complete rest in bed

WERNICKE'S SIGN: a visual dysfunction in which hemianopia prevents reflex action of the iris when light falls on the blind portion of the retina

"WET" SHOCK: shock produced by insulin, characterized by a deep coma and profuse sweating

ZOERASTY: sexual intercourse with an animal

ZOOPHILIA: an unusual love of a certain animal, or animals

ZOOPHOBIA: fear of animals or of some particular animal

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