Being convinced of the importance of this strong sugar reaction of the saccharolytic group and its absence in case of the colon bacillus, an investigation was made to determine the actual explanation of the difference thus manifested. Two suppositions were considered: First, that *B. coli communis* may possess slower actions on the sugar; or second, that it produces some substance which inhibits the saccharolysis which would otherwise proceed as in the saccharolytic group. Both types of organisms begin to form gas at about the same time, but the colon bacillus produces gas more slowly than the group of allied species and its gas production ceases after from twenty-four to forty-eight hours. The saccharolytic group, on the contrary, after beginning about the same time as the colon bacillus to produce gas, continue more rapidly and do not cease until the sugar is entirely exhausted, the duration varying with the percentage of sugar in the medium. At the same time it was found that the acidity of the medium was greater with the colon bacillus, which produced from 3 to 5 per cent. in forty-eight hours; while the saccharolytic group produced only from 1 to 3 per cent. in the same period. This difference suggested that the greater acidity of the medium in case of the colon bacillus may exert an inhibitive influence on the further action of the organism on the sugar. By adding a few grains of sterile calcium carbonate to the cultures after the fermentation had stopped and absorption had begun, with the effect of neutralizing the media, it was found in confirmation of this supposition that more gas is evolved and the sugar further diminished (even to exhaustion). As suggested by Dr. Smith, the acidity of the culture was found to be due to the presence of lactic acid.

Before concluding I would like to point out briefly that, in view of the apparent variations of *B. coli communis*, Booker recognizes seven varieties of organisms of the colon group resembling the colon bacillus morphologically and biologically (but with no especial mention of the production of indol): that Gilbert describes five types: (a) non-motile but otherwise typical colon bacillus, (b) non-productive of indol, but otherwise typical colon bacillus, (c) non-fermenting lactose, but otherwise typical colon bacillus, (d) non-motile and non-fermenting lactose, but otherwise typical colon bacillus, (e) non-motile non-fermenting lactose, non-productive of indol, but otherwise typical colon bacillus; that Fremlin regarded fermentation of dextrose and coagulation of milk as the most reliable indication of *B. coli communis*; that others regard the fermentation of dextrose alone as sufficient evidence of the identity of this bacillus. It is remarkable to note the elasticity of colon bacillus as disguised at present under the name of "the colon group." This elasticity is due, however, to the general conception of the colon group, a term used to cover all bacteria from the true *B. coli communis* to the *B. typhosus*, and the failure of many observers to realize the individuality of the various members of the chain. Careful controlling of all colon-like organisms with the two-color and sugar-exhaustion tests will serve to limit names, and it is with the hope of establishing a clear identity of this important indication of sewage pollution that these methods are offered.

CONCLUSIONS.

From the above I believe the following conclusions to be logical:

1. The saccharolytic group, as its name implies, represents not only one but different kinds of micro-organisms

commonly found in nature, especially in water, characterized by its predominating action in splitting dextrose.

2. The constant occurrence of this group in water may prove to be a factor in itself which may shed a new light on our vital problems of the bacteriology of water.

3. The *B. coli communis* must not be confounded with the colon group, which I name "saccharolytic group," holding that this group should have no relation to the colon bacillus.

4. Since the saccharolytic group is shown to be more closely related to what at present is regarded as the colon group, the substitution of "saccharolytic group" for "colon group" is more comprehensible, and I hope will aid considerably, not only in relieving the confusion which the colon group presents, but especially in establishing the colon bacillus as a distinct type of micro-organism and not an indefinite chain of them, as it is considered at present.

5. *B. coli communis*, in addition to the recognized characteristics, will be positive to Test 2 and negative to Tests 1 and 3 (that is, it will fail to exhaust the sugar in 1 per cent. dextrose bouillon at 37 C. in forty-eight hours), while contrary to this the saccharolytic group may in many ways present characteristics of the colon bacillus, but will always be negative to Test 2 and positive to Test 1 and Test 3 (that is, it will exhaust the sugar in forty-eight hours at 37 C. in 1 per cent. dextrose bouillon).

6. *B. coli* should be discarded as an agent for exhausting the sugar in the meat juice and one of the saccharolytic group should be used instead.

I desire to extend my appreciation and most sincere thanks to Dr. Samuel G. Dixon, commissioner of health of Pennsylvania, for his valuable criticisms on this paper; to Dr. Allen J. Smith, professor of pathology, and Dr. John Marshall, professor of chemistry of the University of Pennsylvania, for their personal interest and valuable suggestions, and to Dr. Herbert Fox, chief of the laboratories, for his valuable assistance during the progress of this work.

PSYCHOTHERAPY, WITH SOME OF ITS RESULTS.*

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In the term psychotherapy I include all forms of mental treatment, whether accompanied by hypnosis or without. The hypnotic state is not primarily the result desired, but the receptive condition induced by that state, in order that the curative suggestion given may be accepted without interference from the objective self. Hypnosis of itself without suggestion never accomplished anything, the forceful directions given the patient during the responsive state of hypnosis achieve the results.

There is a great deal of discussion at present as to the relative value of so-called hypnotic treatment and suggestive or psychic treatment without hypnosis, the discussors apparently losing sight of the fact that in all the various methods of mental therapy it is the same underlying principle—suggestion, or a command to the subconscious mind, and acting through the same brain—that produces the desired effect. The modern teaching that we must treat the patient and not the disease only

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must be rigidly applied in mental therapeutics. Therefore, the individual determines, in a great degree, whether the method used is the form of psychic treatment of which Dubois has written so entertainingly, and which he chooses to call "persuasion" rather than suggestion, or whether the analytical method or the state of hypnosis in one of its many phases, is best employed. There are many people who are "persuadable" or "suggestible" in the waking state, and for those it is entirely unnecessary to produce hypnosis, but there are equally as many who are so deeply possessed by their own beliefs and opinions regarding their physical condition, that no amount of persuasion or suggestion during the normal consciousness will affect their autosuggestions. Something depends also on the nature of the trouble for which relief is sought, for there are certain conditions that can not be gotten rid of except under hypnosis.

The induction of the hypnotic condition is valuable in these cases because of the heightened receptivity produced and the passive condition of the patient's autosuggestions, which in the waking state frequently entirely overcome any curative suggestions from the physician.

Very often, however, it is impossible to say whether the patient is in a state of hypnosis or not, the only evidence being the sensation of calmness and well-being following treatment, and the prompt relief of the pain or other symptoms. Obviously, the physician does not experiment with the individual to find out the depth of the sleep; the entire time being occupied by vigorous suggestions toward the relief of his condition.

The patient's evidence is of no value because of the widespread idea that unless amnesia is present he is not affected and, according to European authorities, including Bernheim, Forel and Moll, although 95 per cent. of all people are hypnotizable, only 13 per cent. are amnesic on waking. In my practice only about 10 per cent. of my patients experienced loss of memory, the others all declaring that they heard everything and were conscious of their surroundings, but, as several expressed it, did not care to exert themselves and felt that to do anything was too great an effort.

That the suggestible state, in greater or less degree, is inherent and producible in the majority of people I think admits of no argument. Indeed, the authorities already quoted agree that the physician who can not influence 90 per cent. of his patients is not competent to criticize psychotherapy. While my own percentage does not run quite so high as that, my failures, I am persuaded, have been due to faulty technic or lack of patience on my part. And this, I believe, is the greatest difficulty with many American physicians, who make a spasmodic attempt to use suggestive treatment, meet perhaps at first with indifferent success, and then cast the whole subject aside as valueless. Some have gone so far as to assert that the treatment may be applicable to Europeans, but can not be used successfully with our high-strung, intelligent American people. It is apparent that this statement is made without proof or adequate ground for the opinion.

Where are the physicians in this country of equal standing with those of Europe who have devoted themselves to the practice of hypnotic or psychic treatment and who have any reliable statistics that they can produce? An occasional sporadic case which has been treated by every possible method unsuccessfully before suggestion is tried, as a last resort, and which perhaps

does not show immediate response, is certainly not sufficient evidence on which to base an opinion as to the suggestibility of the American people.

In my experience with suggestive therapy during the past six years, and during the last two, its exclusive practice, I have found that the most intelligent Americans yield more readily to mental treatment than the foreign-born clinic patients.

There is no question, however, but that there is as much variability in the suggestibility of individuals as there is in their varying temperaments and characters. When physicians study the effect of mental conceptions on the body, and apply themselves as earnestly and as enthusiastically with the treatment by mental methods as they do in experimenting with a new drug or serum, they will be in position to state definitely the relative suggestibility of our own countrymen.

My method of treatment is based on that of Bernheim and Leibault, and I follow very much on the plan of Bramwell in that I always give my intelligent patients a preliminary explanation of what I expect, the probable sensations they will experience the first time, and the fact that sleep, as generally understood, is not necessary in order to experience the benefit of the treatment.

There are two distinct types of patients; the one who is afraid he will go to sleep, and the other who is afraid he will not. Both of these have to be met and dealt with accordingly. The former after a few simple explanations usually lose this feeling. The latter class are perhaps a little more difficult because as a rule they have fixed ideas as to the only way in which they can be helped, and if they are not conscious of being asleep and amnesic they will declare that they are not influenced at all, and by their own strong autosuggestion in many cases will counteract the physician's influence.

In a few of these cases, when reason could not be used, I have employed hypnotic drugs for their quieting influence and to heighten the verbal suggestion. In all I have used these drugs about six times, giving either bromid or paraldehyd. The results have been favorable in all the cases except one insomniac patient, and in that case I could neither influence the patient with drugs or without, and apparently made no impression of any kind.

It is not wise to use drug therapy at the same time as suggestive therapy, for the divided attention of the patient seems to weaken the suggestive effect, and for that reason I never combine the two unless it is especially indicated, or is merely the prescribing of a simple tonic, the effect of which I explain to the patient.

Without dealing any further in generalities I wish to present three definite cases drawn from my own practice which illustrate the success that has been obtained by the use of this method of treatment. In presenting these cases I desire to direct attention to the fact that all possible physical means of treatment had been tried over a long period of time without results.

It is often stated by the opponents of psychotherapy that "other means" will relieve the condition, and, therefore, there is no need to resort to this method. But the facts are that hypnotic and psychic treatment have made their way only through the failure of the "other means." Even now there are few physicians practicing psychic therapy whose patients have not exhausted every method known to the pharmacopeia and often surgery besides, before coming to them.

I have no desire to thrust forward any claim for sug-

gestive therapy being a panacea or specific for even all functional diseases or all so-called incurables, but merely to call attention to the fact that many obscure conditions and functional diseases are cured by this means, and no physician has done his whole duty by his patients who allows them to drift out of his influence and often into the hands of self-styled "healers" of various cults, without having recourse to psychic therapy in competent medical hands.

CASE 1.—Psychasthenia of strongly obsessive type. This patient first consulted a prominent New York neurologist a year previous to coming under my observation. Some months later he was seen by Dr. Charles L. Dana, examined by him, and kept under his care for a time. Dr. Dana then referred him to me with the above diagnosis. He consulted me on Nov. 28, 1906. The history is as follows:

Patient.—Male, aged 28, college graduate, analytical chemist by profession, had never had any physical illness except a catarrhal condition of the middle ear resulting in slight deafness six years previous.

Family History.—No alcoholism or insanity. Father is a well-balanced, intellectual man, free from any nervous trouble. Mother has had slight headaches and occasional fits of depression. There are four brothers and one sister in the family. Of the brothers, three of them are suffering from nervous breakdown.

Personal History.—The condition of my patient can best be briefly described by giving his own analysis of himself, written to me just before he presented himself for treatment:

"A young man at 28 finds himself a prey to his morbid feelings and emotions. Is unable to concentrate his thoughts on anything except himself and his incompetency. The most trivial act, such as posting a letter or dressing himself, is a great effort and is thought over and dreaded before he can force himself to perform it.

"He is still working, but knows he can not continue much longer, and is in constant fear of losing his position. Has no ideals or normal emotions. Would not care if his mother died to-night. Would forget it the next day. Is absolutely selfish and self-absorbed. Is oversensitive and self-conscious, a slight deafness accentuating this natural tendency. When compelled to go among people is in agony and imagines every one is criticising and noticing him.

"Has no bad habits or sexual perversions as yet, but is constantly haunted by the dread of them and feels that he can not resist much longer. His will is weak and he cares nothing for others' most sacred feelings. He is wretched himself and a detriment to others, and ought to be put out of the way, but is too weak morally to do it himself, although suicide is a constant thought. This condition has gone on for years, ever since leaving college, constantly increasing in severity until the present time, when he feels that insanity is the logical outcome, if not already present."

Examination.—This young man presented himself at my office three days after writing this letter. He was in a tense, highly nervous state, very depressed and hopeless over himself. The neurologic examination showed nothing abnormal except slightly exaggerated deep reflexes. He was insistent over the necessity of being placed absolutely under hypnosis. He was convinced that Dubois' psychic treatment, of which he had read, would be of no use to him, and was in the greatest fear that he could not be put to sleep.

Treatment.—Owing to his agitation and intense anxiety I was very doubtful of being able to induce the hypnotic condition, and realizing that the failure to do so at this first attempt would probably deepen his fear and increase the difficulty, I gave him 30 grains of paraldehyd just prior to commencing hypnotic suggestion. He passed into a perfectly quiet restful state, was able to respond to my questions, but was entirely passive unless forced to answer. He was given vigorous suggestions for over half an hour, was left in this condition for about two and one-half hours, and then awakened. He expressed himself as feeling calmed and refreshed. On all subsequent visits the drug was omitted, but he was quite sug-

gestible and slept quietly for over two hours each time. This treatment was continued three times a week for the first month, then twice a week for the next month. After that he came irregularly, when he felt the need. This resulted in about three visits in the third month.

Result.—At the end of the second month he told me that he was able to concentrate his mind on his work, and it had never been so satisfactory before; that he was now able to control his thoughts, and that his different attitude and appearance had been commented on by many of his friends. I saw him once during the summer and he stated that he was entirely free from morbid thoughts and felt perfectly normal for the first time in years. He is now engaged to be married and is leading a perfectly normal life.

CASE 2.—Idiopathic insomnia.

Patient.—R. E., male, aged 37, writer by profession, consulted me Jan. 6, 1907. Family history was negative.

Personal History.—He gave a history of sleeplessness dating back seven years. He had never had any trouble of this kind until he occupied a position as night editor of a daily paper. During this period his heaviest work occurred between 2 and 5 o'clock in the morning. He was a poor sleeper during the day, and finally gave up the position on account of this inability to sleep soundly during the day and because of his nervous, exhausted state. He found, however, that he could no longer sleep at night, although he would occasionally fall asleep on first retiring, but never slept more than an hour and then remained awake until after 4, when he would obtain another short sleep until 6 o'clock, at which time his business necessitated his rising. He commenced to take various hypnotic drugs, and had run through the usual list; he was on veronal when I saw him and was taking 20 grains about every third night.

Examination.—In appearance this man was very pale, thin and anemic. He had dark heavy circles under his eyes and looked strained and worn and was mentally despondent and depressed. The physical examination revealed nothing abnormal. He was greatly troubled with severe constipation, which had been present many years, and every day took an enema or a laxative drug.

Treatment.—This patient, on beginning treatment, was instructed to cease taking laxatives, because, as a rule, the restoration of the normal bowel function is most easily affected by suggestion, and the confidence of the patient is gained if he can see some immediate result of the mental therapy. He was treated three times a week for four weeks, but at no time was he deeply asleep and none of the phenomena of hypnosis was present, although sleep suggestion was always given. The suggestions were directed not only toward the relief of the insomnia, but also for constipation.

Result.—He commenced at once to have a normal daily movement of the bowels. The first night after suggestion had been given he slept for seven hours, the second night for five. He also slept well the night of the second visit, but the following night was a poor one. After the third treatment he again had two good nights, only waking once or twice and going to sleep again. During all this time he was entirely without drugs. During the balance of the month he had three poor nights. The rest of the time he was sleeping normally. His constipation was entirely relieved. He reported to me five weeks after his discharge that he had thirty consecutive nights normal sleep. I have since heard from him and he has remained entirely free from his old trouble.

CASE 3.—Spasmodic stricture of the esophagus.

Patient.—F. B., male, aged 32, an electrician, consulted me March 16, 1906. Family history was negative.

Personal History.—Previous to his illness he had been a bicycle pacemaker for three years. He had always been well up to time of onset of present illness, which occurred when he was 20 years old. The attack was sudden. He had been feeling nervous and exhausted for two or three days. The spasm of pharynx and esophagus occurred first while attempting to eat a piece of bread and was accompanied by regurgitation and vomiting and by a sensation of violent choking. These attacks occurred whenever he attempted to eat solid food, and he went to the Massachusetts General Hospital for several

weeks. He left there without benefit and drifted from place to place for some years. The condition persisted and grew worse so that the attacks came without the provocation of solid food and he now lived entirely on liquids. In the hospital at Rochester, where he spent several weeks, the relaxation and contraction of the muscles produced a rhythmical sound like the ticking of a watch, so that he was nicknamed the human Waterbury watch. From Rochester he returned to New York City and spent the last five years here, during which time he has visited most of the clinics and is known to many physicians.

For many years he carried with him a rubber catheter which he has been in the habit of pushing down the esophagus to relieve the contraction sufficiently to permit the outflow of the contents of the stomach when the spasm would be relaxed. The patient is unable to lie down to sleep at night, the lying posture inducing an attack, and for a year and a half the only sleep he has obtained has been while sitting in a chair.

Examination.—This patient was referred to me in March, 1906, by a physician to whom he had gone for relief during one of the severer attacks. At that time he presented all the appearances of malnutrition and loss of nervous control. He was emaciated—weight, 120 pounds—there was trembling in his limbs, and he alternately wept and smiled in a meaningless way.

He had a rapid pulse and seemed constantly in the act of swallowing. There was clonic contraction of the pharyngeal and laryngeal muscles which threw the thyroid cartilages forward into great prominence. The muscles on each side of the neck were tense and stood out markedly. Examination of the nervous system was negative except for exaggerated reflexes. No sensory disturbances were present and the cranial nerves were normal.

Description of Attack.—During an attack the spasm commenced in the pharynx and descended down the esophagus until the stomach was reached when a violent contraction of the upper abdominal muscles took place, forcing the contents of the stomach upward. Occasionally the stomach contents would be forced through the pharyngeal stricture, but usually the catheter was used by the patient to force an opening. When the spasm was induced by attempting to swallow a solid, the bit of food was grasped firmly by the muscles and held so that without recourse to mechanical means the irritating substance could neither be forced down nor brought back and the catheter was again used for this purpose.

Treatment and Result.—From the history and appearance and absence of symptoms of organic disease I made a diagnosis of esophagismus, and proceeded to treat him by suggestion during hypnosis. His report after the first treatment was that he had gone from my office and eaten heartily of eggs and toast and that he experienced no contraction or difficulty in swallowing. He had gone to bed that night, slept soundly and was feeling much better. The second treatment was given four days later with an equally favorable report. In all he had at this time five sittings covering a period of three weeks. In this time he had a return of the attacks on three different occasions. His sleep had become normal, however, and he was eating regularly solid food.

At this time I lost sight of him for a period of seven weeks, when he returned with the report that the spasms had returned during the last two weeks, although not so severely as formerly. He had been living a very irregular life, working all night and sleeping in the day. This time I treated him on the same lines, but treated him every day for the first week and twice during the second week. At the end of that time he was feeling entirely well again and eating regularly without difficulty.

He disappeared once more, but I received a note from him two months later, stating that he had no further trouble and was well. I did not hear from him again until a few weeks ago, when he called at my office with the report that he had been entirely well ever since and could eat anything he chose without any recurrence of the spasm. His voice had deepened and his weight had increased to 139 pounds.

THE TREATMENT OF TYPHOID FEVER.

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With the possible exception of tuberculosis, there is probably no disease which has been more widely discussed than typhoid fever. The discovery of its cause and modes of distribution, placing it in the list of preventable diseases, furnishes one of the most fascinating chapters in the history of medicine. The pathologic changes found are probably more widely known by the profession and the laity than those of any other disease, but there is still a great difference of opinion as to its treatment.

What are the indications for treatment? Rest for an inflamed or ulcerated tissue is a law in surgery. It applies as well to an inflamed or ulcerated tissue due to the specific poison of typhoid fever as it does to an ulcer of the stomach. The mere fact that the treatment is in the sphere of internal medicine does not justify the physician in ignoring surgical principles.

FOOD AND DIET.

Inflammation and ulceration mean deranged functional activity or its total abolition. Under these conditions frequent feeding is as illogical as it would be in acute gastritis or in ulcer of the stomach. To feed an adult in health every two hours from three to five weeks would impair the digestion of almost any one. To insist on it in typhoid, in the presence of an already impaired digestive process, with the bowel in a condition ranging from catarrhal inflammation to ulceration seems like setting at defiance surgery's first law.

The rapid emaciation in this disease is not due to lack of food, but to failure to digest and assimilate that which is taken. Lack of appetite and diarrhea are Nature's protest against its presence, her appeal that the doctor give the parts rest. When the most easily digested food fails, wholly or in part, of digestion, the fearfully and wonderfully constructed diet lists worked out by some leaders in the profession are not only an insult to the diseased bowel, but to the intelligence of the profession.

It has been urged that the diet should possess sufficient caloric value to compensate for the loss of weight due to the fever, a theory which ignores the fact that the area of food absorption is the very part affected by the typhoid process. An increase in the amount of food taken in typhoid fever no more insures the utilization of its caloric value than would the forced stoking of a defective furnace insure the utilization of the caloric value of the fuel used. Howell says: "It is not what we eat, but what we digest and absorb that is nutritious to the body."

In typhoid fever the ability to digest and absorb food should be our guide, not the amount of tissue waste. We should get rid of the debris before beginning to rebuild. An increased amount of food over that possible to assimilate adds fuel to the fire, and is much like attempting to place a new roof on a house while it is still burning. Is it not reasonable to believe that an excess of food may defeat the object for which it is given? It furnishes much more culture field for the growth of other bacteria in the bowel, increased fermentation, still greater disturbance of function and a decreased absorption.