"Very careful records were kept of every patient upon whom we made the tests. I still have the feeling that ether of superior quality to anything now in the market may be produced by using chemically pure materials to start with. If I could have a sufficient supply to carry me through a year of surgical work, which would aggregate between two and three hundred anesthetizations, I think I could draw conclusions which would be of some value."

It is interesting to note the specific gravity accepted as correct for absolute ether at 25 degrees C. by different authorities:

Dumas and Boullay, 0.70737; Sassure and Thenard, 0.70987; Gay Lussac, 0.71190; Kopp, 0.7084; Watt and Wurtz, 0.70891; Mendeljiff, 0.70826; Allen, 0.71000; Roscoe and Schorlemmer, 0.70750; Dr. E. R. Squibb, 0.70842.

MODERN METHODS OF TREATMENT OF TYPHOID FEVER CRITICALLY RE- VIEWED, WITH SUGGESTIONS FOR A RATIONAL THERAPEUSIS.

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Motto: Im Erkennen und Heilen der Krankheiten liegt die Aufgabe der Medicin. Das Erkennen allein ist Wissenschaft; das Heilen war bisher Empirie und wird es noch lange bleiben.—*Hyrtl.*

There is hardly any other disease to which the above, written by the immortal Austrian anatomist, could be better applied than to typhoid fever. The dignity, the value of all scientific work and research, lies in the recognition of this malady and its pathology—not in its therapeutics. The more there is written to enlighten the profession in that respect, the better for us. The devising of new formulæ or new methods of treatment can never add much to the reputation of the prospective discoverer (?) Typhoid fever patients have recovered without any treatment whatever; others have died, and probably will die, under the most rational and scientific therapeutics.

Infallible methods exist only in the minds of their promoters and advocates. The number of methods, sub-methods and modifications is as large as that of bivalve vaginal specula which are baptized after their modifiers, the modification often consisting only in the different shape of an unimportant screw or handle. In this article only those methods will be considered which have acquired some popularity, or which have really a scientific value.

A priori, typhoid fever does not always appear as that dreadful constitutional disease described in textbooks; there are light forms of short duration. Individuals of regular habits will offer a good deal of resistance, the fight between the disease and the system being even, while others, especially alcoholic drinkers or those with prostrated or affected nervous systems, will succumb immediately. Again, the age, the previous history and the present status of the patient, all need to be considered, and will indicate the course of treatment that should be pursued. We should not treat diseases the same way the cook prepares a certain soup, after a receipt; we claim to be scientific physicians, and as such will have to use our own judgment in each individual case. A specific for typhoid fever has not been discovered as yet. However, we have made of late some advance in the knowledge of the treatment, and can truly assert that our methods

of to-day, if properly applied, are more scientific and more effective than the symptomatic treatment of ten or fifteen years ago.

We will first of all consider the treatment of typhoid fever with water.

Balneo- and Hydro-therapy.—This system, especially when carried out in the rigid manner advocated by Brand, who gave it to the profession, influences the entire course of the disease, reducing the mortality to a minimum, preventing complications (especially affections of the respiratory tract), and now stands ahead of all other therapeutic measures. Hydro-, especially balneo-therapy, has its opponents, one of the objections being that cold bathing is cruel, and can hardly be carried out in private practice. There is much truth in the criticism, and many general practitioners have often been compelled to let patients die from hyperpyrexia, owing to their prejudice or poverty. If the full cold baths be objected to, we can immerse the patient in lukewarm water and let the water gradually cool. Dr. L. E. Maire,¹ of this city, when a general practitioner, obtained good results from full baths with hot water. Where the procedure can not be carried out, the wet pack will prove of great help, although it is not as efficient as the full bath. But in no case of typhoid fever, should regular sponging of the body be neglected. I use in my practice a 10 to 20 per cent. aqueous solution of alcohol. Balneo-therapy will not only reduce the temperature but influence the entire nervous system. Strümpell² is right when he asserts that under balneo-therapeutic measures the grave "status typhosus" is much rarer than otherwise.

The details of bathing can not be given here; in fact, the condition of the patient and his surroundings will dictate to what extent and degree this method of treatment should be employed. In mild cases sponging of the whole body is sufficient.

The Abortive Treatment.—The theory that typhoid fever can be aborted is not of recent date. Wunderlich² believes that if at the onset of the disease a few large doses of calomel were administered, the disease could be aborted. His assertions, however, are very conservative, and he is not so sure of being able to abort *every* case as some modern writers are. *A priori*, typhoid fever aborts spontaneously in some cases, without any interference whatever. The so-called typhus levissimus runs a mild and short course. If such a case came under the care of the authors referred to, they would surely attribute the short course of the disease to the drugs they have "fired" into the stomach of their patient. When reviewing the statistics of their reports, this should always be borne in mind.

Dr. Aulde, of Philadelphia, editor of the *American Therapist*, asserts that he can abort typhoid fever with arsenite of copper. His paper was read only in part at the last meeting of the Mississippi Valley Medical Association. The writer has no experience with this drug. Dr. Aulde's assertions have not been verified by competent authorities in medical literature.

Dr. Woodbridge, of Youngstown, Ohio, has proclaimed himself a pioneer of the jugulant treatment of typhoid fever, and states that if he sees a case early he can undoubtedly abort it, and that death is a wholly unnecessary consequence, for which the physician is to be blamed. It is natural that such assertions must cause some excitement, although at the above mentioned meeting, his theories were received

by a large body of eminent physicians with disbelief and skepticism. He calls his system after his own name. It consists of tablets and soft elastic capsules containing small doses of calomel, thymol, menthol, guaiacol, podophyllin and eucalyptol, of which he administers one every fifteen minutes.

What is more startling is that he allows his patients to eat what they please and to attend to their business affairs while sick! His tablets and capsules are put up and sold by Messrs. Parke, Davis & Co., of Detroit, who send reprints of his various articles to every physician free of charge and distribute them "*en masse*" among students of medical colleges. Dr. Woodbridge could never have gained so much popularity, had it not been for the action taken by Messrs. Parke, Davis & Co., and it is for this reason that I beg the reader's pardon for dwelling somewhat at length on his treatment. It is well for every one to send for his pamphlet, so as to verify the following criticisms:

Dr. Woodbridge is not the first one who has claimed that typhoid fever could be aborted. His formulæ are nothing but a combination of antiseptics and aperients which have been used singly for years by different physicians; the combination forms no new chemical. It is nothing but a "shot-gun" prescription. Similar preparations are already on the market, the well-known antiseptics sold under the trade names listerin, borin, pasteurin, euthymol, etc. He is not original. If Dr. Woodbridge expects us to accept his statistics, he must first prove to be a man who adheres to facts even in little things. He states in his publication that the discussion, which took place after his paper was read at the Mississippi Valley Medical Association, Sept. 4, 1895, lasted three hours; while in fact, including my own criticism, which was also the concluding remarks for my own paper, the discussion lasted thirty-five minutes only.

As regards the value of the formulæ, as intestinal antiseptic treatment, I fully appreciate them. There is nothing bad about them, unless it be that it is very unwise to prescribe his ingredients in tablet form, owing to the pungent taste and the volatility of some ingredients. All his formulæ ought to be put up in soft elastic capsules. To bother a typhoid fever patient every fifteen minutes, is an outrage. Why not give usual doses every three or four hours? The effect is the same. But Dr. Woodbridge regards rest as unnecessary. I trust that no sane physician, for the sake of his patients and his own reputation, will accept this theory of the uselessness of rest and dietetic restriction.

Dr. Woodbridge points with pride to the reports sent him by other physicians. Without casting any reflections on the standing of the reporters, I will merely say that, considered carefully, the reports are inexact, unreliable and far from satisfying the scientific reader.

In most cases we are compelled to accept their statement that they treated cases of typhoid fever. If my criticism has been harsh, I will cite two of the reports which will amuse us:

One physician reports a case in which he observed the usual prodromes. Highest temperature 103.4 degrees; no delirium, no eruption; cure in seven days! *O tempora, O mores!* Another physician reports a case of two weeks' standing, after which he was called in. He gave one tablet and the patient improved immediately after the first dose. It must be borne in mind that the second dose had to be administered

fifteen minutes after the first one. The abortive treatment as such is valueless; the title antiseptic treatment, however, is justified.

Antiseptic Treatment.—According to modern views, typhoid fever is considered a microbial disease, caused probably by Eberth's bacillus typhosus. Most of these germs gain entrance into the human system, multiply in suitable soil and develop toxins, causing a general infection of the entire system.

By internal administration of antiseptics and chemicals the action of the germs is neutralized, their powers of multiplication and toxin production destroyed, thus giving the system an opportunity to eliminate the noxious toxins already produced. Pathology teaches that typhoid fever, as far as local lesions are concerned, is principally an intestinal affection, hence intestinal antiseptics are indicated. Bouchard⁶ urges us to employ general as well as intestinal antiseptics.

This at best is theory only. The writer has practiced, and intends to practice, antiseptic therapeutics in affections now generally accepted as of microbial origin. But he frankly admits that he does so, not from blind belief in the correctness of the above quoted theory, but because it is the duty of every physician to leave nothing undone that might save the lives of his patients or prove of benefit to their sufferings, as no harm can follow from a judicious administration of antiseptics.

Trouessart³ complains that antiseptics has not received general acceptance in internal medicine, while it is indispensable in all surgical procedures. That was so two or three years ago. To-day, chemic antiseptics is entirely discarded by modern surgeons. Even in septic wounds the antiseptic measures taken are not those formerly used. Modern surgeons state that wounds ought to be treated "aseptically." This is not the proper term.⁴ Modern antiseptics in surgery does not consist of the employment of strong and toxic chemicals, but mild measures are used, such as sterilization, normal salt solution, peroxid of hydrogen, etc. The reason for this change is that carbolic acid, mercury, etc., in solutions usually employed, have been found to have very little influence on the microbes, and that wounds, even of a septic character, heal just as rapidly and just as nicely under a less rigorous antiseptics. If such is the case in surgery, the present fad for killing the germs through general counter-intoxication, will have to give place to a less serious medication.

In looking over the list of antiseptics one is impressed with the large number. Almost every drug, beginning with ordinary household coffee (in infusion) and ending with a saline cathartic has been found to be a direct or indirect antiseptic. And now the old-fashioned treatment of malaria with quinin, rheumatism with salicylates, and syphilis with mercury, has been found to be nothing but the antiseptic treatment of those affections. What is in a name? And now modern surgery has taught us that salicylate of soda has but a slight antiseptic power! If the typhoid fever bacillus is so easily neutralized by guaiacol carbonate, that Dr. Woodbridge, or others, have succeeded in bringing typhoid fever patients to an almost normal state, as far as the symptoms of a general intoxication are concerned, in twenty-four hours, why, I ask, does the same drug not kill the malaria organism or the as yet undiscovered and unbaptized but sure to exist bacillus rheumaticus?

That it does not I can testify from clinical experience. In several cases of malaria, for a few days, various antiseptics (guaiacol carbonate, carbolic acid, calomel, iodine) were tried with no effect. A hypodermic injection of the arsenite of quinin was sufficient to stop the chills.

In acute inflammatory rheumatism the salicylate of sodium, in spite of the fact that it has but slight, if any, antiseptic power, has proven of greater benefit than any of the above-mentioned antiseptics. Is rheumatism after all then a non-microbial disease? Colchicin has proven to have no antiseptic power whatever, and still one must be astonished to read in French literature the results obtained from its use in various rheumatic affections.

I have a large number of cases of chronic rheumatism, deforming and non-deforming under my care, and the administration of general antiseptics has produced no marked results within four weeks. Generally in private practice I can control chronic rheumatism with large doses of natrium salicylicum in about ten days.

If microbes are the cause of disease and they are destroyed by antiseptics, then consumption will soon be as much a curable disease as typhoid fever.

When such an eminent man as Osler, with his unusually large opportunities for observation in one of the largest hospitals in the world, testifies to the inefficiency of the antiseptic treatment of typhoid fever I must defer further discussions of "cause and treatment of microbial diseases" until further experiments can be carried out. It is to become my life study henceforth. The statement of the eminent Chicago surgeon, Nicholas Senn, at the last meeting of the AMERICAN MEDICAL ASSOCIATION that antiseptics fail when we mostly expect them to do the work, ought to have awakened the dormant thinking energy of many an intelligent practitioner.

It has been said that the antiseptic treatment influences considerably the typhoid fever curve. Most of the antiseptics are antipyretics and vice versa, and the fever could probably be controlled just as well by the continuous administration of small doses of quinin or acetanilid, which antipyretics have but slight depressing action on the heart. That the fever curve is considerably lowered by a systematic treatment with water is well known.

The hygienic and dietetic treatment of typhoid fever forms an essential part of the general management of such cases. It would be too much risk, however, to abandon all other means of treatment and to rely solely on the dietetic, as has been advocated by some believers in the *vis medicatrix nature*. In mild cases it may be sufficient, but who can tell whether a given case is to remain as mild as it appears in the beginning? *Non medicamentis sed medica mentis* is a very good sophism, but I fail to see why it should be the motto solely of doctors, "à la Kneipp." It ought to be, and in fact is, the motto of every drug practitioner. As regards hygienic treatment it can be framed in four words: Rest, a good bed, ventilation and an intelligent nurse. The diet of typhoid fever should be light, liquid and nutritious. Meat, ordinary bread and raw fruits, especially apples and pears are to be strictly prohibited.

The patient should drink cold, fresh water freely. I allow my patients from ten to twenty glasses *pro die* and would give them more if they so desired. The water can be acidulated with hydrochloric acid,

lemon or peroxid of hydrogen (or hydrozone) alternately. Alcohol should be given early. I am surprised that most of the latest writers restrict its use to cases where direct stimulation only is indicated, as it is a medicine and food at the same time.

The key note of the dietetic treatment is nutrition. For more than a century plain cow's milk has been used. But plain cow's milk has many disadvantages, deranging the digestion and necessitating repeated macroscopic and microscopic examinations of the stools. These objections can be overcome by the addition of Mellin's food. This food, although hardly needing any further recommendation, has proven to me of incalculable benefit not only in typhoid fever but in a great many other acute and chronic affections of the gastro-intestinal tract. The effects this preparation has on milk can be summed up as follows:

1. Owing to its alkalinity it acts chemically upon the casein of the milk, converting it into soluble albuminates.

2. The dextrin present is a powerful peptogen and greatly increases the secretion of pepsin from the stomach glands, by its physiologic action.

3. Clinical observation as well as chemic experiments have proven beyond doubt that if the food be added to cow's milk it is rendered more easy of digestion and more nutritious.

4. If necessary Mellin's food can be given with water instead of milk, with similar results.

Light soups, preparations of beef juices, beer and coffee, can be given in small doses.

Suggestions for a Rational Treatment.—After considering the former methods together with my own experience, I think I can propose a treatment, that although far from being infallible, will recommend itself to the thinking physician, as one that promises the most satisfactory results.

I divide the disease, for practical purposes into three stages: 1, the time when owing to certain symptoms and phenomena, the disease can be suspected only; 2, the time from the definite diagnosis of typhoid fever until convalescence; 3, convalescence plus two weeks.

The treatment as long as the disease is only suspected, consists of attending to the symptoms as they appear. To produce diuresis, diaphoresis and catharsis is the most rational procedure.

But as soon as a diagnosis of typhoid fever is made, all energy should be awakened.

Hygienic and hydro-therapeutic treatment must be outlined for the entire course of the disease and systematically commenced at once.

No matter what the condition of the bowels, the first two days, the following prescription is given.

R. Calomel	gr. iii	18
Salolis	3ss.	16

Misce. F. pulv. No. vi. Sig.: One powder three times a day.

Then I commence with tonics, calculated not only to support vitality but to sustain the heart. Digitalis, strychnin, nitroglycerin are prescribed in suitable doses, and proper excipients administered at regular intervals. (Stearn's essence of pepsin is what I prefer.) For this reason I commence early with the administration of alcohol. French brandy (cognac) port or sherry wine are suitable. Recently I have obtained good results from the wine of fresh (undried) kola nuts, "kolavin-Stearns," which is not only a good tonic but a brain stimulant.

But one of the drugs on which I place much dependence is the peroxid of hydrogen. Care should be taken to obtain the strongest and best brand, as most of them sold in this country are poor imitations of even what the Pharmacopeia prescribes and that is weak enough. Hydrozone, as prepared by the New York chemist, Charles Marchand, is at this date recognized as the best in every respect being a 30 volume solution. It is best administered in teaspoonful doses (to be measured with a glass spoon only) in the water used as drink three or four times a day. I also add some hydrozone to the water used for washing the colon. The effects of hydrozone when administered in typhoid fever are these:

1. It oxygenates the blood, thus keeping the brains in activity. It is a brain tonic. If hydrozone be given properly all cerebral disturbances, delirium, that state of semi-unconsciousness which most of our patients pass through will be a "rara avis."
2. It improves digestion and checks abnormal fermentation.
3. It stimulates exertion.
4. Mechanically it cleanses the bowels, allays the hyperemia, prevents ulceration, and assists in "disinfecting" the contents of the gastro-intestinal tract.
5. It is as powerful an antiseptic as creosote and carbolic acid without possessing any of their disadvantages.

A useful procedure is irrigation of the colon, which should be practiced twice daily in cases of typhoid fever. It matters little whether the fluid passes beyond the ileo-cecal valve or not, for either through reflex action or through the aseptic state of the rec-

tum, the state of the bowels is greatly improved by the irrigation throughout the disease. It produces a natural catharsis. Only when an emaciating diarrhea exists (a case I never observed) I would substitute sugar of lead and opium and then would not irrigate but inject the fluid as a simple clysm. A stiff rectal rubber tube attached to a fountain syringe is the best means for irrigation. Soft rubber is not to be used as it lodges in the mucous folds of the rectal wall and bends over.

A metal sigmoid flexure irrigator has been devised by Dr. Cole. It is manufactured by Messrs. Halsey Bros. of Chicago, to whom I am indebted for the accompanying cut, which represents about one-third the actual size. On my suggestion they now manufacture smaller nozzles for children, which can be easily screwed on the instrument. This instrument has proved of great use in my hands, as it can be easily introduced into the sigmoid.

This treatment is routine in my practice. Depending on circumstances it is altered in minor points. Special symptoms call for special medication. This article is an incomplete pen sketch rather than a treatise on the treatment of typhoid fever. It is intended to cause the general practitioner to think, not to copy formulæ.

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TREATMENT OF TYPHOID FEVER.

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Before continuing the discussion, on the disinfectant and eliminative treatment of typhoid fever, which was presented in a former paper, we wish to notice some criticisms upon this method read at the last meeting of the AMERICAN MEDICAL ASSOCIATION at Atlanta. The distinguished chairman of the section on general medicine, attacks rather severely, the advocates of the new method, calling them "heretics of the worst possible stamp," because they do not choose to "swim in his puddle with him." Being himself an advocate of hydrotherapy of most enthusiastic stamp, he takes issue with all those who differ from him, and triumphantly declares it "impossible to disinfect 25 feet of intestinal canal, with such remedies as Woodbridge recommends." He may find before getting through with the discussion of this important subject that there are "more things in heaven and earth than are dreamt of in his philosophy"; also that there are more than "two grains of wheat in his two bushels of chaff." His late work on the Practice of Medicine, lies on the table before us, and we venture the assertion that he will not spoil the next edition of his "jewel" by omitting a full description of the new method of treating typhoid fever. He may not then regard the papers which have hitherto appeared in the JOURNAL of the ASSOCIATION on the subject, as a "heterogeneous jumble, entirely unworthy

of the best traditions of the profession, and of a subject connected with the names of Bartlett, Gerhard, Jackson and Flint." He might have added also the name of George B. Wood, who first called attention to the value of oil of turpentine in this disease. We had the pleasure of listening to the clinic lectures of both Gerhard and Wood on typhoid fever, and believe that were they with us to-day, they would be found in the front ranks of antiseptic medicine. The latter had discovered an intravascular disinfectant of great value, without being able to explain its "modus operandi."

We agree with Dr. Osler that "all wisdom is not found in the professorial corps" and that "a good thing may come out of Nazareth." Professor Quine from the chair of the section on the Practice of Medicine, was more considerate of the new method and reports "twenty-one consecutive cases, covering his private practice during the last two years," and which were treated antiseptically. Under the same treatment, he gives an account of 275 cases and 6 deaths; a mortality rate of 2.2 per cent. He does not claim however that "the Woodbridge method was employed in one of them." The plan of treatment followed consisted in a general way of purgatives to the extent of from two to six evacuations daily. The antiseptics used were a mixture of guaiacol carbonate, thymol, menthol and eucalyptol—but not the Woodbridge formulæ. He declares: "Although no death occurred, the results, especially in the direction of aborting the malady, albeit, not discouraging to one who had not expected much, were less brilliant than those recorded by our friend from Ohio."