ance of mental functions in place of actual intellectual deterioration.

In catatonic excitement or stupor, a sort of barrier seems interposed between the examiner and patient, which cannot really be broken through, while, in delirium, unless the clouding of consciousness is very deep, the patient is usually not entirely inaccessible, so that occasional relevant answers to questions may be obtained. In excitements the motor activity is coarser and of a more senseless character. When typical signs of a catatonic condition, such as stereotypy or cerea flexibilitas are present, the diagnosis is, of course, rendered easier.

In manic depressive insanity, when the excitement and flight of ideas is so extreme that a certain clouding of consciousness results, perplexities may arise.

TREATMENT.

The treatment, of course, should be directed to the cause, and when the condition is due to the ingestion of a toxic substance, as alcohol, bromides, etc., this cause may be removed.

It is to be remembered that we frequently have to do without a condition which is primarily physical and not mental, and the treatment is somewhat the same as that of any acute disease, the chief indications being to keep up the strength of the patient by appropriate nourishment and to prevent exhaustion from the motor unrest, which is frequently extreme.

Of quieting measures the continuous warm bath is generally preferable to soporific drugs. By this method—which is warmly advocated by Kraepelin—the patient is kept in a warm bath at 92° to 95° until the restlessness subsides, and is then put to bed, when he frequently falls asleep. When restlessness reappears he is again placed in the bath, and this procedure is continued until his quiet becomes permanent.

This method is particularly useful in delirium tremens; but in asthenic conditions, caution must be used, and the patient's pulse and general condition carefully watched.

In some cases soporific drugs may be combined with the bath treatment.

Heart stimulants, as alcohol, strychnia and digitalis, may be indicated. In alcohol delirium, however, alcohol should be avoided, and if polynuritis exists, even small doses given as a stimulant may be distinctly harmful.

When a delirium tremens is threatened during enforced abstinence in the course of an acute illness in an alcoholic person, the case is somewhat different. On this point a diversity of opinion exists, but I am inclined to believe that small doses of alcohol are here beneficial.

In senile delirium, also, the effect of alcohol may be distinctly good, being not only stimulative but sedative as well.

Nourishment should be given at regular intervals as in any acute illness. If, owing to the mental condition, the patient cannot be made to take the necessary amount, tube feeding may become necessary.

PROGNOSIS.

The prognosis is in general good when no underlying, incurable cause exists. In senile conditions and in prolonged alcohol delirium, an outcome in deterioration is to be feared.

UNDERFEEDING AND ITS ASSOCIATED ILLS.*

BY DUDLEY ROBERTS, M.D., BROOKLYN, N. Y.

THE state of nutrition of an individual, a race or a nation in large part determines relative fitness and consequent natural selection. Undoubtedly the dietetic habits are of primary importance in determining this question of nutrition; an improper food supply is detrimental to health, just as abstinence from food is incompatible with life. The effect of innumerable other factors in determining the state of nutrition is very evident but of secondary importance. The best habits tend to increase efficiency under given conditions and to make for the perpetuation of their possessors. The standard customs of a people are, then, actually evolved by choice and the force of circumstances. In any discussion of the best habits of diet it is not proper to overlook these facts; if a choice is to be made between the customs of different individuals or peoples, we have strong *a priori* grounds for the belief that the best habits obtain among the most efficient and the most successful in the struggle.

Whether we turn to history or draw our facts from the lives of those about us, we notice few examples of individuals or groups of individuals showing average efficiency while living on a dietary markedly under average. Among the most efficient physically, at least, the minimum has been shunned and the most liberal food supply has been sought. There are many interesting examples of "physiological economy in nutrition" that stand out as unexplainable exceptions. History furnishes us with no examples of groups of people of such a type achieving or becoming dominant. Generalized reductions in the dietary standards of a highly efficient people, based on theoretical considerations and brief periods of experimentation, seem, therefore, open to serious question.

During the past few years, however, there has arisen a vague idea that the people of this country eat too much; although there has been nothing approaching proof to show that the majority suffer from overeating or would be in better health on a lower dietary standard, this impression has many adherents among the medical profession. Such a broad generalization is hard to attack; it savors of fighting with shadows. Certainly, derogatory statements as to our general average of health are entirely unjustified; the average efficiency suggests no general physical incapacity. There is no reason to believe that the strong would be stronger for diminishing their food supply. If rhyme or reason there be in

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this prevalent impression, reference is actually made to a class taking little physical exercise, living under high tension, eating improper foods at all hours, frequently with great haste, and ingesting a liberal quantity of alcoholic beverages. The medical mind, struggling with the problem that this class presents, deprecates only the quantity of food ingested, and spreads the idea that overeating is common to all classes. If all instances of poor health be studied with care, free from preconceived prejudice, I am of the opinion that we shall reach an agreement that those who suffer from the over-ingestion of suitable foods eaten in proper amounts at one time and always in a correct way, are indeed few in number.

In the general clamor on this subject the great danger of eating too little has been very generally forgotten. I am convinced that there are many conditions incident to present day life that make for this menace to health. While figures on such a subject as this are not readily given, it is my conviction that more instances of true underfeeding come to my attention than cases of actual overfeeding in the sense in which that term has been used above. The resulting discomfort, loss of efficiency and danger of intercurrent disease indicate to me that of the two evils overfeeding is the preferable one.

There are two reasons that account in large part for the fact that underfeeding is so generally overlooked. In the first place, the present tendency of medicine is toward diagnosis of abnormalities existing in each and every organ. Underfeeding induces innumerable such abnormalities, the fundamental cause of which is not considered. On the other hand, underfeeding is corrected in the prosecution of some of our most valued forms of treatment, and the true cause is unknowingly removed; such therapeutic measures as change of climate, of scene and occupation, life in the open air, exercise, improvement of psychic control, gastric lavage and many tonic medicines depend in large measure on the improvement of nutrition resulting from a more abundant food supply; rest has a similar effect in decreasing the demand for food.

Those who have seriously attempted the determination of underfeeding have encountered a difficult problem; namely, What constitutes underfeeding and how is it to be recognized? As underfeeding and overfeeding are each compatible with unusual leanness or excessive corpulency, we cannot depend on standards of weight to furnish an absolute guide. The *per diem* ingestion of food varies widely in some instances from the standard without disastrous results, and we should not endeavor to decide the question simply on the estimation of the dietetic habits. The different ills occasioned by underfeeding are often caused by conditions detrimental to digestion, or the utilization of food or by depleting processes, and we cannot consider a resulting clinical picture as more than suggestive. The only absolutely final criterion is the effect of an increased diet. I do not advance the absurd proposition that all chronic ailments are to be

treated with an increased diet, but I do contend that individuals afflicted with ills known to arise from poor general nourishment, who have the physical conditions suggestive of such a state and who on careful study are found to be living on an amount of nutritive material lower than is usually taken under like conditions of physiological activity, — that such individuals are entitled to the experimental test of treatment. In this way and only in this way have we positive proof of a tentative diagnosis; we are entirely justified in withholding all other possible modes of treatment until this important question can be finally settled.

No effort looking toward a complete knowledge of the gastro-intestinal tract and all its functions is to be spared; every possible cause of excessive waste of energy or destruction of tissue demands a careful search. Fortunately, our methods of accurate observation are constantly being increased. It is clearly appreciated that the removal of all these conditions is of primordial importance; when, however, this is impossible, it is clearly evident that we must supply food in such quantities that the general nutrition is built up in spite of abnormal waste. This is now the accepted practice in tubercular conditions. Failing in our search for a cause of excessive waste, we must turn to an actual failure of intake of nutritive material.

The clinical determination of the amount of true food stuffs habitually ingested by our patients has not been on a practicable basis, and consequently has infrequently been made with any degree of accuracy. We have absolutely no guide in the offhand answers of patients. The weighing of food is impracticable for general use. I have found that the caloric value and nitrogen content of certain bulks of food as eaten may be accurately determined if the patient under cross-examination can state his usual habits for each meal, using simple units of bulk as measures of quantity. Occasionally it is necessary to have records kept for several days. The nutrients and albumin contained in certain bulks of the commoner foods are given in tables published by the writer¹ or can be estimated by the more elaborate method of Fischer.

Daily observation of the diet of different classes of people has convinced me that with the gradual diminution of muscular labor there has been a natural tendency to lessen the food intake; in consequence of this our food standards to-day are, on the average, somewhat lower than those compiled by Voit, Atwater and others of an earlier period.

From an analysis of cases occurring in hospital, clinic and private practice it would seem that there are three chief causes of habitual underfeeding, — the effort to save time and money, the loss of appetite and complaints referred to the stomach. One or more of these three causes can almost always be found, and each tends to become more operative as the struggle becomes keener. Inherited customs might be spoken of as playing

¹ Jour. Amer. Med. Asso., April 21, 1906.

a predisposing part. The curtailment or omission of meals is exceedingly common because of the great demands of commercial and school life. Experience teaches that less discomfort results if meals are curtailed than if bolted, but underfeeding may gradually ensue. The cost of food is relatively high in our larger cities and among the poorer classes economy is practised to a dangerous degree. Loss of appetite is dependent on many conditions of mind and body; indoor life, physical and mental fatigue and emotional states are particularly common causes. The appetite may be described as "ravenous," but a few mouthfuls of food cause satiation. Loss of appetite is a condition incident to prolonged undernourishment, and the individual who for any reason eats too little food generally loses the natural desire.

In a very large proportion of cases underfeeding is due to attempts to relieve true or fancied gastro-intestinal derangements. The complaints commonly held to augur digestive disorder are many and varied. Relief of digestive embarrassment is apt to follow the lessening of the demands on the stomach, and if this diminution of food be temporary or carried only to a point of safety it is a valuable mode of treatment for many conditions. When spontaneous or induced recovery does not come about, the sparing of the stomach continues, and to the real or imagined trouble is added undernourishment of the entire body and actual gastric weakness. The physician is often responsible for this underfeeding, in failing to see that sufficient food is taken to keep up the nourishment. We have been careless of the fact that dietetic prohibitions are dangerous in the hands of those willing to follow them. The uncured chronic sufferer is apt to collect the advice of many physicians and try to cure himself by avoiding rich foods, starchy foods, fatty foods, sweet foods and meats.

The *clinical picture* of underfeeding is necessarily that of the various functional conditions to which it gives rise. The part of the body most affected by the general undernourishment depends on the constitution of the individual mind and body and on the work each part is called upon to perform. The nervous system is most commonly affected, as would be expected from its highly organized character; this is shown by deficiency or aberrancy of innervation, or by some irritability of weakness. Clinically there are certain types of ills most commonly seen to be due to underfeeding, and their separate study is warranted.

GASTRIC TYPES.

Functional disorders undoubtedly constitute the vast majority of all gastric abnormalities; such disorders are incident to almost every disturbance of health, but normal function returns on the resumption of proper conditions. There are, however, certain disturbing factors which tend to persist unless removed in the course of time by chance or conscious effort; in this manner a large proportion of "chronic dyspepsias" are

to be accounted for. That all the various abnormalities of gastric function may result from poor general nourishment has frequently been suggested. That such abnormalities very frequently arise from habitual underfeeding is not at all appreciated, but can readily be proven by the criteria we have suggested. This has been the entire cause of such a large number of cases coming directly under my observation, cases of months' or years' duration, cases that had previously been subjected to all other plans of treatment, that I feel it is impossible for me to exaggerate its importance. Hyperacidity, subacidity, anaecidity, myasthenia, atonic dilation, peristaltic unrest and spasm of the orifices, each with its particular clinical picture, may be caused simply by the ingestion of too little food. Subjectively there are complaints of belching, slight or excessive, of bloating after meals, constant or late afternoon nausea, nervous vomiting or regurgitation, loss of appetite or anorexia, epigastric pain or discomfort soon after taking food. Usually the patients are of a nervous type; generally they are rather thin, but sometimes pale and fat. Enteroptosis is common, but not always present. We are all familiar with the old and new lines of treatment to stimulate or depress the activity of the stomach. If we are interested in the study of actual causes we must probe into the dietetic habits not so much in search of objectionable foods as to see if a sufficient amount of food has been eaten. We surely cannot expect to find normal stomach functions in an undernourished individual, and yet the average dyspeptic continues to eat too little while all measures are tried except the rational cure.

We must admit, however, that having determined what we should judge to be an insufficient dietary, we are confronted with a rather anomalous situation, for the increased diet must be given to an individual who attributes many of his complaints to the ingestion of even a small amount of food. In practice it is seen that this difficulty is more imagined than real, as the patient soon discovers that two or three times the amount of properly selected food can be taken without causing more trouble. In the course of a few weeks the stomach begins to function normally and irritability disappears. The weight and general condition show steady improvement. Failure to achieve the desired result, if proper amounts of food are actually taken, shows us that we are indeed dealing with a condition other than underfeeding.

Organic changes in the stomach or neighboring organs generally tend to result in underfeeding and its associated disturbances of function, but the cure or amelioration of the organic disease is necessarily the first consideration. It should be recognized, however, that the resumption of proper dietetic habits is not necessarily spontaneous and that the persistence of underfeeding is a good and sufficient reason for the continuance of digestive disturbances following actually successful medical or surgical plans of treatment.

INTESTINAL TYPES.

The various intestinal neuroses, nervous diarrhea, mucous colic and atonic and spastic constipation are frequently found to be due to the ingestion of insufficient nourishment. This is the one dietetic plan that is rarely suggested for these conditions, but is most often of value, as it removes the causative condition while other plans depend on blandness to quiet or irritation to stimulate peristaltic activity. The patient is apt to learn, after months of suffering, that a choice of food makes comparatively little difference in these neuroses, and admits complete discouragement. If the condition is due to underfeeding, the ingesting of a generous diet and one chosen with comparatively little regard to stimulation or sedation of peristaltic activity soon shows remarkable results.

Chronic catarrhal conditions of the bowel are frequently complicated by functional disturbances from underfeeding, and the apparent failure in the treatment of some cases of colitis may be attributed to the oversight of this complication.

ANEMIC TYPE.

Although we have long known how little iron was needed by the body and how small were the daily losses compared with the iron content of almost any diet capable of sustaining life, we have continued to administer iron to the individual with hemoglobin below the average, and have constantly been on the alert to find a more efficacious form of this element. We have no reason to suppose that the red cells have the first call on the ingested proteid for use in the making of hemoglobin. A deficiency of available proteid means deficiency of hemoglobin, whether the deficiency be due to failure of proper intake or to the abnormal destruction of the ingested proteids. I am convinced that we should have these two possibilities in mind in every case of simple anemia. In the absence of those pathological conditions known to affect dissipation of energy or tissue destruction we may find, then, either a diet deficient in total nutrients but abundantly rich in proteid which is used up as a fuel food, or a diet markedly poor in proteids although little below the standard in total nutrients.

Among young children, school girls and young women there is a large number who owe their anemia to this kind of underfeeding. Some have an aversion to all albuminous foods and are overfond of fruit and candy. Others have no particular aversions, but eat little of anything. The resulting anemia is not evidenced alone by the color or estimation of hemoglobin, but often leads to attacks of faintness, dyspnea on exertion, palpitation of the heart, anemic hemorrhages and other symptoms of the true anemic state. Many of these cases have no nervous symptoms or actual gastro-intestinal disturbances. The condition of anemia has usually been recognized by all their medical advisers and iron in all its various forms administered for months. The reply to absolute and strict regulation of the diet is very

rapid, if underfeeding is the true cause of the anemia. In every case of simple anemia without discoverable organic cause, this is the rational line of therapy.

NERVOUS TYPES.

The management of the class of conditions spoken of as the neuroses presents the most difficult of medical problems. Their complete understanding requires more knowledge than we possess of the psychic functions and their relation with the physical body. We are almost necessarily led into the maze of metaphysical speculation. Fundamental differences of opinion seem unavoidable. Formerly all treatment was physical, while to-day the pendulum is swinging in the other direction. It seems impossible to deny the mutual interdependence of the mind and the body. It is only in rare instances that we fail to see subversion of the higher mental faculties in depleted physical conditions. Practically it is observed that the so-called neuroses and poor general nourishment usually go hand in hand. Many have called attention to the almost universal habit among this class of individuals of eating less food than their stronger neighbors. Emphasis has usually been laid on the necessity of rest and "overfeeding" when the condition of neurasthenia or nervous exhaustion is reached. No doubt this type is more in need of radical treatment, but all about us are numbers of poor forlorn individuals living in a state of semi-invalidism, possibly able to work, but continually afflicted with "nerves"; with easily developed mental and physical fatigue, headaches and backaches, vertigo and nausea, insomnia and depression of spirits, all manner of aches and pains and disturbances of function. Some owe their condition purely to mental habits, but experience soon teaches that a stronger mind and a less irritable nervous system naturally follows an improvement in nutrition. In an astonishing number of instances a restoration to usefulness and health follows the ingestion of proper foods. The institution of the proper habits is the difficult problem to be worked out in each individual case; the tact and resourcefulness of the therapist are taxed to the uttermost. Harmful auto-suggestions must be combated by reason and by encouraging suggestions. It is in this direction that our work as practitioners is broadening out. We are learning to treat not the body, but the whole man.

IMMUNITY AND THERAPEUTIC ACTION.

BY THOMAS J. MAYR, A.M., M.D., PHILADELPHIA, PA.

BELIEF in the existence of a principle that protects the animal organism against disease and injurious influences is coeval with the history of medicine. The *vis medicatrix nature* of Hippocrates, the *archæus* of Paracelsus, and the *vital spirit* of van Helmont, were but various expressions of this faith. The fact that typhoid fever, smallpox, yellow fever and many other diseases