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Original Communications.

BACTERIOLOGY OF CHOLERA AND METHODS OF DISINFECTION.

BY GEORGE M. STERNBERG, M.D.,

Deputy Surgeon-General U.S. Army.

As I understand it, I am expected to say something to you about the etiology of cholera, and about its disinfection. Of course, it is not necessary to describe the "comma bacillus" of Koch; you are all familiar with it. I may say, however, that at the present time bacteriologists over all the world are pretty thoroughly convinced that this is the special etiological agent in cholera. Koch at first met with many opponents, who claimed to have found micro-organisms under different circumstances which were identical, but these claims were not proven. The comma bacillus found in the mouth by Lewis proved not to be in any way identical, and numerous observers have made cultures from the salivary secretions of man, but no one has ever cultivated from the mouth of man a spirillum which liquefies albumen like that of Koch. In reference to comma bacilli in the intestines and their presence in other diseases, numerous bacteriological studies which have been made of the fæces of persons in health and persons with various diseases have utterly failed to demonstrate the presence of

anything corresponding to Koch's comma bacillus, or, as we now call it, the spirillum of Asiatic cholera. I myself have made very extended bacteriological researches in yellow fever, having collected fæces from the intestines of cadavers, forty in number, and the discharges from a large number of patients during the epidemic at Decatur, Ala. I have also made comparative experiments with discharges from healthy persons in a large number of cases, and I have never encountered anything which corresponded with Koch's comma bacillus. But, on the other hand, all competent bacteriologists who have made researches at the proper time and in the proper way have, in cholera, been able to demonstrate the presence of that particular micro-organism. I have not heard the results of the researches now being made at Quarantine Station, but we cannot doubt it will be found there.

As to the biological characteristics of this micro-organism, I think I will save time by referring to some of the proof-sheets of my work, which is now being put in type. This spirillum grows readily in the presence of oxygen, and also in the absence of oxygen, as it must do to thrive in the intestines. I shall not stop to dwell upon its characteristics in culture media, but I will say that it does not form spores, and consequently is very easily destroyed. Indeed, it is one of the most easily destroyed of all the pathogenic organisms known. It grows readily in a variety of organic media. Milk is a very favorable medium, but it does not grow in acid media. A slightly alkaline medium is most favorable for its growth. It grows very readily in bouillon which is diluted with eight or ten parts of water, and it also multiplies to some extent in sterilized river or well water. Experience shows that there is sufficient organic pabulum in ordinary river or well water for the multiplication of this particular micro-organism. In water which is rich in organic pabulum, and consequently contains numerous other common organisms, it dies out, as these take the precedence; so it would apparently multiply more rapidly in water not containing a large amount of organic material than it would in sewage. Koch found in his earliest investigation that this spirillum grows readily on moist linen, or the soiled clothing of patients. In experiments made by Bolton in 1886, he found that it multiplied in distilled water to which bouillon was added in the proportion of fifteen to twenty-five parts in the thousand. The thermal death point of the cholera spirillum I fixed myself some years ago at 52° Centigrade, which is 125.6° Fahrenheit. Kitasato has since made experiments and places it a little higher, at 55° C. There seems to be a difference in cultures in different media, but ten minutes' exposure to 55° C. will suffice. Sixty degrees C. is a good figure, remember—that is, 140° F.—and ten minutes' exposure to this temperature may be relied upon for the destruction of this spirillum; so if your milk or water has been heated up

to that point you are safe. In giving our directions to the public, we usually say, boil your water for half an hour.

Another very important point about these particular micro-organisms is the fact that they are so quickly destroyed by desiccation. Koch found in his early experiments that a few hours' exposure in dry air when the culture was spread upon a glass cover were sufficient to kill it. Since that Kitasato has taken up the subject, and has found that it may live for a longer time if the stratum has some thickness. If you have a very thin film upon your cover-glass, the spirilla die very quickly when simply dried in the air. If the thicker layer is used, they may live for a longer time. Under certain circumstances, when he had a thick film from an agar culture, Kitasato found that they lived even as long as thirteen days, but ordinarily they only survived desiccation from a few hours to twenty-four hours.

Now, therefore, in regard to articles coming from abroad that have been ten days or more on the steamer—merchandise, mails, etc., I can hardly understand how clean merchandise in original packages or mails could become infected. The mails might easily become infected by scarlet fever or smallpox from convalescents. We know very well that something from the surface of the body of such persons might get into letters written by them, and be transmitted in that way, and yet we very rarely hear of that sort of thing happening. We do not attempt to fumigate our mails on account of smallpox, and in case of cholera, where the germ is in the intestine, even if a sick person sat up and wrote a letter, the chances are that the letter would not convey any infection. I therefore think that all this insistence upon disinfecting the mails and merchandise is going a little too far in that direction, especially as we know the biological characters of this particular micro-organism, and know that it is quickly killed by desiccation.

In regard to the value of various disinfecting agents, innumerable experiments have been made in this country and in Europe by competent observers. In a culture in bouillon, twenty-four hours old, experiments made in Koch's laboratory show that it is killed by hydrochloric acid, 1-1300; sulphuric acid, 1-1000; methyl violet, 1-1000; carbolic acid, 1-400. These experiments were made, however, under different conditions from those which would obtain in practical disinfection. For practical purposes the experiments made by Bolton for the Committee on Disinfectants, under my direction, several years ago, are more reliable. In Bolton's experiments the spirilla were killed in two hours by mercuric chloride, 1-10,000; sulphate of copper, 1-500; and carbolic acid, 1-200; and one per cent. solution of carbolic acid will destroy the spirillum with great certainty in such cultures in two hours.

The methods of obtaining and testing the presence of the cholera spir-

illum in suspected rejecta I will not dwell upon now; but I want to call your attention to the measures recommended by the International Sanitary Conference, which assembled in Rome in 1885. When cholera last prevailed in Southern Europe, the Italian Government invited the countries of Europe and America to send delegates, supposed to be experts in sanitary matters, to an international conference, for the purpose of considering measures of prophylaxis against cholera. The conference met in Rome on the 23rd May, 1885, and had daily sessions until the 7th June. A Committee on Disinfection was appointed on my motion. This committee consisted of Dr. Koch, of Berlin; Dr. Sonderegger, of Switzerland; Dr. Hoffman, of Vienna; Dr. Thorne, of England; Dr. Semmola, of Italy; Dr. Proust, of France, and myself; and the report, which was made after very careful consideration, was adopted unanimously by the conference, so that it is the most authoritative report published, although I believe a majority of health officers in the United States are not familiar with it. I made a translation of this report which was published in the *Marine Hospital Report*, volume of 1886. It recommends as a means of disinfection against cholera, besides destruction, steam at 100° Centigrade, carbolic acid, chloride of lime, and aëration. Carbolic acid and chloride of lime were to be used in aqueous solution as follows: carbolic acid, two per cent.; chloride of lime, one per cent. (called the weak solutions); carbolic acid, five per cent.; chloride of lime, four per cent. (called the strong solutions). These means of disinfection were to be applied as follows: For the disinfection of persons, one of the weak solutions should be applied. For the disinfection of clothing, bedding, and similar articles, the direction is given that steam should be passed through the articles for one hour.

Steam and dry heat, as you know, are two very different matters. There has been a great deal of bad practice on this subject. Certain persons, having read that 60° C. kills the spirillum, have taken it for granted that if an oven is heated up to somewhere about 100° C. the cholera spirillum will be certainly destroyed. But Koch's experiments, made upon other similar organisms having about the same resisting power, show that if dry heat is used the temperature must be carried up to 220 or 230° F. Learning that 220 to 230° F. is required, and ignorant of the fact that it was dry heat that was meant, some authorities have directed that steam should be used at that temperature, which gives you a very great pressure and makes it impracticable. As a matter of fact, 100° C., the boiling point of water and temperature of live steam, is all that is required. It must, however, be freely admitted to the chamber in which the articles to be disinfected are placed, and must come in contact with them. If I were in charge of a quarantine establishment and were disinfecting a quantity of things, and

was satisfied that live steam had been in contact with every article thoroughly for five minutes, I would be satisfied that the disinfection was complete—a great deal more so than if a lot of articles were tumbled in together and left for an hour exposed to the action of steam, for in this case some of the articles might not be disinfected at all, as the steam does not penetrate readily into the interior of such a mass. This is an important point in using steam or sulphur dioxide. The International Sanitary Conference directs: "Immersion for twenty-four hours in one of the weak solutions—carbolic acid, two per cent.; chloride of lime, one per cent." I saw the directions of the New York City Board of Health published in the *Times* this morning, and they call for the use of carbolic acid in five per cent. solution, which is good. A circular which I saw a few days ago recommended the use of sulphate of zinc and chloride of sodium, which salts have been proven to be comparatively worthless as disinfectants, but the directions require the use of the solution boiling hot. It is perhaps a good plan to give the people some salt, such as chloride of sodium or sulphate of zinc, to put in the water in which articles to be disinfected are boiled. It might satisfy them better, and the boiling point would be somewhat higher from the adding of the salt. I was surprised that in the same circular sulphate of iron was recommended as a disinfectant for privy vaults and cesspools. It has been demonstrated that sulphate of iron has scarcely any disinfecting value; it is a good deodorant, and a tolerably good antiseptic, but is unreliable as a disinfectant. An agent which is very valuable and very important, and which has not been mentioned in any of the circulars I have seen, is recently-slacked lime. Experiments in Germany with recently-slacked lime show that it is a very potent disinfectant. The cholera spirillum and various micro-organisms in the dejecta of patients are all destroyed by a freshly-prepared milk of lime, and recently-slacked lime thrown into urinary vaults or cesspools is one of the cheapest and best methods of disinfection. Chloride of lime was first brought into prominence by the experiments of the Committee on Disinfectants of the American Public Health Association as one of the very best disinfectants. It is much cheaper than carbolic acid, and has other advantages. In hospitals, sulphate of iron, which I have been telling you has no value as a disinfectant, kept in a boiling hot solution in a reservoir of some kind, would be an excellent thing to disinfect bed-pans—the hot water would be the disinfectant and the iron would remove the odor.

"Articles of leather, such as trunks, boots, etc., should be either destroyed or washed several times with one of the weak solutions. Vomited matter and dejections of the sick should be mixed with one of the strong solutions in quantity equal to the material to be disinfected. Linen articles soiled with the dejections of the sick, if not immediately subjected

to the steam, should be immersed in one of the strong solutions and left for four hours."

The article which I shall next read was adopted unanimously by the Committee on Disinfectants, and subsequently by the International Sanitary Conference.

"The disinfection of merchandise and of the mails is unnecessary. (Steam under pressure is the only reliable agent for the disinfection of rags.)" By merchandise is meant ordinary merchandise in unopened packages, such as goods from wholesale merchants, etc. It does not mean the rags here spoken of; it does not mean damp hides in bad condition; it does not mean spoiled meats or vegetables undergoing putrefaction; but it means ordinary merchandise stored in the hold of a vessel. It is a great mistake to spend time in disinfecting things that do not need it and to neglect those things which do need it, and we should devote ourselves to the things which especially need disinfection.

Further directions are given about boiling water for drinking purposes, etc., and the conclusions further relate to quarantine in general and the precautions to be taken at the port of departure, during the voyage, and in the case of vessels from infected ports upon arrival. I shall not enter upon the subject of quarantine, but before leaving the platform I wish to call your attention to the method which I think is the most satisfactory for collecting discharges from cholera patients and others for bacteriological examination and transportation from the bedside to the laboratory. What we want is some material from the intestine, or, if the patient is living, a little material from the vessel containing dejecta, being very careful, if sending it to a bacteriologist, that it has not been already disinfected; that is, that the material has not been placed in a vessel that has contained a disinfectant. I have offered to make these examinations at the Hoagland Laboratory, if there should be any call for them in the city of Brooklyn. I am one of those who believe that if a certain number of cases were landed from Quarantine here in Brooklyn or in New York, and scattered about in ten or a dozen different parts of the city, that with the facilities we have, and the knowledge we now have of prophylaxis by means of disinfection and isolation, the disease could be stopped even then. I believe it would not extend in these cities, because I have a good deal of confidence in our water supply. You all know that when the cholera prevailed in Naples, as a very severe epidemic, refugees went to Rome and fell sick and died. Rome is dirty enough, but she had a good water supply, and the disease did not spread, there being no cases except those of the refugees. We hear that refugees from Hamburg have been taken sick in Berlin, but there is no local epidemic there so far, and I believe the Berlin people will be able to keep it away, and we can do the same thing.—*Brooklyn Medical Journal.*

THE HYGIENE OF CHOLERA.

ABSTRACT OF ADDRESS

BY ALBERT L. GIHON, M.D.,

Medical Director U.S.N.; ex-President American Public Health Association.

I thank you very cordially for your courtesy in asking me to say something; and as a member of the corps which has to do with these floating habitations which have invariably the reputation of bringing this disease and carrying it about the world, I cannot refuse to say something; but after the very interesting talk of my friend Colonel Sternberg, I feel that there is very little left for me to say. The occasion that brings us together just now is not actually the presence of an epidemic, but of its attendant cause, because all epidemics have a phobic *alter ego*, and we have now amongst us really not cholera, but cholera-phobia; it kills in an aggravated form, but in a mild form I do not know that it is altogether to be regretted. I recently learned from the members of the executive committee of what used to be called the National Conference of State Boards of Health, but which in the last year is now known as the International Conference of State Boards and Provincial Boards, not only the United States, but Canada and Mexico—I learned from them that it was the desire and intention of the State Boards of Health of this country and Canada and Mexico that there should be such a department of public health in the United States, which could unify them, unite them together, co-operate with them, and in time of emergency like this could direct them, could authorize them to do, could tell them what ought to be done. Now a national board of health, or department of health, or a bureau of the public health, whatever you call it, is absolutely useless unless it is an efficient one; and how can it be an efficient one unless it has all the means and money and men that it requires?

The mistake that health-men make everywhere is in tacitly acquiescing in the poor little sum doled out to them, and tacitly acquiescing in that the nation becomes imbued with the idea that that little is enough, and I believe health boards and health officers would do better by refusing to do anything unless they had the means they ought to have. A national board of health with \$5000, or \$10,000, or \$20,000 is no earthly good. It must have the proper power to use \$100,000 or \$200,000 if necessary. Now if we had a national department of the public health, foreign nations would know what to expect of us. The first absolute necessity of dealing with cases like this is to take the well off the ship as soon as possible, and not to shut them up and keep them there. Such a practice is indefensible, it

is absurd, it is preposterous, whether it be five, ten, fifteen, or twenty days; they should not be shut up on board ship a single day.

If we cannot do that, what is it that we can do in the city? It is very simple; everybody says, clean the city. Do you realize what cleaning the city is, what sanitary inspections are? I do not believe that there is a man here who can inspect thoroughly one hundred tenement houses in a week. I said thoroughly; I do not mean simply to walk and look around the rooms. To inspect a tenement house or a palace involves beginning at the attic, the opening of every door and window in that house, the taking down of every curtain, the looking under every bed, the turning over and moving of that bed, the opening of every closet and looking at things in the closet, the moving of every piece of furniture, and going down and down into the cellar and looking at everything in that cellar.

Now, if houses are foul, what do you think of ships? You probably never have seen a Russian Jew when he starts for this country. He is a man who probably has never washed in his life; he is a man who has certainly worn the rags upon him as many years as these rags would hold together. You put that man in a crowded steerage; he becomes seasick, (this same thing applies to the women), he vomits, his dejecta are thrown out in that bunk, it becomes saturated with seasickness, and then he becomes choleraic. Will you tell me what amount of cleansing will get that ship in condition again for a long time, except all such men are taken out and then she is thoroughly washed and cleaned? All these ships are damp ships. We are told that water is the very means of communicating cholera. We know in the navy that water has had a great deal to do with the spread of tubercles. It used to be the disease that prevailed in our service, and the medical officers of the navy for thirty years were fighting wet decks, and the last few years there has been no such thing as wet decks on board ship. If the atmosphere can support and transmit this aqueous vapor, and with it the tubercle germ, is it not possible that the same atmosphere can transmit that aqueous vapor, and with it the cholera germ? I do know whether Dr. Sternberg will agree with me in that; certainly, I think if that aqueous vapor gets into the mouth in any way, it will be carried down to the stomach. Imperfect sanitation is worse than no sanitation. Fumigation is as unfortunate a word as quarantine. I abominate the word quarantine, because it carries with it the idea of forty days' detention, and that I do not approve of; it would be better to call it sanitary non-intercourse. Fumigation is worse than quarantine, because if you fumigate you burn something, and you think you are perfectly safe. A friend told me he was in a house during a fumigation, and as he did not feel inclined to move he stayed there, and sat in the room and read a paper during all the time of the fumigation. There is a report in the papers of a

ship which was fumigated, and after it was all over they found an old hen still sitting on her nest ; and still another case where a cat was discovered having gone through the fumigation without being disturbed. Now processes of that sort are worse than none at all, in that they give a feeling of protection when it does not exist.

Unfortunately commerce is the enemy of sanitation. Commerce opposes everything that sanitary officers and health officers try to do, and I am delighted when commerce is made to bow. I would carry out the President's proclamation to the very letter, even if it obstructed immigration. There is a certain sort of immigration that we want to have in this country. Two years ago I came over from Holland with a party of young men and women who constituted the Holland American Land Company. They went out to California and bought some land there and domesticated. Those are the same kind of Dutchmen who settled in Brooklyn years ago, and whose names are left in your streets, the Brevoorts, the Remsens, and the Rapalyeas. A little stream mixes with us and is lost ; but when you take the flood of sewage and pour it into our country, as is being done now, the whole mass gets muddled. Every insane asylum, every almshouse, every charitable institution contains them. If you open soup houses, what is the result? The indigent people do not get the soup, but it is these fellows that live on it. If steamships persist in bringing these people here, I hope it may be possible to take our own people who are coming home out of these ships, and send the others back with their rags and with their disease.

I would make every medical man in this city a sanitary inspector under the direction of the health commissioner, give him his block or two, authorize him to go into these houses, rich men's houses as well as poor men's houses, and go from the attic to the cellar and see if they have done that which the circular has told them to do. I think that would be fulfilling the highest duty of the medical profession. Then you would give your health officer a hundred arms, and he would not be limited to the very small force which he has and with which he does so much. Further, I would have every police officer compelled, while on his patrol, to examine the outdoor condition of things—the gutters, the corner grocery stores, looking down into their cellars to see that there is no decaying vegetables. If you do that I think that in one week you can put this city in a thoroughly sanitary condition, and you can defy the cholera and control the disease that has a germ so delicate that you can hardly help killing it.

PROPHYLACTIC MEASURES AGAINST ASIATIC CHOLERA.

BY A. C. ABBOTT, M.D.,

First Assistant, Laboratory of Hygiene, University of Pennsylvania.

With the existence of Asiatic cholera in the western seaports of Europe, the question involving its possible importation into this country becomes a grave one, and it behooves us to exercise the greatest vigilance in endeavoring to prevent such a calamity.

There is no doubt that the suggestion, radical though it is, that has recently been made to the President of the United States by the Medical Board of the Johns Hopkins Hospital, at Baltimore, viz., that immigration be entirely interrupted until after the disappearance of cholera from the western cities of Europe, is by far the safest measure that could be employed.

Should it not be considered wise to check absolutely all immigration into the United States until after the disappearance of the disease from the infected ports of Europe, there remains to be considered the question of quarantine. Quarantine, if maintained for a sufficiently long period, offers a certain guarantee of safety against the spread of the disease through the bodies of individuals who come from the plague-stricken districts; for they are usually detained for a length of time sufficient to permit of the appearance of the disease, had the causative elements gained entrance into their bodies; but, as is most commonly the case, the means employed for disinfecting the personal effects of these individuals that arrive along with them on the same ship are of but little value; and it is through the channel afforded by soiled and infected bedding, clothing, etc., that the greatest danger is to be anticipated.

Another point that is worthy of consideration in connection with the subject of quarantine and of absolute cessation of immigration is whether or not it would avail us much without the institution of similar measures by our neighbor, the Dominion of Canada, into whose eastern seaports emigrants are constantly arriving from the same places as those from which come the emigrants against whom we are taking such radical steps. With Canada separated geographically from the United States by only an imaginary line, it must be plain that it would be practically folly for either country to close its doors against the tide of immigration without similar steps on the part of the other; for, unless they act in unison, the tide will simply be deflected from the closed to the open way, and, related geographically as both are, the existence of cholera in either place would be a menacing danger, if not a practical assurance, of its appearance in the other.

Of primary importance in the management of cases of cholera is, of course, an accurate diagnosis of the condition; and fortunately this offers but little difficulty to the skilled clinician, particularly if it has been his privilege to have seen the disease before, and still more especially if it is in his power to bring bacteriologic methods to his aid.

When recognized, the management of these cases and the methods of prophylaxis against their spread depend so largely upon absolute isolation and attention to sanitary surroundings that too much stress cannot be laid upon these points.

By isolation is not meant simply the confinement of a patient in a room or apartment set aside for the infectious maladies, but it comprises a great deal more; it must be absolute, or the sense of security that it affords becomes false, and is, therefore, worse than useless. The isolation of a patient with this disease, or with any other form of highly infectious malady, implies the provision of separate apartments; an attendant whose duties are confined to patients who are similarly affected; plates, dishes, bed-pans, bedclothing, etc., that are used by no other patient; and a rigorous disinfection of all excreta, vomited matters, and refuse food *before they are removed from the apartment occupied by the individual*. It involves the greatest care and intelligence on the part of the attendant to close all channels through which he or she and the patient may become a source of contamination, for contamination and spread of these diseases occur almost as frequently through the attendant as through the patient. The reason for this can be appreciated only after an intimate acquaintance with the nature of the causative element and its peculiarities when outside the body of the diseased individual.

Studies that have been made upon Asiatic cholera in recent years have shown it to be of an infectious nature, and due to the activities of a specific lower organism, which is present in the intestinal canal of all infected persons. This organism belongs to the family of bacteria. It is a bacillus, comma-shaped or curved in its morphology, and presents peculiarities of growth and chemical reactions that render its identification by the bacteriologist a matter of certainty and of a fair degree of simplicity. As a result of studies upon the nature of this organism, when isolated under artificial conditions, it is found to possess a relatively low degree of resistance to both thermal and chemical agents; that is to say, its vitality and disease-producing properties are easily destroyed by heat, and it quickly becomes inert when subjected to those chemical substances that are known to possess germicidal qualities. It likewise loses its resistance when *absolutely* dried, but retains it for a longer or shorter time when the drying is not complete. Having gained access to water, its growth seems to depend upon the amount of organic matter present, the reaction of the fluid,

and also upon the number and kinds of other organisms that may be present; for, owing to the antagonism that is seen to exist between different species of bacteria, it not uncommonly occurs that one species or group may develop entirely at the expense of the other, which quickly disappears.

Milk offers a most favorable nidus for its growth, as do likewise many solid materials used as food-stuffs, and particularly after they have been cooked. The bacillus is very sensitive to both acids and alkalies, and is quickly killed when subjected to the influence of either. As has been stated, it is located in the intestinal tract of the affected individual, and therefore appears in enormous numbers in the intestinal evacuations from these patients; and it is through these evacuations that the disease is usually disseminated.

Some of the more common channels through which diseases of this class are transmitted are drinking water, milk, and solid food-stuffs that are eaten in an uncooked condition, such as salads, fruits, etc.

Bearing in mind the points that have been here hastily reviewed, it is easy to comprehend the value of measures that will now be suggested for prophylaxis against the disease.

During the existence of an epidemic of Asiatic cholera—

(1) No food, of whatever character, should be eaten in an uncooked condition.

(2) All water intended for drinking purposes should be heated to a temperature of 80° C. (176° F.) for half an hour, or boiled for ten minutes and allowed to cool before using. When iced, the ice should be placed around the vessel containing the water, and not in it.

(3) Milk should be steamed in a vessel placed within an ordinary kitchen steamer (if a regular sterilizer is not at hand) for fifteen minutes, and allowed to cool before using. The same precaution as regards icing is to be taken as was recommended for water.

(4) Salads of uncooked materials are to be dispensed with, and all vegetables, fruits, etc., particularly those coming from districts in which "night-soil" is employed as fertilizer, are to be thoroughly boiled or otherwise cooked before using.

(5) If possible, a daily bath in warm water, with the use of soap, should be indulged in, and the teeth should be carefully brushed after each meal. In short, rigorous attention to personal hygiene is of great importance.

(6) In the management of cases of Asiatic cholera, isolation should be as complete as possible. Wherever practicable, tents on open lots, lawns, or fields are perhaps the best shelter for the sick. These patients should be provided with special nurses, who are made thoroughly aware of the fact that they themselves afford as potent a channel for the dissemination of the disease as do the patients themselves. These nurses should come

in contact with no one other than the patient and physician. They should be impressed with the necessity of rigorous attention to their personal hygiene, frequent baths and changes of clothing being all-important. The nurse should under no circumstances partake of food in the apartment occupied by the patient, and never partake of any portion of the food remaining from the meals of the latter. Before meals her hands should be scrubbed with soap, brush, and hot water, and after drying be rinsed off in 1 : 1000 solution of corrosive sublimate and dried.

(7) The evacuations and vomited matters of the patient should be disinfected *as soon as passed, and before they are removed from the apartment.* This is best accomplished by thoroughly mixing them with ordinary milk of lime (fluid "whitewash") until the mass is of a *distinctly alkaline reaction.* They should remain in contact with the lime for from twenty to thirty minutes. After this they can with safety be emptied into the general receptacle for such matter.

(8) Bed-pans, bedclothes, etc., that have been soiled by the evacuations of the patient must be cleansed by boiling for from *twenty to thirty minutes* in water to which about 1 per cent. of common soda has been added.

(9) Mattresses should be subjected to sterilization in a *steam sterilizer for one hour.*

(10) All clothing, towels, and napkins from the patient should be placed in clean canvas bags and conveyed from the apartment. They should be sterilized in steam for one hour. They can then be removed and washed with safety. If it is not possible to employ steam, they can be packed in an ordinary wash-boiler and boiled for half an hour in water to which 1 per cent. of common soda has been added.

(11) All dishes, knives, forks, spoons, etc., used by the patient should, after each meal, be boiled in 1 per cent. soda-water for half an hour.

(12) The remains of meals should be thrown into a vessel containing milk of lime.

(13) If practicable, the patient should be bathed as often as circumstances will permit, and the nates, thighs, and anus thoroughly cleansed with soap and water.

Before closing, emphasis will again be laid upon the necessity of *isolation* in the sense laid down in the foregoing directions: Separate attendants, who do not come in contact with other attendants whose duties take them to patients sick of other diseases; special clothes, bedclothes, dishes, knives, forks, spoons, napkins, towels, etc., for each patient, and a careful disinfection of the same as soon as they have been used, and are ready to be removed; disinfection of excreta with milk of lime *at the bedside, or before removal from the apartment.*

After the death or removal from the apartment of the patient, the walls should be wiped down with moist cloths, sponges, or fresh bread-crumbs. These are to be burned as soon as used. Floors should be scrubbed with ordinary soap after having been *saturated* with a solution of 1-1000 corrosive sublimate. Furniture should be thoroughly wiped with cloths soaked in 1 : 1000 corrosive sublimate solution. All cotton or woollen materials in the room should be either steamed or boiled, according to the rules already given for bedding, clothing, etc. The room should then be thrown open to air and sunlight for several days.

In the event of death, the body should, without being washed, be immediately wrapped in sheets, placed in a coffin, and buried or cremated as quickly as possible. If buried, it should be placed beneath the surface at a depth of not less than six feet, and not in the near vicinity of a spring or watercourse.

There is absolutely no objection to burying the bodies, providing the interment does not take place in a locality where a spring or watercourse could be directly contaminated; indeed, on the contrary, experiment has demonstrated that this method of disposing of infected materials is second to cremation only in its requiring a somewhat longer time for the accomplishment of the same end.

The foregoing directions comprise those sanitary measures that have been found by experience to afford the greatest protection against the contraction and spread of infectious diseases generally, and particularly of that class of diseases of which Asiatic cholera is a representative.

NOTE.—In times of epidemic, the most common prophylactic measure is, perhaps, fumigation by means of sulphurous acid. This is usually accomplished by burning sulphur in the infected room. In order to carry out this measure with any degree of certainty that it is doing what one desires, a great deal of care and detail is necessary, and for that reason it is not a measure to be recommended for general use. By the ordinary means that are employed in fumigation, practically nothing of good is accomplished. It is, however, possible to disinfect apartments by this means if they are closed as tightly as possible, by pasting paper over the cracks about the doors and windows, and burning not less than a pound to a pound and a half of sulphur for every 1000 cubic feet of space to be disinfected. Even then the best results are obtained only with the simultaneous generation of steam in the apartment, or by previously having moistened every crack and crevice in the wall, ceiling, and floor with water. The reason for this is that sulphurous-acid gas in a dry state or upon dry objects has but little germicidal value; this property is only developed in the presence of moisture.

CHOLERA AND ITS MIGRATIONS.

BY HENRY HARTSHORNE, M.D.,

OF PHILADELPHIA.

The extreme public alarm existing in this country concerning cholera, and the action of municipal and national authorities in their endeavor to exclude it, have caused immense commercial losses and great inconvenience—indeed, distress—to individuals and families. It seems important, therefore, that well-defined and well-sustained opinions on the subject should be held by physicians and sanitarians, to whom the people naturally and properly look for advice.

The intervals, often of a number of years, between the widely-prevalent epidemics of cholera, especially in this country, leave opportunity for many of the facts in their history to be practically forgotten. Of physicians now in practice, a large number did not have personal acquaintance with the visitation of 1866; few of them reach back in memory to those of 1849 and 1854. Moreover, the complexity of the subject of the causation of disease, particularly with regard to the questions of personal contagion, local infection, fomites, and atmospheric transmission, accounts for the diversity of opinion even amongst medical men; leaving the conclusions current from time to time often remote from the secure foundations of exact science.

Personal acquaintance, as a practitioner, with cholera in 1849, 1854, and 1866, as well as a good deal of attention to the literature of the subject,¹ makes it pardonable for me to recall at this time some of the facts, and the legitimate, indeed logically necessary, deductions from them, which appear to be now largely lost sight of, even within the medical profession. As astronomy was a science before Schiaparelli, so cholera had a history before Robert Koch. Yet certain ideas are now by many persons taken for granted which were long ago tried and found wanting; some of them as far back as 1831-32. A few cardinal questions may serve to bring the matter clearly in view.

Is cholera personally contagious? Only one *rationale* of its personal transmission has taken much hold of the minds of the medical profession: that of its being produced by the use of drinking water infected by the stools of cholera patients. There is much to sustain the opposition of Pettenkofer and others to this theory; all the facts asserted in its favor being explicable under the wider generalization that, in the presence of

¹ Cholera: Facts and Conclusions as to its Nature, Prevention, and Treatment. By Henry Hartshorne, A.M., M.D., etc. J. B. Lippincott & Co., Philadelphia, 1866.

the epidemic cause, foul drinking water is the most effective of all agencies in the propagation of cholera. Since the discovery by Koch of the asserted specificity of the comma bacillus, the cholera-stool theory, and with it the contagion idea altogether, has prevailed over everything else; bringing back a *wave* of rage for rigid quarantine, isolation, etc., under which we are now suffering more than ever before in this country. It is satisfactory to read in the editorial columns of the *Medical News* (September 3rd, 1892) an allusion to the "disputed question of the causal relation of the so-called comma bacillus." The affirmation by T. R. Lewis, Ray Lankester, and others, of the identity of that microbe with one commonly found in the intestines, and even in the saliva, has been denied, but not disproved.

That the cholera-stool transmission cannot be the exclusive mode of extension of cholera over the world is demonstrated by well-known facts. Look, for instance, at the immense zigzag leaps, or rather flights, taken by the epidemic in its migrations after entering Europe from Asia.

In 1831 cholera was in Warsaw in April; in Hungary from May to September; in St. Petersburg in June; in Moscow in September; in Berlin and Vienna first in August; Hamburg, October 11th, and Sunderland, England, October 26th; but not in Edinburgh and Glasgow until January, nor in London till February, 1832; in Dublin and Paris in March. On our continent, Quebec and Montreal had it in June, and later in the same month New York and Albany; Philadelphia in July; Boston and Baltimore in August; by September it was present, with more or less virulence, in twelve states of the Union.

Not proposing to touch upon this history, except for the purpose of exemplification, it may be mentioned that in 1849 the first American cities attacked were: In January, Memphis and St. Louis; in May, Chicago, Buffalo, New York, and Philadelphia; in July, Baltimore had a very remarkably limited epidemic, affecting *one-half of its almshouse building*, the side whose windows overlooked a large and foul cesspool. England and Wales, besides Cologne and other continental cities, were affected with the epidemic in 1848-49.

In 1865, Arabia and Egypt were severely visited in the spring; Constantinople, in July; then it spread over Europe. In 1866 it was in Egypt in June; thence it traversed Europe, and finally crossed the Atlantic, reaching New York, Philadelphia, and some other cities. It was our last cholera epidemic. Since that time the most notable cholera year in Europe has been 1884. Its ravages during that summer were particularly severe in Naples, 1200 deaths resulting from it in that city by the middle of September, and nearly 11,000 altogether in Italy.

The order of succession in the European cities in the present year has

been, so far: Moscow, St. Petersburg, Paris, Hamburg, Havre, and Antwerp. How did cholera pass from St. Petersburg to Paris without, so to speak, stopping at stations by the way? Political sympathy, it is true, exists between Russia and France. The Psychical Society might suggest that it was communicated by telepathy, but sanitary science admits no such conception. Neither should it hesitate to recognize that such a transit could not be checked by any quarantine or *cordon militaire*. The latter measure was fully tried in Europe as long ago as 1831-32, with absolute failure; at Vienna, for example.

An *instantia crucis* against the dependence of the migration of cholera upon transmission by the channels of human intercourse occurred in France in 1884. The outbreak at Marseilles and Toulon in June of that year was made the occasion of a scrutinizing investigation. There was then no cholera elsewhere nearer than India. The Chief of the Naval Bureau of Health and the Admiralty Inspector, Rochard, declared officially that the disease was not brought by any vessels from elsewhere.

Dr. Brouardel made a special visit of inquiry to the infected cities. His conclusion, as reported to the Académie de Médecine, was published in a letter from Paris to the *London Times*, July 4th, 1884. It was to the effect that the two sailors first taken ill had not been to sea for five years, and had no communication with other vessels; and that the same was true of a person who died of cholera at the Lycée in Marseilles, June 21st, about a week after the two sailors were attacked. Brouardel affirmed decidedly that (notwithstanding a charge made against a vessel from China, all on board of it being well after a voyage of forty-five days) it was impossible for any vessel to have brought the infection to Marseilles and Toulon. Yet 5000 deaths occurred in France, mostly in those two cities, in June, July, and August, 1884.

In the *American Journal of the Medical Sciences*, July, 1873, Dr. E. M. Estrazulas presented important testimony showing that an epidemic of cholera beginning in Paraguay in 1866, and continuing as an endemic for three years, could not have been imported by human intercourse, by ships or otherwise; the peculiar circumstance of the war with Brazil making this impossible.

As to the possibility of the personal contagion of cholera in any other way than through the entrance of the stools into drinking water, some facts, now generally forgotten, but on record, may be here recalled. Dr. Austin Flint well contrasted cholera, in this respect, with typhus, smallpox, and scarlet fever.¹ In Moscow,² in 1831, 587 patients affected with cholera were admitted into a hospital containing 860 patients of other

¹ Practice of Medicine, p. 425.

² Brigham: History of Cholera, p. 324.

kinds, yet not one of the latter took the disease. Dr. Alison,¹ of Edinburgh, testified that in 1832, and in 1848-9, the dissecting-rooms of his city were almost exclusively supplied with cholera subjects; but in neither year was there a single case of the disease among the numerous students attending in those rooms. How preposterous, in view of such evidence, seems the assertion by cable, September 3rd, 1892, that a porter in Berlin was attacked with cholera half an hour after carrying to the disinfecting chamber some linen of a traveller just arrived from Hamburg! If that were so, how could any survive who handled all the linen and put it into the chambers for disinfection?

Dr. Foy² and ten others in Warsaw, in 1831, inoculated themselves with the blood of cholera patients, tasted their dejections, and inhaled their breaths, without taking the disease. Similar experiments were performed, with the same negative result, by surgeons and medical students at Moscow and Dantzic in 1832, and afterward by Lizars, Coste, Schmidt, Meyer, Marshall, and others. Dr. Houston, in the *Richmond Medical Journal*, in 1866, stated that a man in Wheeling, Va., lay all night in the clothes of another who had just died of cholera, without evil consequences. How unreasonable, then, is the *panic* that leads some persons to be afraid, almost or quite, of the shadow of any one who has been near a place, or a vessel, infected with cholera. We read the following in a recent cable despatch from Europe:

"Hamburgers are treated like lepers elsewhere in Germany. Hotel doors are shut in their faces, and it is impossible for them to obtain lodgings. Many of them have been known to alight from the railroad trains a few stations before reaching Berlin, and to come into the city by local trains, in order to avoid inspection. The authorities are endeavoring to stop this practice, but find it difficult to do so."

Let us hope that no such inhumanity will throw discredit upon civilization in this country.

Some other facts in the history of cholera, strangely ignored by many, need to be here recalled. In 1848 two emigrant ships, the *New York* and the *Swanton*, left Havre at a time when there was no cholera there, the former going to New York and the latter to New Orleans. Both were attacked by cholera during the voyage; one when sixteen and the other when twenty-seven days out at sea.³ If there had been cholera at Havre when they started, no chance of so long a time of incubation for the disease could possibly be allowed by any, either of the older or of the more recent authorities.

¹ *British and Foreign Med.-Chirurg. Rev.*, Jan., 1854; p. 22.

² *Gazette Medicale*, 1831.

³ Dr. James Wynne, *Report of Cholera in the United States*; and Dr. Gavin Milroy, *British and Foreign Medico-Chirurgical Review*, October, 1865.

In 1854, two of the Copes' line of packets, sailing from Liverpool to Philadelphia, at a time when there was no cholera in the former city, were attacked by cholera when many days—one of them, the *Tonawanda*, two weeks—out at sea. The latter vessel, after the disease had continued for several days, neared a large iceberg, which reduced the temperature of the air 30°. On the day before the iceberg was met the largest number of cases occurred; after that, no new one at all; the morbid cause appeared to have been frozen out. In April, 1866, two steamers, the *England* and the *Virginia*, left Liverpool, the former for Halifax and the latter for New York. One had on board 1202 passengers, chiefly emigrants; the other 1043, of whom 1029 were in the steerage. There was no cholera in Liverpool at that time; but both vessels were attacked, one five days and the other seven days from port. In all these instances now mentioned, the only rational explanation is that the epidemic cause *passed over the ocean through the atmosphere*, independently of human conveyance.

On account of this manner of migration, I propose a new term as applicable to epidemic cholera. It is *autoplanatic* (from *autos*, self, and *planao*, to wander); that is, wandering under causal conditions peculiar to itself, as distinguished from the conveyance of smallpox, scarlet fever, measles, etc., only through human intercourse.

In view of the facts alluded to, and others also which are particularly familiar to those who have resided in British India, it is not strange that many of those most fully and closely acquainted with cholera are convinced of the uselessness of personal quarantine as a measure for its exclusion anywhere. That view of it has been emphatically affirmed by such eminent authorities as Gavin Milroy and Sir Joseph Fayrer, in England; Stewart Clark, Payne, Bryden, and Cunningham (after thirty-three years' residence), in India; Cazalas, in France; Pettenkofer, in Germany; and Tommasi-Crudelli, in Italy.

On the other hand, *sanitary police* (including, as properly coming under that term, Dr. Joseph Holt's systematic disinfection of infected or suspected vessels) has had signal triumphs, showing that it is entitled to entire confidence for the prevention of cholera, always and everywhere. Notable instances of this might, were space here allowed for it, be narrated as occurring in the arrest of a very destructive epidemic of cholera in 1884, in Genoa,¹ by a change from a bad to a good and pure water supply for the city; a similar result at Mendoza,² in South America, in 1887, following the provision by the government of Buenos Ayres of means for boiling all the drinking water used by the inhabitants of the infected town; and the eradication of an epidemic occurring for the third time on the island of

¹ Philadelphia Times, October 6, 1884.

² Public Ledger, Philadelphia, 1887.

Takasima, Japan,¹ in 1887, by a thorough system of sanitary improvement, under charge of a company having in its employ a large number of laborers on the island.

Shortening the time of detention at quarantine to three, four, or five days, sufficient for thorough disinfection of all suspected *fomites*, is a most beneficial improvement on the old-time forty days' imprisonment on board or at a lazaretto. This is in the direction of scientific as well as humane progress. There is room for further progress in the same direction. It is within the power of the medical profession at the present time to render a great service to commerce, as well as to philanthropy, by urging the immense advantage of thorough sanitary police over any and all measures of quarantine in the certain and perpetual prevention of epidemic cholera.

THE TREATMENT OF CHOLERA.

BY ROBERTS BARTHOLOW, M.D., LL.D.,

OF PHILADELPHIA.

Personal experience during two epidemics of cholera will, I trust, be considered some justification for adding another to the numerous papers that have appeared on the subject of cholera. Unfortunately, it cannot be said that the lessons of experience have been fruitful in curative results, but they afford unmistakable indications as to the direction our efforts should take in the future, and they have settled opinions as to the practical value of many of the proposed remedies. Until Koch's discovery of the comma bacillus, there had been no scientific basis for the therapy; but even now, with all the aid afforded by this great fact, the problem of a cure for cholera remains unsolved. The mortality rate continues nearly at the same level; and although the epidemics have lessened in severity, these facts only show that sanitation has done much, whilst therapy, if not impotent, has been at least unequal to its prescribed task.

The theory of a cholera-seizure, based on the existence and agency of a specific microbe, may be stated as follows:

The parasite, reaching the intestinal canal by any of the several channels of communication, finds there a suitable nidus, and undergoes pullulation, increasing enormously in numbers, and producing as a result of its vital activity a peculiar poison—a ptomaine—and on the action of this morbid material depends the systemic symptoms as they successively arise. First, we have the evidences of a local irritation—the cholera-diarrhœa—due to the presence and development of the bacillus on the surface of the

¹ Sanitary News, March 26, 1887.

mucous membrane. Next is the stage of systemic infection, due to the absorption of the ptomaine, quickly followed by the algid state, and then, should reaction occur, a typhoid condition. An important chemical change also takes place, consisting, for the most part, in an increased alkalinity of the intestinal juices and of the blood. Coincidentally with these alterations occurs an extraordinary change in the mucous membrane; its epithelial layer is detached more or less completely, and the basement membrane laid bare. The normal functions are necessarily abolished, and the transudation from the blood vessels is enormously increased. This outward diffusion of the blood-serum makes the blood thick, and its movement in the vessels sluggish, and the blood globules become so much changed in structure as to be unable to functionate.

Such is the "therapeutic diagnosis" on which we now base our measures for relief.

The first point is to arrest the preliminary diarrhœa. There are three indications for the use of remedies: the presence of a parasite in process of pullulation; the excessive alkalinity; the diffusion of the blood-serum from the vessels into the intestinal canal.

Of all the remedies proposed for the arrest of the diarrhœa, not one has done so much good, in the writer's experience, as sulphuric acid. It is usual, and generally best, to combine some opium with it, according to the formulæ here given:

R.—Acid. sulphuric. aromat. ℥v.
Tinct. opii deodorat. ℥iij.—M.

Sig.—From ten to twenty drops every hour or two in sufficient water.

R.—Acid. sulphuric. dil. ℥iij.
Tinct. opii camph. ℥xiiij.—M.

Sig.—A teaspoonful every half hour in water.

Sulphuric acid is a germicide; it neutralizes the alkalinity of the intestinal canal, and promotes diffusion into instead of outward from the vessels. During past epidemics opium has had an important place as the principal, or the adjunct, or associated remedy. The experience of the present epidemic is against the use of large doses of opium, because of the narcotism, and the paralytic state of the intestine thereby induced. On the other hand, small doses, especially for the control of the preliminary diarrhœa, are quite indispensable. I find that amongst those who are against the free use of opium is Rumpf,¹ whose observations were made in the New General Hospital at Hamburg during the present epidemic, and also the veteran Ziemssen.² Both, however, find small doses useful in certain

¹ Deutsche med. Wochenschr., 1892, No. 36. Abstract in Centralblatt für die gesammte Therapie, November, 1892.

² Munch. med. Wochenschr., 1892, No. 41. Ibid., Dec., 1892.

conditions, amongst which the preliminary diarrhœa is most important. So necessary is opium during the first stage that all the formulæ most popular during the past and present epidemics contained it. I may mention the preparation of Squibb, which is largely used now as formerly. This contains rhubarb, aromatics, and the deodorized tincture of opium. According to Meyer, the prescription here given was employed for a diaphoretic action, and for the diarrhœa a decoction of rhatany, with tincture of cinnamon and tincture of opium:

Münch. med. Wochenschr., October, 1892, p. 591:

R.—Ol. menth. pip.	. . . . .	gt. j.
Tinct. opii	. . . . .	℥xxx.
Tinct. rhei vin.	}	aa ʒj.
Tinct. capsici		
Spirit. vini gallici	. . . . .	ʒij.—M.

Sig.—A teaspoonful in black tea.

Ziemssen advises fifteen drops of the tincture of opium in infusion of chamomile as an enema, to restrain the diarrhœa. In India, chlorodyne—the original nostrum—has had the first place as a remedy for all stages of the disease. This preparation contains two ingredients of especial value, namely, morphine and atropine. Also, pills of lead acetate and opium, of tannin, capsicum and opium, of camphor and opium—with or without tannin and capsicum—were largely employed. Indeed, it is impossible to name the various combinations in which confidence was reposed, each physician having his special pill or mixture. I should mention, also, that homœopathy had its favorite remedy in Rubini's solution of camphor—a saturated solution in alcohol. Almost any of the various combinations of remedies proved equal to the arrest of the preliminary diarrhœa, if administered early enough. The case was far different when systemic infection occurred.

During the existing epidemic the treatment of cholera-diarrhœa has been attempted on a scientific basis, and various new remedies have been brought into use. The modern doctrine of antiseptis and the discovery of the cholera bacillus have led to the employment of germicides, which are administered with the view to arrest the development and to destroy the product of the cholera microbe. But conclusions drawn from the results of the treatment of cholera-diarrhœa can be depended on only when bacteriologic examinations have shown the presence or absence of the cholera bacillus. The severity of the diarrhœa is not a means of differentiating, for it has been found that in very mild cases the bacillus may be present,¹ and in cholera morbus there may be all the symptoms of true

¹ Dr. William Russell: London Lancet, December 3, 1892.

cholera, without a single parasite in the intestinal canal. In the absence of a proper bacteriologic diagnosis, the curative action of any remedy cannot be determined.

The remedies from which the most has been expected were salol and creolin. From a theoretic standpoint nothing could be more appropriate than the action of salol, for this substance is supposed to pass through the stomach unchanged and to be separated into its constituent elements—salicylic acid and phenol—by the alkaline intestinal juices; but the practical outcome has not been so fortunate as its promoters hoped for and predicted. At the Moabit Hospital in Berlin,¹ and at the New General Hospital in Hamburg,² salol and creolin were found useless. From my observation of the effects of naphthalin in the various forms of diarrhoea, I am inclined to believe that this remedy promises well. As under ordinary circumstances it affects the whole intestinal canal, deodorizes the stools, and restrains the peristaltic movements, it should under the different conditions of a true cholera attack accomplish similar results. Naphthalin may be combined with bismuth and carbolic acid, and opium may enter into the combination, if necessary :

R.—Naphthalin	℞ss.
Bismuthi salicylat.	ʒij.
Acid carbolic.	ʒss.
Glycerini.	ʒss.
Aquæ chloroformi	ʒjss.—M.

Sig.—A teaspoonful every half hour, hour, or two hours.

The experience of the present epidemic is in harmony with that of preceding epidemics as regards the utility of calomel as a remedy for cholera, but on very different grounds. Now it is regarded as the most efficient of the antiseptic remedies. Formerly it was given in truly massive doses—from ʒj to ʒj—to arrest vomiting, to secure “a change in the secretions,” and to bring about bilious evacuations; and it was also administered in small doses (from ½ gr. to 2 grs.) to arrest vomiting, to act on the liver, and to exert its specific action on the gums; for it was not uncommon to hear a practitioner say, “If only the gums were touched,” the case would take on a different aspect.

Rumpf maintains the superiority of calomel as a remedy over all other remedies that have been used thus far in the treatment of cholera. Ziemssen also strongly advocates it, administered in somewhat larger doses—usually giving a large single dose (8 grs.) at the outset, and smaller doses at short intervals thereafter. At the Hamburg New Hospital the

¹ Russell: *Lancet*, December 3, 1892.

² Rumpf: *Centralblatt für die gesammte Therapie*, November, 1892.

initial dose was 4 grs., and subsequently every two hours 0.02-0.05 grams [= $\frac{1}{3}$ - $\frac{3}{4}$ gr. nearly] (Rumpf). The administration of the calomel was kept up during the first and second stages. Similar use was made of calomel at the Moabit Hospital, Berlin.

Enteroclysis has come into use during the present epidemic. The method of Cantani, who is the author of this expedient, consists in irrigating the intestine with a solution of tannic acid. His directions are to take from 5 to 10 or 20 grams [$1\frac{1}{4}$ $\bar{3}$ to $2\frac{1}{2}$ $\bar{3}$ or 5 $\bar{3}$] of tannic acid in from $1\frac{1}{2}$ to 2 liters [1 to 2 quarts] of hot water or chamomile infusion, and to this add from 20 to 30 drops of laudanum, and suspend by means of gum arabic from 30 to 50 grams. The temperature should be from 38° to 40° C. [99° to 104° F.]. With this the intestine is irrigated. A fountain syringe with a glass reservoir, properly sterilized, is a suitable apparatus for this purpose. Views differ as to the utility of this procedure. At Hamburg and Berlin it was found useless; but Ziemssen, probably on theoretic grounds, urges its use at all stages. It is difficult to understand how irrigation of the large intestine can modify a morbid process going on in the small intestine; for nothing is more certain than that an injected fluid does not pass beyond the ileo-cæcal valve. It is not surprising, therefore, to learn that actual experience with this treatment is not in its favor, notwithstanding Ziemssen's ardent advocacy, and Cantani's sanguine expectations.

So long ago as 1834, *infusion* of salines into the veins was practised. It had been seen at this early period how much injury the enormous outpouring of serum must inflict on the constitution of the blood, and on the circulation, and during every epidemic since attempts have been made to arrest the algid stage by supplying fluid to the veins, with marvellous immediate effect, but without permanent results. The modern expedient is less complicated than the operation for transfusion as originally performed. Now a simple reservoir for containing the fluid, a flexible tube, and a needle-trocar for perforating the vein, suitably sterilized, are the instrumental means required. The saline solution most used is one containing sodium chloride and sodium carbonate. Hayem's solution consists of common salt 5 [= $\bar{3}$ j and $\bar{3}$ v], Glauber's salt 10 [= $\bar{3}$ ij and $\bar{3}$ ij], distilled water, sterilized, 1 liter [= 1 quart]. Cantani's solution contains 4 [= $\bar{3}$ j] of sodium chloride, and 3 [= 48 grains] of sodium carbonate in 1 liter [= 1 quart] of water. The ordinary salt solution, properly sterilized, and at the right temperature, suffices.

Cantani¹ proposed the subcutaneous infusion of a saline solution as a substitute for the intravenous method. The term *hypodermatoclysis* has

¹ Centralblatt für die gesammte Therapie, October, 1892. From Berliner klin. Wochenschr., No. 37, 1892.

been contrived to designate this procedure. The apparatus required for the performance of this method consists of a reservoir for the fluid, a flexible tube, and a hypodermatic needle. The axillary region, the buttocks, and the interscapular and subscapular spaces are suitable sites for the infusion. To secure the admission of a sufficient quantity of fluid, the infusion may be allowed to continue for some time (Samuel's continuous method).

Saline infusion is also practised by introducing the fluid into the peritoneal cavity. The same apparatus, as that used for the subcutaneous method may be employed for this operation. The experience with the peritoneal transfusion is very limited for the present epidemic, and it need not, therefore, be considered here.

Infusion of salines is adapted to the treatment of the algid state, to supply a material to the blood—the serum—which has been lost.

If the immediate effects of the intravenous infusion could be fixed in its permanent state, nothing could be more effective than this mode of treatment. Unfortunately, the immediate and astonishing improvement is not sustained for any considerable time; in most cases a repetition of the injection becomes necessary in a few hours; the improvement each time is less decided, and still shorter in duration, until finally the injection is without effect, and profound and fatal collapse ensues. The mortality in cases treated by intravenous infusion in the New General Hospital at Hamburg was, in a group of 103 cases, 87, the rate being therefore 84.5 per 100, thus showing but little influence over the results in cases of the algid state.

As compared with hypodermatoclysis, the advantage, slight as it is, remains with intravenous infusion. The remarkable change at once manifest in the condition of the patient when the route by the veins is pursued does not occur to nearly the same extent when the subcutaneous infusion is practised; the effect comes on more slowly, and the result, as shown in the mortality following these methods, does not favor hypodermatoclysis. Rumpf declares that the subcutaneous method is not nearly equal to the intravenous infusion in the algid state. Both modes of treatment were much employed in Hamburg. In the two hospitals—the New and the Old General Hospitals—the method of intravenous infusion was more used, and in private practice throughout the city the subcutaneous, especially the continuous method of Samuel, because of the greater care and safety with which it is done, and no assistant being required. At the Moabit Hospital in Berlin, Dr. Guttman preferred the subcutaneous infusion of salines, and at Koch's Institute the intravenous method was the favorite.¹

From these facts it is evident that a final decision has not been reached

¹ Russell: *Lancet*, December 3, 1892, p. 1258.

regarding the comparative value of these plans of treatment; but it seems to me nearly certain that in the algid state, with fatal collapse imminent, it were better to resort to the intravenous method. In private practice, hypodermatoclysis is preferred by most of the Hamburg physicians, because an assistant is not needed and the injection is entirely safe, although abscesses have resulted in some instances. The large amount of fluid considered necessary, which is forced under the skin, explains the mishap. Irrespective of this, and considered from the point of view of the results in blood transfusion, it is my belief that the quantity of fluid passed into the veins by either mode is much too large, one liter [=one quart] being considered the minimum. Yet at the Hôpital Bonjean, Paris, as much as two liters were injected in twenty minutes, and without any ill result so far as reported.

A new method of treating cholera is the subcutaneous injection of Kleb's *anti-cholerin*, a toxic material obtained from cultures of the comma bacillus, after the method of Koch. This was also tried at the New General Hospital at Hamburg, and is reported on by Dr. Manchot, who compares the results of its use with the statistics of the intravenous method. Of 31 cases treated by anti-cholerin there were 21 deaths, the mortality being 67.7 per 100; whereas, of 103 cases (already given) treated by saline infusion, there were 87 deaths, the percentage being 84.5. It should be understood that these were cases of cholera already advanced to the algid stage.

As during the algid stage of cholera the temperature is subnormal, the surface is cold, and the breath cold, the application of artificial heat in the shape of bottles of hot water, hot bricks, etc., was usually practised in past epidemics. During the present epidemic hot baths have been made use of at the Hamburg hospitals. Winternitz¹ extols especially the use of cool sitz-baths and frictions of the body with towels wrung out in the water. In Hamburg, Berlin, and in Russia, but rarely in Paris, hot baths were held in high esteem during the algid stage. The temperature ranged from 33° to 40° C., or from 99° to 104° F. The immediate effect of the bath is to raise the warmth of the body and to increase the pulse rate and the depth and frequency of the respiratory movements.

The treatment of the algid stage by the use of medicaments during the present epidemic does not differ materially from that of former epidemics. There are some new remedies, however, that deserve consideration. The soluble salts of caffein were much used in Paris subcutaneously, and it is said with benefit. The diuretic action of this agent, as well as its stimulating effect on the circulation, were the chief reasons for its employment. In the Paris epidemic, especially at the Hôpital Bonjean, injections of

¹ Centralblatt für die gesammte Therapie; op. cit.

gotten beyond the space it should occupy. There is, however, a practical point or two in regard to the dietetic management of the disease that I should not fail to mention. The attempt to feed a cholera patient when the digestive tract is undergoing desquamation is worse than useless. Such a preparation as beef-tea is only harmful at any stage of the disease. A little cold milk or wine-whey may be given as the state of the stomach will permit. The profound depression that occurs in these cases is a constant temptation to push the use of stimulants, and this practice is usually overdone. A moderate quantity of iced champagne, or a little brandy in ice, may be given from time to time. Thirst is excessive, and the indulgence in water-drinking is likely to excite vomiting; but, as Rumpf says, the advantages due to the free use of water more than counterbalance the injury done by a renewal or an increase of the vomiting. Carbonic acid water may agree better than simple water, or such a mineral water as Apollinaris may prove less likely to disturb the stomach. As the renal function is suspended, or nearly so, and as during the typhoid stage the restoration of this function is of the first importance, the free use of diluents may prove in a high degree useful.

A CLINICAL STUDY OF ELEVEN CASES OF ASIATIC CHOLERA TREATED BY HYPODERMOCLYSIS AND ENTEROCLYSIS.

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This evening I shall give a short description of the clinical history and treatment of eleven cases of Asiatic cholera that I had the opportunity of observing at the Swinburne Island Hospital in New York bay in September, 1892.

The first case was typical of a group that may be called mild cases, and occurred in a Russian, aged 16 years, admitted to the ward, September 9th, from the steamship Bohemia. His temperature was 99.2°F., pulse 94, and respirations 24. Three more observations, which were continued until midnight, gave the same results. The first matter vomited after admission was composed of a greenish liquid mixed with mucus. The diarrhœal discharges were whitish in color and rice-water like in character. The pulse was of fair volume; he complained of abdominal pain of moderate severity. He slept well and passed a normal quantity of urine. It is

worthy of note that at no time was the temperature below normal. After remaining in the cholera ward three days he was discharged fully convalescent. The spirillum of cholera was detected in the discharges.

His treatment was as follows: Upon admission he was given ten grains of calomel, and afterward he received one grain every hour for six hours. He was also given two quarts of a one per cent. solution of tannic acid at a temperature of 104° F., by enema, every three hours. At no time was it necessary to resort to subcutaneous injections of the six-tenths per cent. solution of sodium chloride. He was also given twenty minims of whiskey hypodermatically, and occasionally one-eighth grain of morphine.

The second case well illustrates an ordinary attack of Asiatic cholera. A Russian, aged 7 years, was admitted from the steamship Bohemia, September 26th, at 8 p.m., with a temperature of 96.2° F., pulse 106, respirations 22, and the surface of the body extremely cold and cyanotic. The face was pinched, especially in the nasal region, it was markedly cyanotic, and the eyes were deeply sunken and surrounded by dark circles. The pulse was feeble and small, and was counted with difficulty. She at once received a warm plunge bath, and her stomach was then washed out with one pint of a one per cent. solution of tannic acid at the temperature of the body. Shortly afterward she vomited twenty-three ounces of fluid. She remained in about the same condition during the night, but the passage of a moderate amount of urine encouraged us to hope for a favorable issue. On September 27th her pulse was 104, her temperature 97.4° F., and her respirations 18 to the minute. The cyanosis persisted, there was no vomiting, but she had frequent copious discharges from the bowels, composed chiefly of the tannic acid solution which had been injected per anum. Later in the day improvement began, the temperature varied between 100.2° and 100.4° F.; a large semi-solid stool was passed. She slept moderately well during the night, but complained greatly of thirst. A sufficient quantity of urine was excreted, and the liquid from the bowels was composed chiefly of the tannic acid solution that had been given by injection. She became very restless, but the following day was much brighter and began to notice her surroundings. The dejecta changed in character, becoming greenish in color and somewhat frothy. On September 29th she slept well; her bowels were moved only after giving the intestinal injection of tannic acid solution. In the afternoon her improvement was so marked that it was decided to suspend these injections. Her temperature varied from 97.8° to 99.4° , the pulse between 96 and 120, and the respirations from 22 to 24. On September 30th she was able to take nourishment and stimulants by the mouth, but the stools continued brownish and thin, and when an attempt was made to administer beef-tea or any food by the mouth vomiting occurred. The cyanosis disappeared, and it

was then observed that she was shrunken and emaciated. She continued to improve, and on the fourth day after admission was carried into the open air, where she received a sun-bath for two hours.

The following summary of the treatment may not be without interest. Upon admission she received a hot plunge bath. The first enteroclysis or intestinal injection was retained for three minutes, and afterward these injections were repeated every two hours. A subcutaneous injection of one pint of a six-tenths per cent. solution of sodium chloride was given the day after admission. At first whiskey was administered by the mouth, but afterward ten minims were given hypodermatically every four hours. The total duration of the patient's illness was five days, and her convalescence was extremely rapid and uninterrupted.

The third case presented the typical symptoms of Asiatic cholera, and death occurred forty-one hours after admission to the hospital. The patient was a Russian boy, aged two years, who was admitted to the ward from the steamship Bohemia at 2 p.m. He complained of pain, and vomited and purged freely. His face had the bluish and shrunken appearance that is so characteristic of this disease. The upper and lower extremities, as well as the face, were cold and cyanotic. The pulse was very weak, about 100 per minute, and the respirations were shallow, averaging forty-two per minute. The temperature was 98° F., and soon descended to 97.4° F. He made no complaint of pain, nor of muscular cramps. At first everything taken by the mouth was vomited, but soon this symptom subsided. The bowels moved frequently, the discharges were copious in quantity, whitish, and contained a large quantity of epithelium, giving them a rice-water like appearance. The patient soon became apathetic, and during the night continued to purge and vomit, and during the day the cyanosis became extreme, especially in the face and extremities. The remainder of the skin surface was whitish in color, and when a fold was pinched between the thumb and forefinger it remained elevated for some time, and then gradually resumed its former condition. The pulse became weaker, small, and increased in frequency from 90 to 100; the respirations rapid and shallow; and the temperature varied from 98.8° to 99.6° F. There was no vomiting except that which was excited by attempts to administer food or remedies. During the night he had two copious choleraic discharges from the intestine. He continued in about the same condition until his death.

The spirillum of cholera was obtained from the early intestinal discharges. The autopsy was performed six hours after death. The cadaver presented the same general appearance as has been already described. *All* the tissues and *all* the organs of the body were remarkable for their extreme dryness. Both pleuræ showed extensive old adhesions, particularly on the left side. The lungs, liver, spleen, and peritoneum were normal,

but *dry*. The kidneys showed acute parenchymatous nephritis. The entire subcutaneous tissue was dry and dark, and the skin when pinched remained elevated, the same as during life. A rectal tube was introduced for a distance of ten inches, to which was attached an ordinary fountain syringe, the reservoir of which was placed at an elevation of five feet, and contained two pints of water, which was passed through the ileo-cæcal orifice, filling the small intestine and stomach.

Upon admission he was placed in a plunge bath having a temperature of 104° F., and calomel in one-grain doses was given every hour for three doses. Two pints of a hot one per cent. solution of tannic acid was injected into the intestine every two hours, and also a subcutaneous injection of half a pint of a hot six-tenths per cent. solution of sodium chloride, containing one per cent. of brandy. Every hour *mv* of whiskey were given hypodermatically, and at night oxygen was given by inhalation. All attempts to administer food or remedies excited vomiting.

The fourth case, illustrates how rapidly death may occur in cholera. The patient was a Russian emigrant, aged eight years, admitted from the steamship Bohemia at 6 p.m. on September 26th. She told us that in the morning, at two o'clock, vomiting and purging began, and between the hours of 2 a.m. and 6 p.m. she had three large rice-water discharges from the bowels, and two similar discharges from the stomach. Upon admission she presented the characteristic facies of cholera. The orbits were deeply discolored, and there was a suffused reddish-purple blush over the arms, nose, legs, and feet. This cyanosis was especially marked on the left side of the neck, arm, and leg. This was due to the position assumed while on board the tugboat which was used in conveying her from the steamship to the hospital. At first she was able to say a few words, but soon became unconscious. Her respirations were very shallow, numbering thirty-five to the minute. Her axillary temperature was 96.6° F. Soon after admission she vomited a moderate quantity of light-brownish fluid, and at 8.15 p.m. she again vomited twenty-eight ounces of a liquid having the same character. At 9.15 p.m. she discharged a large quantity of rice-water liquid per rectum, and she died at 10.15 p.m., four hours and fifteen minutes after admission, or twenty hours from the appearance of the first symptom of the disease.

Upon admission she received a hot plunge bath, and fifteen minutes thereafter her stomach was washed out with one pint of solution of boric acid at the temperature of the body. At 8.45 p.m. she received an enteroclysis of two pints of one per cent. solution of tannic acid at a temperature of 104° F., which was rejected. At 9 p.m. oxygen was used freely, and at 10 p.m. a subcutaneous injection of two pints of distilled water, containing six-tenths per cent. of sodium chloride and one per cent. of whiskey,

was administered. From time to time whiskey was given by the mouth. Oxygen was continued until her death.

The autopsy was performed eighteen hours after death. *Rigor mortis* was extreme; the entire skin surface was dark-bluish in color, as were also the matrices of the nails. The body was considerably shrunken and emaciated. There was but little subcutaneous fat. Both pleuræ were free from adhesions. The lungs were collapsed, dark in color, but otherwise normal. The thymus gland was unusually large, measuring three by two inches. The right ventricles were contracted, and each contained a moderate-sized clot. The ventricles and auricles and cavæ were over-distended with blood, coal-black in color, and tar-like in consistency. The small intestine showed exfoliated epithelium and injection of the blood vessels. The heart muscle and pericardial sac were normal. The liver was moderately enlarged and the right lobe was unusually flattened at its base, and its entire surface was mottled with irregular areas of a whitish wax-like material passing into the substance of the liver. The left lobe of the liver was infiltrated more uniformly with the same material, but its consistency was normal. The gall-bladder was over-distended with a thick dark-green bile, containing mucus. The kidneys were cyanotic, but otherwise normal. The spleen was normal in size, and its pulp was black in color and glutinous. The bladder contained about two drachms of pale urine. The gastric and intestinal contents were typical in appearance, and contained the spirillum of cholera. There was complete suppression of urine. The skin and subcutaneous tissues were so dry that, when pinched, the fold remained for several minutes.

I beg your indulgence while I narrate the history of case five, the most interesting of all observed, and where we were fortunately able to note minutely every change that took place from the beginning to the end. This patient exhibited nearly all the symptoms of a typical malignant case of Asiatic cholera, illustrating also, in an equally striking manner, the results obtained by treatment.

This patient, a male, aged 24 years, a native of Germany, was admitted to the Swinburne Island Hospital on September 27th, 1892, at 11 a.m. His muscular and osseous systems were unusually well-developed, and it was reported that he was perfectly well on the morning of September 27th until 4 a.m., when he first complained of pain in the abdomen, which was followed by two loose stools. He continued feeling well until we saw him at 10 a.m., when, in view of the diarrhœa, it was deemed wisest to remove him to the hospital, although his general condition did not indicate that he was suffering from cholera. He objected strongly to his removal, and said that he felt perfectly well. He walked from his berth to the side of the ship and down a rope ladder to the quarantine tugboat. He arrived

at Swinburne Island and reiterated his statement that he felt perfectly well, and walked from the quarantine boat to the door of the hospital, when *suddenly* he complained of weakness in the knees, and fell to the ground in a state of collapse. He was carried to the ward in a condition of partial stupor, from which he was easily aroused. He responded to all questions in a manner showing that his consciousness was perfectly preserved. Soon he complained of agonizing cramp-like pains in the arms, feet, and knees, which recurred more or less regularly at intervals of thirty minutes. Immediately after his admission his countenance presented the typical appearance of cholera. The eyes were deeply sunken and surrounded by dark circles; the pupils were contracted to the size of a pin-point. The lips, cheeks, arms, hands, legs, and feet were cyanotic, and the entire skin surface was dry, and when the skin was pinched it remained elevated and compressed for several minutes. There was no pulse at the wrist. The temperature was 98.5° F., the respirations shallow and 18 per minute, and the voice whispering. I was unable to detect any special coldness in the expired breath. He was at once placed in a hot plunge bath having a temperature of 104° F., and was given four pints of a one per cent. solution of tannic acid at a temperature of 104° F.; also two pints of distilled water at a temperature of 100° F., containing $\frac{1}{8}$ of one per cent. of sodium chloride and one per cent. of whiskey. He responded but slightly to this treatment; the pulse was scarcely perceptible, was filiform in character, and about 100 per minute. At 11.30, or thirty minutes after his admission, he complained of intense agonizing pain in the legs, feet, and hands. These cramps forced the feet into extreme extension, and twisted and distorted the fingers. The pain was so great that it became necessary to administer a hypodermatic injection of one-eighth grain of morphine. The hypodermoclysis and enteroclysis were repeated. Camphor was given him hypodermatically. He inhaled oxygen constantly, hot bottles were applied to the extremities, and hot air was conducted under the bedclothing from a large steam radiator. He now vomited a large quantity of a clear liquid, and passed several copious rice-water discharges from the bowels. His collapse deepened; the pulse became slow, feeble, and almost imperceptible; and his respirations shallow. His intellection was clear, and his condition is best described by the word "terror." At 2.30 p.m., or three hours and thirty minutes after admission, he was extremely restless and anxious, and the choleraic intestinal discharges continued. He moved from side to side, tossing the arms about wildly, and calling aloud for air. The hypodermoclysis was repeated, and hydrochloric acid and brandy were administered by the mouth. At 5 p.m. he was pulseless, and complained most bitterly of intense pain, produced by the tonic spasm of the muscles. These cramps were so violent that the muscles were knotted and felt board-like. At 6

p.m. the hypodermoclysis was repeated; the pulse was scarcely to be felt, and thirty minims of whiskey were given hypodermatically and repeated for five doses, but with no effect. He now passed two copious liquid stools containing whitish shreds composed of intestinal epithelium, giving the discharges their rice-water like appearance. At 6.30 p.m. he passed three more stools, and at this time we were unanimously of the belief that he must speedily die. At 7 p.m. he showed slight reaction; his extremities became a trifle warmer, and the pulse more easily counted. At 10 p.m. hypodermoclysis and enteroclysis were repeated, and a hypodermatic injection of twenty minims of whiskey was given every thirty minutes until 1 p.m. At 11 p.m. the intellect was clear; the eyes were horribly sunken and surrounded by dark circles; the nose pinched; the face shrunken; the voice whispering, and so feeble that he was compelled to rest between words in replying to questions. He now complained of pain in the chest and renal regions. His extremities grew warmer, and perspiration was visible on the trunk. This symptom was peculiar and rare, as in none of our other cases was perspiration visible. The mental condition—terror—persisted. At this time he ejected large quantities of rice-water liquid by five acts of emesis. At 1 p.m., September 28th, this slight improvement continued, and the hypodermoclysis and enteroclysis and hypodermatic injections of whiskey were repeated. At this time he had three movements of the bowels which were composed of the tannic acid solution given by injection. At 5 a.m. a hypodermoclysis and a subcutaneous injection of whiskey were administered, and at this time the improvement was quite marked, and he slept quietly for a few hours. At 8.30 a.m. the enteroclysis was repeated and the whiskey suspended. At 9 a.m. his physiognomy underwent a truly remarkable change for the better; the face became slightly flushed; the ghastly, deathlike pallor disappeared; the expression about the eyes became more natural, and the entire skin surface, especially that of the extremities, was warm, and the pulse was of full volume, soft in quality, regular, beating 100 per minute. At 11 a.m. it seemed incredible that such wonderful changes could have occurred in the twenty-four hours which had just elapsed. At 10.30 a.m. the enteroclysis was repeated, and at 10.50 a.m. the pulse was full, regular, soft, and 88 per minute; the respirations were normal, and the expression good. He responded intelligently to questions, and the improvement continued.

In both flanks, where the needle had been inserted repeatedly for the subcutaneous injection of the sodium chloride solution, the tissues were hyperæmic and sensitive to the slightest touch. No extravasation of blood occurred, and in three days these symptoms disappeared. At no time was a single drop of urine excreted. In ordinary cases the rate of absorption, after the hypodermoclysis, varies between forty and sixty minutes, whereas

in this case three hours were required, thus showing that the power of absorption had been almost abolished. So soon as the liquid was absorbed a second enteroclysis was given. Hypodermatic injections of twenty minims of whiskey were repeated almost hourly until midnight. He passed a good night, vomiting but twice, and had dark-colored stools. His general condition remained unchanged. On September 29th he received champagne, and now recognized that he was convalescent. He was given whiskey and seltzer water, equal parts, every three hours, and at 10.45 a.m. for the first time, precisely forty-eight hours after admission, he passed one pint of urine. The examination of this urine showed a distinct trace of albumin; no sugar; a sp. gr. of 1024; an acid reaction; and in the sediment numerous granular tube-casts. The liquid movements continued every two hours; and again he passed a normal quantity of urine. On September 30th the diarrhoea continued to average one stool every two hours, the quantity passed was small, and the color had become dark. The patient was excessively irritable and nervous. He improved slowly for two days, and then sank into a typhoid state.

There was no enlargement of the spleen or elevation of temperature.

As we feared, but little improvement occurred, and the typhoid state continued until death, which took place on October 5th, or eight days after his admission to the hospital.

The *post-mortem* examination revealed the ordinary changes that are found in cholera; the kidneys showed a severe grade of acute parenchymatous nephritis.

The sixth case was of moderate severity, and the occurrence of an acute gastritis seemed to act as a predisposing cause. He was a native of Russia, aged 12, admitted from the steamship *Rugia* to Swinburne Island on September 8th as a cholera suspect, suffering with diarrhoea and vomiting. The fluid ejected was light in color and large in quantity. He soon improved and was placed at work filling wine bottles, and drank freely of the red wine until he became thoroughly intoxicated. He thereby acquired an acute catarrhal gastritis, the symptoms of which increased on the following day, and soon afterwards he vomited and purged large quantities of rice water like liquid. His temperature, pulse, and respiration remained normal. He rapidly grew worse, and soon passed into a stage of collapse. On September 13th his diarrhoea continued; he passed a normal quantity of urine, but there had been no vomiting for several hours. The stools were light in color, largely admixed with the tannic acid solution which had been injected per anum. The temperature remained normal.

On September 14th the diarrhoea continued, and frequent vomiting occurred. The urine was normal in quantity and appearance. The small quantities of whiskey given by the mouth were promptly rejected.

On September 15th vomiting was frequent, with excessive retching and choking, and there was considerable abdominal pain complained of. The urine became scanty and rather high-colored.

On September 16th the temperature was 97° F., respiration slow and labored, pulse very weak and scarcely perceptible, beating 100 per minute. Complaint was made of excessive weakness and restlessness. The face and upper and lower extremities became cyanotic. After the subcutaneous injection of a quart of hot liquid containing three-tenths per cent. of sodium chloride and one per cent. of whiskey, his pulse became stronger, and a marked improvement in his general condition was noted.

On September 17th he complained of considerable pain in the lower abdominal region, with great restlessness; the vomiting decreased in frequency and amount, and the patient gradually grew stronger.

On the 18th he was stronger, and on the 22nd he was discharged from the ward. Bacteriological examination of the dejecta showed the presence of the spirillum of cholera.

Treatment. In the beginning he was given a hypodermoclysis every two or three hours, averaging a pint, and this was continued in conjunction with enteroclysis, three to six pints, at intervals of four or more hours, according to his condition. Twenty minims of whiskey were given hypodermatically, and oxygen was administered p. r. n. His diet was liquid, chiefly composed of milk and beef juice.

The seventh case was unusually mild, and was interesting from the total absence of vomiting. He was a native of Russia, aged 10, admitted from steamship Candia, September 14th, with choleraic discharges which continued during the next day, and ceased September 16th; at no time was there vomiting. The spirillum of cholera was detected in the dejecta. He was discharged on September 19th. Treatment: calomel, grs. vj; enteroclysis every four hours until three were given. No hypodermoclysis.

The eighth case was one of great severity, with marked gastric symptoms; recovery in ten days. The woman was a Russian, aged 28; was admitted from the steamship Scandia on September 10th with the diagnosis of cholera, complaining of continuous vomiting, which was at first associated with a burning sensation in the epigastrium. Her extremities and face were cold and cyanotic, and her physiognomy was typically choleraic. Her intestinal discharges were copious and frequent and rice-water like in appearance. So many patients were admitted at this time that it was impossible to make careful observations regarding the pulse, temperature, and respiration. For several hours she was pulseless, respiration shallow, 20 per minute, and temperature 97° F. On the following day vomiting and diarrhoea were almost continuous. On September 12th she had but one intestinal discharge, but the vomiting continued almost constantly;

and was rice-water like in character. Medicines and food when administered by the mouth were immediately rejected. September 13th, vomiting still continued; towards the close of the day some liquid ejecta were bile-stained; there was no intestinal discharge. On September 14th vomiting continued, but still no movement of the bowels, though enemas were given at 9 a.m. and 6 p.m. with the idea of securing evacuations. On September 15th, vomiting continued with much less frequency, and a stool was secured by enema. On September 16th, there were numerous acts of vomiting and one normal stool. On September 18th, she was convalescent, and on the 21st was discharged from the hospital. The spirillum of cholera was found in the matter vomited.

Treatment. At first she received a plunge bath, the water having a temperature of 104° ; enteroclysis, two quarts, for two days, and one hypodermoclysis of two pints of the saline solution. Attempts were made to administer champagne and whiskey by the mouth, but they were both rejected. On September 13th, she received ten grains of calomel, which was repeated on September 15th. Ten drops of hydrochloric acid were given from time to time.

The ninth case, like the sixth, would seem to illustrate how an acute gastric irritation or catarrh increases the susceptibility to cholera. It is probable that he was infected during his stay in the hospital, inasmuch as there was no cholera on board the ship for some days; he showed no choleraic symptoms until the evening of the second day after his admission to the cholera ward. He was a Polish Jew, aged 18, a butcher by occupation, and a steerage passenger on the steamship Bohemia, which arrived on September 15th. He was admitted to the wards on Swinburne Island on September 21st. He had a well-developed osseous and muscular system, and seemed fairly strong. The face was of a dark-red color, especially in the nasal and maxillary regions; the eyes were deeply sunken, with dark lines surrounding them; but the intellect was clear; the tongue was pointed, and its dorsum was covered with yellowish-brown fur.

The first symptom was diarrhoea, which was repeated three times during the day. While on the ship he was bottling wine and drank to excess, and, in consequence, he had several attacks of vomiting, which were accompanied by great pain and retching. On the morning of September 21st he was quite well, and was discharged from the convalescent ward, and during the night he had three large passages, which were fluid, yellow, and painless. On September 22nd he had three intestinal movements, liquid and yellow, in which floated shreds of intestinal epithelium. The next day movements occurred smaller in amount and less frequent, and there was no vomiting; the urine was scanty. The rectal temperature was 100.6° ; pulse 98; respirations 19. He gradually improved, and on September 27th was discharged.

On September 20th the stools were dark in color, fluid, frequent, and mixed with mucus. The temperature was 98° ; pulse 97; and respirations 18; at 9 p.m., temperature 97.4° ; pulse 96; and respirations 16. He was very restless, and complained of an obscure uncomfortable laryngeal sensation, which seemed to be more of a paresthesia rather than a pain. He passed a good night, and a sufficient quantity of normal urine was excreted. September 21st, temperature during the day was 99.2° ; pulse 94 to 96; respirations 20 to 18. Three moderate-sized whitish watery mucous stools were passed; the patient sat up during the day, but complained of pain in the left side; he excreted in twenty-four hours 46 fluid ounces of urine. His improvement was so rapid that he was directed to sit up, and sent to the convalescent ward. During the night he became worse and diarrhoea returned, and he was again placed in the wards. September 26th, temperature was 98.5° to 99° ; pulse 98 to 97; respirations 15 to 24. He passed three watery yellowish stools, and slept on and off during the day, and said that he felt much better. At no time was pain complained of. He passed thirty-two ounces of urine during the past twenty-four hours. September 23rd, temperature 99° to 99.5° ; pulse 76 to 80; respirations 16 to 22. He had passed six light-colored, yellowish, liquid stools; there had been no vomiting; the urine was passed in normal quantities, and he had been able to sleep fairly well. September 24th, pulse and respiration normal; sleep normal; no vomiting; and there were but three yellowish watery stools, and the urine was normal in quantity. September 25th, pulse, respiration, and temperature normal; three liquid stools. September 26th, he was discharged from the convalescent ward.

Treatment. Calomel, ten grains, followed by one grain every hour for six doses. Enteroclysis, Ovj, every two hours; whiskey hypodermically, to the extent of drachms ij, which was administered during the night. Beef tea and seltzer water p. r. n. September 21st, an enteroclysis was given every four hours, and whiskey, drachms ij, was given by the mouth every four hours. September 27th, rectal injections of tannic acid solution were discontinued, and a light, easily-digested diet was ordered. September 23rd, enteroclysis was resumed, and on September 24th Squibb's cholera mixture, one drachm, was given t. i. d. Whiskey, drachms ij, was given three times daily, as it was necessary, to stop enteroclysis and hypodermoclysis.

The tenth case requires no special comment, and occurred in a man aged 18, who was removed from the steamship Bohemia to the ward of the hospital on September 20th. On admission, his temperature varied from 99.4° to 99.6° ; pulse 98 to 100; and respiration 20 to 24. He had considerable abdominal pain and diarrhoea, and vomited continuously a greenish watery liquid.

September 21st, respiration and temperature about the same; on several occasions a yellow-greenish liquid was vomited, and five liquid movements occurred during the day. He slept well; the urine that was passed was normal in appearance and quantity. September 21st, pulse, respiration, and temperature unchanged; the vomiting and diarrhoea were frequent, and the ejecta were milk-like in color and small in quantity, and contained some mucus. September 23rd, frequent vomiting of a yellowish liquid. One small stool passed normally. He complained of but a moderate amount of pain in the abdominal region, and slept well. September 24th, no complaint of pain; pulse, temperature, and respiration unchanged. On September 25th he was considered convalescent, and was discharged the following day.

Treatment. Upon admission he received a hot bath, and was given ten grains of calomel; whiskey was given every four hours by the mouth, but it was rejected, and we were compelled to resort to hypodermic injections of ten minims thrice daily. September 21st, whiskey every four hours was ordered, and one enteroclysis of two pints was administered. September 22nd was a repetition of September 21st, and on the 23rd whiskey was administered by the mouth in two tablespoonful doses every four hours, and a hypodermic injection of one-eighth grain of morphia for abdominal pains.

The eleventh and final case was one of great severity, and we attributed the favorable result largely to the treatment employed. It occurred in a girl, aged six, admitted from the steamship Bohemia, September 27th, at 11 a.m., in a state of marked collapse, with coldness of the entire surface and with the characteristic facies of Cholera Asiatica, and cyanosis of the face and upper and lower extremities. Her mental condition is best described by the word "stupor." Her pulse was scarcely perceptible, and very rapid. She had frequent attacks of vomiting and diarrhoea, and the stools were faecal and dark in color. Her respirations were labored, shallow, and 22 per minute. The pulse was 122. No urine was excreted. The temperature was 97.8° F. On September 28th the vomiting continued, and there were but two liquid stools. In the afternoon a moderate quantity of urine was passed—the first for thirty hours. The passage of the urine in our cholera cases was always viewed as a most favorable indication. The pulse improved in force and volume, the respirations were slow and labored, and the temperature was normal. On September 29th the pulse still showed signs of increasing strength, averaging 100 to the minute; the respirations were quiet and 20 per minute; the temperature normal, and a fair amount of sleep was secured. There had been but one liquid intestinal movement, and a sufficient quantity of urine had again passed. On September 30th there was one act of vomiting, which seemed

to have been excited by the remedies administered. The respiration was normal and the temperature remained unchanged, and the pulse was small and weak, 100 per minute. But two loose intestinal discharges occurred. The improvement continued, though she remained in a partial typhoid state. The urine was passed in moderate quantities, and in a few days she was discharged from the hospital.

Treatment. Upon admission she received a hot plunge bath, an enteroclysis, a hypodermoclysis, and camphor and ether *m. xx* hypodermically. Oxygen was administered *p. r. n.* She had hypodermic injections of *m. x* of whiskey every two hours for five days. The enteroclysis was repeated every two hours, and hypodermoclysis but once. On the following day, September 28th, the enteroclysis was given at 9 and at 11 a.m., and at 1 p.m. the second hypodermoclysis was administered. The hypodermic injections of whiskey were persisted in. On September 29th, the hypodermoclysis was administered at 1.30 p.m., and the enteroclysis at 1 and 5 a.m., and the hypodermic injections of whiskey were given at 10 a.m. and 4 p.m. September 30th, hypodermoclysis and enteroclysis were suspended, and seltzer water and tincture of senna were administered by the mouth. October 1st, improvement continued, and during the day there were but two loose, dark-colored stools, and no vomiting.

Mortality. Of the eleven cases of cholera under my personal observation, eight recovered and three died, which is a mortality of 27 per cent. As one of these cases died two hours after admission, it could be fairly excluded in giving the percentage of deaths of cases under treatment, which would reduce this mortality to 18 per cent.

The total number of cases admitted to the Swinburne Island Hospital was seventy-two, and the number of deaths was twenty, or a general mortality of 27 per cent. In addition, fifty-six suspects were admitted, of whom forty-six presented the prodromic symptoms of cholera. If these were included, our mortality would be reduced to 17 per cent. The mortality from all cases under treatment, including the forty-six suspects and excluding the deaths occurring within two hours after admission and those deaths occurring later from complications, would be 11 per cent.

The mortality of the cases of cholera that occurred on shipboard varied between 50 and 98 per cent., while the percentage of deaths in Hamburg varied between 50 and 60 per cent.

In considering the number of deaths in relation to the question as to how far the treatment was responsible for this low rate of mortality, it is well to remember that most of our patients were half-starved, rachitic, and anæmic Russian emigrants, many of whom were children; that they were in a specially weak condition, due to the long voyage and also to the fast days which their religion imposed upon them; that the premonitory stage

in the epidemic was present to a slight degree or not at all ; that many died before the treatment could be inaugurated ; and that this epidemic was especially virulent.

Despite these unfavorable circumstances our general mortality was but 27 per cent., while that of Hamburg was from 50 to 60 per cent. After a very careful deliberation, in which we discussed everything that could have influenced the percentage of mortality, we were convinced that it was chiefly due to the method of treatment employed.

Treatment. As to prophylactic treatment, the rules found necessary were both few and simple. Each of us wore a separate suit of clothes for the hospital, and avoided physical contact with patients except when it became necessary. Regularly, each time after examining a cholera case, we would wash the hands thoroughly with hot water and soap, afterward immersing them in a 1 : 500 solution of bichloride of mercury. The convalescents and those employed about the hospital were instructed to drink a lemonade of ten drops of hydrochloric acid to the glass of water. No ordinary water was used, and we drank exclusively of carbonated distilled water or Apollinaris water. All foods were thoroughly cooked, and green vegetables, salads, and indigestible foods were avoided. These precautions were so effective that, despite the dense ignorance of the people under our care, but two cases of cholera originated on Swinburne Island. In both instances these emigrants drank red wine until they became thoroughly intoxicated, and this was followed by acute catarrhal gastritis and infection by the spirillum of cholera. We had no experience in the treatment of the primary stage, as all our cases were fully developed when they came under observation.

In the treatment of the stage of collapse the patient was first immersed in hot water, and then given a subcutaneous injection of a quart of hot, sterilized water, containing six-tenths per cent. of sodium chloride and one per cent. of brandy. This procedure is known by the name of hypodermoclysis. The first injection in an adult may be one or two quarts. In but one of our cases did an abscess form. Usually the only complaint made when this operation was frequently performed was sensitiveness and pain on light pressure over the region of the punctures. In favorable cases absorption takes place in from thirty to forty-five minutes ; but in those cases where collapse approached death, as long as four hours may be required. It therefore becomes evident that the rate of absorption is of great prognostic importance. The best position for these subcutaneous injections is in the flanks, in the region of the floating ribs, in the median axillary line, although it may be administered in the buttocks or inner aspect of the thighs. The neck is to be avoided, as there is danger of producing œdema of the larynx. Ordinarily, a hypodermoclysis may be repeated every two

hours, and in severe cases it may be well to inject one quart in each flank, repeating the injection so soon as it has been absorbed. In supplying the indication for heat, it is necessary that the solution should have a temperature of about 104° F., and care should be taken that it is thoroughly sterilized immediately before it is introduced beneath the skin. In each of our cases a Davidson syringe was employed, but I would strongly urge the adoption of the ordinary fountain syringe, as by this means the liquid may be slowly introduced, and hydrostatic pressure controlled to a nicety by raising or lowering the reservoir. It requires from twenty to thirty minutes to introduce one quart of liquid, and usually it is unnecessary to attempt to disperse the fluid by manipulation, though it may be advisable in grave cases where rapid absorption becomes necessary. As one would naturally suppose, this subcutaneous liquid forms a large oval swelling, the size depending upon the amount of liquid introduced.

A good working rule regarding the quantity of the injection is the following: For an adult, two pints; for adolescents, one pint; for an infant, half a pint.

We found that the best place for the hypodermoclysis was in the mid-axillary line, in the region of the floating ribs. In an adult a quart of the solution may be introduced in this locality, and when the case is urgent a second quart may be introduced at a corresponding point on the opposite side. When it is desirable to change the locality, the inner surface of the thighs or the chest may be selected. Observation has shown that there is danger in the injection of liquid beneath the skin of the neck. Fatal œdema of the larynx has been reported in two cases where the injection was made in this region.

An enteroclysis consists of a one to two per cent. solution of tannic acid, having a temperature of 45° C. or 113° F. For an adult, two quarts may be given; for an adolescent, one quart. This solution should be introduced very slowly, and in each of our cases the Davidson syringe was employed, but I should advise the use of a medium-sized soft-rubber rectal tube, having one outlet one-half inch from the extremity, and a second on the opposite side, two inches from the extremity, and the terminal portion closed so as to facilitate its introduction. In an adult this tube should be well oiled, and gently and slowly introduced by a slight rotary and inward pressure for the distance of ten inches. To this tube should be attached an ordinary fountain syringe, the same as the one suggested for hypodermoclysis. The advantage of this method is that the hydrostatic pressure may be modified immediately to suit the particular case in question, and in this manner the rate of discharge of the liquid may be regulated. It is necessary that the solution should be *slowly* introduced, occupying not less than *ten minutes*. The tube should then be slowly withdrawn, and gentle

pressure applied to the anus in an inward direction toward the anterior perineum. The patient should be encouraged to retain the liquid as long as possible. Not infrequently, if the first desire to void the injection is overcome, it is retained without further difficulty.

It has been hitherto generally believed that the ileo-cæcal valves prevented the entrance of liquids from the colon into the ileum. In many of our cases, after giving an enteroclysis of tannic acid, we were convinced that the liquid entered the small intestines, and this opinion was strengthened when several of our patients vomited this same solution.

In order to investigate this matter more carefully, the following experiments were made :

A fountain syringe containing three pints of water was suspended at an elevation of five feet, and a rectal tube introduced for a distance of six to ten inches.

CASE 1. Male child, aged 2 years ; dead of cholera ; the liquid passed readily, filling the intestines and stomach.

CASE 2. Male child, aged 2 years ; dead of marasmus ; liquid passed freely, filling the intestine and stomach.

CASE 3. Child, aged six years ; dead of measles ; the liquid passed readily through the entire intestinal tract, and flowed from the mouth and nose.

CASE 4. Child, aged 3 years ; dead of measles ; the liquid passed readily through the ileo-cæcal orifice, filling the small intestine.

CASE 5. Child, aged 3 years ; dead of measles ; the liquid refused to pass. A *post-mortem* examination showed that the colon was over-distended, and that there was a twist in the ileum against which the distended colon pressed, rendering it impossible for any liquid to pass into the ileum.

CASE 6. Female child, aged 18 months ; dead of measles ; the liquid failed to pass both before and after opening the abdominal cavity. In this case the ileo-cæcal valve was small, and the lips of the valve were in close apposition, rendering it impossible for any liquid to pass from the colon into the small intestine.

CASE 7. Child, aged 2 years ; the liquid refused to pass ; upon examination the ileo-cæcal valve was found to be competent.

These observations show that in two cases the valve was competent to prevent irrigation of the small intestine, and in one case, owing to the peculiar twist in the ileum and the pressure of the over-distended colon, liquids failed to enter the ileum. This case is particularly instructive, and shows that in a certain number of cases success may be looked for, even though the first attempt prove unsuccessful. In four cases there was no difficulty whatever in the passage of liquids from the anus to the stomach, or even out through the mouth and nose.

As *coldness* of the body and *lowering* of the *central temperature* is an almost constant condition in Asiatic cholera, it becomes necessary to supply heat. This is accomplished by heating the liquids used in hypodermoclysis and enteroclysis, and also by the hot plunge bath, which is always given to the patients in the state of collapse. I should further advise that the entire skin surface be covered by soft woollen undergarments, and from time to time hot air should be conducted beneath the bedclothing. Advantage may also be taken of hot air bags and hot bricks. The patient should be covered by two woollen blankets and a counterpane. A most excellent practical suggestion to add to the heat of the body has been made by Dr. Francis X. Dercum, namely, that the patient be placed upon a water-bed, through which hot water should constantly circulate.

Stimulation. The best method of administering stimulants is by deep hypodermic injections of whiskey, repeated every hour or less frequently, according to indications. For an adult, twenty minims may be employed; for an adolescent, ten minims; and for an infant, five minims. During the stage of collapse, if there is any tendency to vomiting, it is wisest to avoid the administration of any substance by the mouth.

Lavage. As the stomach frequently contains large quantities of choleraic liquid, it is often advisable that a soft rubber stomach tube be introduced, and that lavage be thoroughly performed, using the hot tannic acid solution as in washing out the intestines.

Hydrochloric Acid. As the growth of the spirillum of cholera is inhibited by an acid medium, and as hydrochloric acid is the normal acid of the gastric juice, it is desirable that it be administered diluted in a glass of water at intervals of two hours. An adult may receive fifteen minims; an adolescent, ten minims; and an infant, five minims, taken slowly in sips.

Nourishment—Liquids. The only nourishment that should be administered is peptonized milk, or milk that has been sterilized, in small quantities, about two ounces every two hours. If this is not well received, it may be surcharged with carbonic acid gas, or koumiss may be substituted. Iced champagne, in small quantities, may also be given, or iced wine-whey made in the proportion of one part of sherry wine to four parts of milk. The only liquid that should be permitted is carbonated distilled water. When vomiting is persistent, all attempts to administer remedies or food by the mouth should be avoided.

In conclusion, I cannot refrain from acknowledging my hearty thanks to Drs. Byron and Abbott, of the Loomis Laboratory, New York, to whom I am not only indebted for the opportunity of making this clinical study, but also for the many courtesies which I have received at their hands; and, further, to Dr. Byron is due the credit of having initiated the treatment of these cases in the manner herein pointed out.

To Dr. Jenkins, the health officer of the port of New York, my thanks are due for his many kindly courtesies, and for the aid which at all times he gladly extended to me.—*University Medical Magazine.*

Clinical Notes.

A CASE OF COMPOUND FRACTURE OF THE SKULL FOLLOWED BY SUPPURATION.

BY CHARLES B. LANGFORD, M.B.,
BLENHEIM, ONT.

Clifford C., aged 6 years, on the afternoon of July 6, 1891, received a violent kick on the head from a horse. He was seen shortly after the injury, and a compound depressed fracture of the skull, with escaping brain substance, was found. It was not deemed advisable to operate, but await developments.

I saw the patient next morning in consultation. I found him unconscious; respirations 24, rather shallow; pulse 110, weak and compressible; wound in scalp about one and a half inches above external angular process of the left frontal bone, exposing the depressed bone. Brain substance was still escaping, and its irritation caused convulsive movements of the right foot and leg. The raising of the depressed fragment of bone by operation was deemed advisable. In the preparation of scalp, wound, etc., the technique of modern antiseptic surgery was carried out in detail. The patient being anesthetized, I made an incision upwards and backwards from the wound in scalp for about two and one-half inches, and cleared out the blood clots, exposing the depressed fracture. The fracture passed through the coronal suture, and the depressed fragment was one and three-quarter inches long, and varied from one-half to three-quarter inches in width, with edges irregular and slightly chipped. After careful cleansing of structures involved, I snipped off the protruding portion of brain substance. By gentle manipulation, the remainder was restored to the cranial cavity. The estimate of brain substance lost would be about four drachms.

After trimming off projecting spiculæ of bone, the depressed fragment of skull was restored to its original position by means of a fine elevator.

After the usual antiseptic precautions incision in scalp was sutured, and a small drainage tube was placed and left in the most dependent part. Antiseptic dressings were applied, and orders given not to have them disturbed. Patient progressed favorably, but on the third day I found the dressings had been so disturbed that free hemorrhage ensued. Further examination revealed that this disturbance was sufficient to make repair by granulation inevitable. The wound being dressed every day or two, healing progressed favorably, the detached fragment of bone became united, consciousness was regained, and the movements of the limbs restored.

On two occasions threatened intracranial inflammation was prevented by the ice coil, purgation, etc. I was taken ill myself on July 1st, and the

dressing of the wound was left in care of the mother. On Aug. 6th I found that the dressings had been so neglected that the periosteum over a surface one and one-half by one and one-quarter inches had been destroyed and necrosis of skull begun. The edges of the wound had ceased to granulate, and had become attached to the bone beneath. The case looked as if the surface denuded of periosteum would become necrotic and exfoliate. To overcome this difficulty, the treatment advised by Dr. Senger in a paper read before the German Surgical Congress, and referred to in the *International Journal of Surgery*, August, 1891, was carried out. The small portion of necrosed bone having been removed with a scoop, the parts were kept constantly moist for three days with warm boracic acid solution (grs. x- $\bar{5}$ i), and the dressings changed four times in twenty-four hours. With a fine chisel, the upper layer of the external table of skull was then taken off in thin lamellæ sufficiently deep that drops of blood appeared on surface of bone.

Anæsthesia was unnecessary, as there was very little pain. The surface was covered with lint, which was kept constantly moist with warm boracic solution (grs. v- $\bar{5}$ i). On the fourth day I found at denuded points granulations shooting from the bone beneath, and in ten days, in place of bare necrotic bone, the whole surface was covered with healthy granulations. Healing progressed favorably; and to-day, a year and one-half since the accident, a healthy, firm cicatrix is found, and very little evidence is shown of the severe injury received, or of the operation having been performed. The boy's faculties and movements have regained normal condition, except that in walking or running he flexes the right forearm on the arm with hand pronated and fingers flexed. When extending the fingers of the same hand, he does so slowly. The success of the treatment was perfect, and fully verified Dr. Senger's experience.

HYSTERO-EPILEPSY IN A CHILD OF THREE.

BY W. B. THISTLE, M.D., L.R.C.P. LOND.

That hysteria in its various phases is seen in childhood is a well-established fact. Cases are on record of hysterical paralysis, aphonia, aphasia, anæsthesia, and catalepsy occurring in children two, three, and four years of age.

However, the appearance of the severer phenomena of the condition in the very young is sufficiently uncommon to, perhaps, render a report of the following case of interest.

G.C., æt. 3 years, a bright, healthy-looking little boy, had been admitted to the Victoria Hospital, suffering from purulent discharge from the right ear. In other respects he was quite well.

Feb. 14th. He seemed to be in excellent health, playing and singing; took his breakfast, but while at the table the nurse noticed that he acted

strangely, grasping at imaginary objects, and shortly began to cry. In about half an hour he became somewhat unconscious, very restless, and was seen to strike at the other children who came near. He attempted to bite his hands. Was put to bed. Temperature normal.

1 p.m. Face flushed a bright red. Pupils widely dilated, but contract to light. At times there is convergent squint. Eyes are wide open, bright, and looking about constantly. The head is rolled from side to side. There is incessant movement of arms and legs, somewhat spasmodic in character. Evidently there are hallucinations of sight and hearing, as the expression of the face changes quickly, now indicating surprise, again pleasure, and in a moment starting as if in terror. The symptoms of busy delirium are constant, there being no periods of subsidence into somnolence, as in meningitis. At times he shows a sense of what is going on about him; for example, saying indistinctly, "Hold my hand." He showed no sign of recognition when his mother came into the ward. Breathing is short and rapid. Temperature 99.2° . Discharge from ear as usual. No tenderness about that region.

4 p.m. Temperature 102.2° . Respirations 68. Condition as at last visit. Ordered chloral hydrate, grs. vi. This was given, and repeated in half an hour with potassium bromide, grs. x. There was very slight adhesion of the prepuce, which was broken down.

10 p.m. Temperature 102.1° . Respirations 70. No change in condition; constant movement and busy delirium have continued without interruption since last visit.

While at his bedside I told the nurse to bring in the bath, fill it with cold water, and plunge him into it if the movements continued, when he at once became quite still.

12 p.m. Temperature 99.4° . Respirations 30. No movements since visit at 10 p.m.

11 a.m. Temperature normal. Has had breakfast, and is playing in bed.

On one occasion since there were indications of another attack, but the suggestion of a cold plunge was sufficient to prevent further manifestations.

NOTES OF A CASE OF AORTIC ANEURISM.

(UNDER DR. MCPHEDRAN.)

REPORTED BY J. W. E. BROWN, M.B.,

House Surgeon, Toronto General Hospital.

Thomas A., æt. 44; occupation, boilermaker; admitted to Toronto General Hospital, Sept. 28; died, Oct. 7th, 1892.

Patient's mother died of apoplexy. His wife died seven years ago. Has drunk moderately heavy, and always worked hard. About nine

months ago, while riveting a boiler, he was suddenly seized with a sharp pain in the chest, accompanied by dyspnoea, which caused him to quit work at once. Was treated for rheumatism. In a few weeks he began to notice a small lump on the left side of his chest, which gradually increased in size. His voice gradually became husky, and phonation difficult. He also suffered from dysphagia. At the time of his admission to the hospital, he complained of much pain if he moved. He was considerably emaciated and quite weak. Skin was cyanosed, particularly on the hands and face. Tongue was thickly coated, teeth badly decayed, and his lips covered with dry bloody scales. Appetite was poor, and bowels irregular. His pulse was frequent (130), weak, and fairly regular at first. Arteries were markedly sclerosed. The area of the heart dullness was increased, the apex beat being felt indistinctly in the sixth intercostal space, four inches to the left of the mid-sternal line. The second sound was markedly accentuated; but there was no murmur or bruit. The respirations were fifty a minute, unilateral, the right side alone expanding, and that much more than normal. No fremitus could be obtained over left lung on palpation; but dullness over its whole area on percussion. On auscultation, no breathing sounds could be heard on left side, but were much exaggerated on the right. Mucous râles could be heard after he coughed. His cough was very marked; however, there was very little expectoration. His voice gradually became so indistinct that finally it was very difficult to make out what he said. He moaned with each respiration. His temperature was $103\frac{3}{4}^{\circ}$ when he came in, continuing nearly as high in the evenings, with slight morning remissions, until the last two days, when it fell to about normal.

The tumor extended from the second to the fourth rib, and from the left side of the sternum to an inch beyond the mammary line, was firm, regular in outline, pulsating, and expansile.

The patient, toward the last, became quite delirious, had muscular twitchings, pulse became very weak and irregular, and had occasional spells of vomiting.

Patient died on ninth day after admission.

The medicinal treatment consisted of nitro-glycerine and opium.

At the *post mortem*, in stripping off the pleura from the left side the aneurism was cut into. A part of the second rib and the sternum had been absorbed. A large quantity of clotted blood was found in the left pleural cavity, showing that the aneurism had burst into it. The right lung showed hypostatic congestion. The left lung was completely collapsed and non-crepitant. The aneurismal sac was large, with walls an inch thick. It was situated on left side of the ascending aorta. There was a large perforation in it. Within it were both *ante-* and *post-mortem* clots. The inner surface of the aorta was markedly calcareous.

Progress of Medicine.

MEDICINE

IN CHARGE OF

W. P. CAVEN, M.B. Tor.,

Lecturer in Clinical Medicine in the University of Toronto; Physician to
Home for Incurables.

THE TREATMENT OF OXYURIS VERMICULARIS.

Dr. Nicholson draws attention to the fact that children suffering from the oxyuris vermicularis may, after irritation and scratching of the anus, convey the ova to the mouth and thus reinfect themselves.

When a child suffers from this parasite he recommends that it should be bathed twice daily, the underclothing changed frequently, a draw sheet put below the patient at night, the nails kept short, the fingers dipped frequently in an infusion of quassia, and the anus smeared night and morning with an ointment composed of nitrate of mercury, with a small quantity of extract of quassia added. The condition of the bowels should be attended to. Mercury, with chalk and rhubarb and soda powder, should be prescribed to secure daily evacuation. Now santonin must be given every other night for a week, and if taken longer santoninism must be guarded against, viz., tenesmus, spasms, yellow vision, hemorrhages, and red-yellowish urine. Attention should be paid to the bile secretion, the great antiseptic of the intestinal tract. The endeavor should be to increase peristalsis and diminish the secretion of mucus by giving as a tonic citrate of iron and strychnine, in moderate doses, after food. Dr. Nicholson has lately been using, with great benefit, extract of quassia made into a suppository with cacao butter (one to three grains); these suppositories are easily introduced at night, and children do not object to them.

Injections are disliked by children, and it is difficult to get the mother or nurses to take the necessary trouble. An injection of menthol (one grain) dissolved in one ounce of olive oil is often useful. The child should have abundance of outdoor exercise and a free diet, avoiding uncooked vegetables, fruit, sweets, etc., and anything likely to produce catarrh or increase the mucus. The patient should be isolated during the period the oxyurides are being expelled, kept from school, should sleep alone, and not be allowed to mingle with other children. This treatment should be maintained until all signs of oxyurides are obliterated.—*Lancet*.

EFFECTS OF A VERY LARGE DOSE OF QUININE.

Dr. Grosskopf (*Therap. Monat.*, October, 1892) reports the effects of 75 grains of quinine in a single dose. The patient had been ordered six 15-grain powders, and finding that one powder was of much service to him he took the remaining five in a single dose. He became unconscious in about an hour. Two hours after the large dose had been taken, Dr. Grosskopf found him still unconscious, face pale, the whole body icy cold, the pulse small and frequent, the breathing superficial and accelerated. Two "ether camphor" injections were administered, and frictions to the chest employed. After about an hour the patient recovered consciousness and opened his eyes. When asked how he felt, he said, "Well, but I can see nothing." He then fell asleep, and when he awoke a few hours afterwards he said he felt well, but that the room was dark, although there was a bright light burning in it.

In a few minutes after this, however, the room appeared to be lighter, and he could see things on the wall. Next day he was quite well. During the whole time he never complained of noises in the ears or difficulty in breathing. It is worthy of remark that the malarial attacks, for which he was ordered the quinine, did not recur after the dose of 75 grains.—*Medical Chronicle*.

THE TREATMENT OF SCROFULA WITH CREASOTE.

Professor Sommerbrodt (*Therap. Monat.*, October, 1892), in his first work on the treatment of lung tuberculosis with creasote, notices the identity of scrofula and tuberculosis, and advises the same treatment in young persons with large cervical glands without weakness of the lungs or larynx, and states that he has noticed the disappearance of these glands under creasote treatment. Since that time Sommerbrodt made use of every opportunity to give creasote to scrofulous children. The results have been so good that, in the *Berl. klin. Wochen.*, 1892, No. 26, he directs the attention of medical men to creasote, and tells them to try it in the treatment of scrofula. In children under six years of age he recommends pure creasote to be given in milk or wine, without any further addition, three times daily, beginning with one drop and increasing the dose every two days, until seven to ten minims has been given daily. In children over seven years of age it is easy to arrive at fifteen minims daily, either giving it in the form of drops or in capsules of $1\frac{1}{2}$ minims creasote, with cod liver oil (not with tolu balsam). An increase to more than fifteen minims daily will very seldom be necessary. It should be noticed that the medicine ought not to be taken on an empty stomach, but only after each of the three chief meals.—*Medical Chronicle*.

ON THE SPREAD OF DIPHThERIA.

Diphtheria claims from 5,000 to 6,000 deaths in England and Wales, *i.e.*, twice as many now as twenty years ago. Faulty drainage no longer holds its ground as a cause, for *pari passu* with improved sanitation the mortality from diphtheria has increased, more especially in large towns where, owing to these improvements, general mortality had agreeably diminished. It is granted that general sanitary defects may prepare a condition of the fauces favorable to a diphtheritic attack, but that the true source of diphtheritic contagion may be assigned to the lower animals principally, as shown by Mr. W. H. Power and Dr. Klein in a kindred infectious disease amongst milch cows. Once thus started, the "school influence" means of diffusion comes into action, school life in all its phases especially favoring its dissemination—in a mild form, it may be, at first, but subsequently becoming intensified. Diphtheria is intensely infective from person to person, the ages from three years to twelve years being especially liable in this way; and mild cases often in their sequelæ become alarmingly dangerous, and quite often instigate in others malignant types of the malady. Such are the prominent and at the same time not easily preventable causes of the disease.—*Editor, in British Medical Journal.*

FORMS OF TUBERCULOSIS FOUND CLINICALLY IN CHILDREN.

Dr. E. C. Aviragnet concludes his review of the subject thus:

(1) Tuberculosis frequently attacks children and then usually becomes general; local tubercloses are rather exceptional in them.

(2) General tuberculosis in them is acute, subacute, or chronic.

The acute kind takes three different forms: (a) A very acute tuberculous infection; (b) a continuous tubercular fever, typho-tuberculosis; (c) a general miliary tuberculosis. The subacute is the so-called galloping consumption. The chronic is found chiefly in the very young.

(3) The localized tubercloses are acute and chronic.

The acute takes the form of pneumonia and broncho-pneumonia, manifestations which do not appear to be due to the bacillus of tuberculosis alone, but to the bacillus associated with other microbes. It is then a mixed lesion. The chronic kind takes the form of pulmonary, intestinal, peritoneal, and mingal tuberculosis.—*Bulletin Général Thérapeutique.*

J.A.A.

THE USE OF SULPHONAL IN ARRESTING THE CRAMPS OF FRACTURED LIMBS AND OTHER REFLEX SPASMS.

Dr. Edward Andrews, of Chicago, contributes to the *Journal of the American Medical Association* for August 27th, 1892, a brief article upon

the use of sulphonal for the purpose of overcoming reflex spasm. After recognizing the fact that its action is very slow, and that when the cramps are nocturnal it is necessary to give a large dose two or three hours before bedtime, or else to give small doses several times a day, he strongly urges the employment of this remedy in such spasmodic affections.

He reports the case of a vigorous young man who fell forty-two feet, striking obliquely on a slope of timber, causing a severe contusion of the right sciatic nerve, without any fracture. The thigh and leg of the injured side were affected by a constant and painful jerking motion resembling chorea. Two doses of sulphonal of fifteen grains each completely arrested the distressing movements.

In the discussion which followed the reading of this paper a number of physicians recorded their experiences, which, as a rule, were favorable.—*Medical Chronicle*.

VOMITING OF PREGNANCY.

Dr. Weil recommends that ten drops of a twenty per cent. solution of menthol in olive oil, dropped on powdered sugar and sugar sprinkled over it, be taken whenever nausea appears. By this means relief can be obtained, he says, in the most severe cases of apparently uncontrollable vomiting.—*New York Medical Record*.

DR. LOWSON, of Hull, has, we learn, operated in a case of tuberculous disease of the lung by removing the right apex, where the disease alone existed, the left lung being apparently sound. The operation was performed eight days ago, and the patient is doing well.—*British Medical Journal*.

THERAPEUTICS

IN CHARGE OF

O. R. AVISON, M.D. Tor.,

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AND

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A PHYSIOLOGICAL STYPTIC.

According to the London correspondent of *The Therapeutic Gazette*, Dr. A. E. Wright's new styptic is the outcome of considerations on the factors which determine coagulation. It occurred to him that the best way of controlling hemorrhage would be to imitate as closely as possible one of

nature's own methods and produce natural coagulation in the blood. Now the addition of fibrin ferment to the blood is in itself sufficient to hasten its coagulation. We know, besides, that the coagulability of blood is dependent on the proportion of lime salts contained in it, blood absolutely deprived of these being uncoagulable. Combining these two ideas, Dr. Wright has prepared his styptic, which is a solution of fibrin ferment, together with one per cent. of calcium chloride. The efficiency of this solution, when applied to severe wounds in animals, is, as the writer has himself seen, very remarkable; a small quantity applied with a swab of cotton-wool being sufficient to almost immediately arrest the hemorrhage, which is ordinarily very profuse. The solution is prepared as follows: The blood of cattle or sheep is received direct into about three times its volume of water, is set aside to gelatinize for a few moments, and then thoroughly whipped with twigs. The fibrin thus obtained is gently washed, so as to free it from blood pigment, and then extracted for about twenty-four hours with five to ten volumes of water. To the filtered extract is then added one per cent. of calcium chloride. The great advantage, besides its efficiency, is that the process of occlusion by a natural coagulum is one which is calculated to do least harm to surrounding tissues. The action of the styptic is perfectly selective, being exerted on nothing but the blood with which it is brought in contact. No other styptic so thoroughly fulfils this condition.—*Medical Age*.

HYDROGEN DIOXIDE.

Hydrogen dioxide (peroxide of hydrogen) has been used much more largely during the year past. The more that is learned, both as to its applicability and as to its mode of preparation and keeping qualities, the more reliable will be the therapeutical results, and the less adverse criticism from unnecessary failures will be heard.

Its range of usefulness has also been somewhat extended since last year. In illustration, Dr. Althoefer recommends it as a disinfectant of polluted water. His researches tell him that one part per thousand of water containing sewage or infectious microbes is fully sufficient to destroy the various organisms if left to act for twenty-four hours. Used in drinking water it does not make it in the least unpotable, and the proportion of the agent needed is so small that the cost is inappreciable.

It has had quite an increasing use as a cleansing agent for foul wounds, abscesses, and the like.

It is found to be a valuable diagnostic agent in determining the presence of pus; for Staver found that when injected into a part in which suppuration was suspected, it would indicate its presence by causing an

almost immediate swelling up of the part. If such a discovered spot was at once cut into, pain was avoided. He treated a number of suppurating buboes in this way with great success.

Dr. F. H. Wiggin, of New York city, desires the profession to try it in the treatment of typhoid fever, as he has had one very successful case, in which he "prescribed one ounce of fifteen volumes of peroxide of hydrogen to eight ounces of water, to be taken every three hours, by the mouth." He is fully alive to the fact that his one case cannot prove anything, and therefore urges others with more frequent opportunities to try it and report on further use.

During the year it has been the chief work of the manufacturing chemists in this line to either improve the process or to discover some agent to add to the finished product that will render its keeping qualities far better than they are at the present time. The presence of a free acid appears to be absolutely necessary in all solutions of this article, since without this careful comparative tests have definitely proven that decomposition is rapid; but much free acid protects no better than a little, while it renders the solution and its dilutions hurtfully irritant to diseased and sensitive surfaces. Boroglyceride in small proportion acts fairly well as a preservative, but still decomposition occurs, and chiefly upon agitation.—*Squibbs' Ephemeris of Materia Medica, etc.*

GUAIACOL.

Guaiacol—the beechwood tar product containing a maximum of 90 per cent. creasote—has been in remarkable demand during the last year. At one time it seemed as if the manufacturers could not supply the unusual calls upon them, and an inferior article was offered for sale, with customary failures in expected results.

Its use, together with that of its salts, has been largely, if not wholly, confined to the treatment of pulmonary tuberculosis. Of all the agents used for this affection, there is probably none which has proved so uniformly beneficial. It has been constantly increasing in favor from its very introduction, many years ago, and it is now, perhaps, more generally used, in every country in the world, than any other agent for this infection. The benzoate, salicylate, iodide, and carbonate—all have found their use in individual practice, but none of these has been given more attention during the past year than the carbonate.

The irritation produced by guaiacol, as well as by creasote, is, in some cases, sufficient to preclude the use of either, and therefore Drs. Richard Seifert and Fritz Holscher proposed to overcome this difficulty by substituting the carbonate—obtained by passing chlorine and CO gases into a

mixture of guaiacol and caustic soda. The product is a tasteless and odorless crystalline powder, insoluble in water.

In a healthy stomach it apparently is not split up—remaining unacted upon until it reaches the intestine—and therefore it does not disturb the digestion. In an hour after administration it may be detected in the urine.

According to the above observers, the initial dose to be used is from 20 to 60 milligrammes (about $\frac{1}{3}$ to 1 grain), and increased up to a maximum of 6 grammes (about 90 grains). No disturbance of the digestion, circulation, or nervous system was noted from even the maximum dose. Out of four cases upon whom the carbonate was tried, two had taken creasote and one guaiacol itself with trifling benefit, but were manifestly improved by the carbonate. Again, other cases taking the carbonate regularly and improving, lost in weight and in general condition when put upon creasote.—*Squibbs' Ephemeris of Materia Medica, etc.*

BROMOFORM.

Bromoform is now well prepared by the action of sodium hypobromite on acetone (made by the dry distillation of acetate of lime). Caution must again be emphasized in the selection of this article, as it should be a clear, *colorless* liquid, with an agreeable odor and sweetish taste. If the liquid has color it should be rejected, as it denotes decomposition, and therefore is treacherous.

It still has an increasing use in the treatment of pertussis, with comparatively few failures. It apparently simply aborts the paroxysms, and probably reduces their number somewhat, but has little other effect on the regular course and duration of the affection. Increasing doses must not be pushed too far, especially in children, as toxic symptoms have manifested themselves in more than one case. The late Prof. P. W. Bedford, of New York city, recommended the use of glycerin as a perfect solvent, which water is not, and suggested the following prescription, which has been a serviceable one:

Bromoform.....	16 minims.
Alcohol.....	2 fluid drachms
Glycerin.....	12 “
Tinct. cardamon. comp.....	2 “

Inhalations of bromoform have been used with some success both here and in England in the treatment of diphtheria—particularly in recent epidemics.

The topical application recommended some two years ago by Dr. S. Solis-Cohen, of Philadelphia, continues to meet with some favor in cases of ozaena and tuberculous and other ulcers of the larynx. It acts as a deodorizer, disinfectant, and analgesic.—*Squibbs' Ephemeris of Materia Medica, etc.*

THE CONTINUOUS CURRENT IN SCIATICA.

M. Rauviex says that all cases of neuralgic sciatica should not be treated by currents running in the same direction. A distinction should be made between acute sciatica having pain as a symptom and an old sciatica having stiffness and interference to movement. In the acute, descending continuous currents, currents which relieve pain, must be used, and later on the ascending currents might be employed. In the chronic, ascending currents should be used. But if the acute stage has not altogether passed, there will be a return of pain. It is important that the symptomatic forms be differentiated from the essential forms; because in symptomatic sciatica of bone disease the indiscriminate use of the currents might cause serious inconvenience.—*Bulletin Général de Thérapeutique.*

J.A.A.

CASTORIA.

Castoria, which has been so profusely advertised on almost every available square inch of house and fence surface unprotected by the warning "Post no Bills under Penalty of the Law," has been counterfeited (?) by some obtrusive intermeddler with lucrative commercial interests by producing like results with a mixture of Fl. Ext. Alexandria Senna, Fl. Ext. Levant Wormseed, Fl. Ext. Peppermint, Fl. Ext. Anise Seed, Wintergreen Oil, Rochelle Salt, Sodium Bicarbonate, White Sugar, Molasses, Alcohol, and Water—the alcohol being very nearly one-third, the senna about one-sixth, the molasses about one-twelfth each by measure, and the "sugar two ounces by weight." The originator of Castoria may claim that this concoction is not at all the true article, but nevertheless "children cry for it" as loudly as for his, and what more could one ask?—*Squibbs' Ephemeris of Materia Medica, etc.*

GLYCERIN SUPPOSITORIES.

Glycerin suppositories have met with increasing favor in the treatment of some forms of rectal inertia and weak peristaltic action, particularly of the lower intestinal tract.

Many formulas are in use, but the one which gives the best satisfaction, according to Prof. J. P. Remington, of Philadelphia (President of the American Pharmaceutical Association), is as follows :

Sodium carbonate	.....	2.6 grammes	(	40 grains)
Stearic acid	.....	5.2	"	(80 ")
Glycerin	.....	70.0	"	(1080 ")

—*Squibbs' Ephemeris of Materia Medica, etc.*

OBSTETRICS

IN CHARGE OF

ADAM H. WRIGHT, B.A., M.D. Tor.,

Professor of Obstetrics in the University of Toronto; Obstetrician to
the Toronto General Hospital.

EFFECT OF CHLOROFORM ON LABOR.

The exact effect of chloroform inhalation on the contractions of the uterus during parturition has been recently experimentally investigated by Dr. Donhoff, in the Kiel *Obstetric Clinic*, by means of an india-rubber bag passed into the uterus, communicating with a recording manometer, a kymograph, and a mercurial manometer by means of a tube which, together with the india-rubber bag, was partially filled with water. He finds that a slight degree of chloroform narcosis has a paralyzing effect on the uterine contractions, the pressure falling to nearly half what it was previously. If the chloroform is stopped the pressure during a pain increases, but at first to only about two-thirds of the original pressure. In two of the cases observed, the initial pressure was not regained until two hours after the cessation of the administration of chloroform. In cases where the abdominal muscles assisted the uterine contractions to only a moderate extent this auxiliary was entirely arrested by chloroform, even when the patient was partially under its influence; but when the muscles exerted a great deal of force their action did not entirely cease unless the patient was fully narcotized. The intervals between the pains were prolonged by chloroform, so that when the patient was partially anæsthetized the number of pains in a given time was diminished by 20 or 25 per cent.—*London Lancet*.

[Many careful observers, including Lusk, of New York, who has probably furnished the most valuable contribution on the subject, are convinced that the administration of chloroform has a serious effect in diminishing uterine contractions in a certain proportion of cases. I believe that it somewhat frequently causes decided uterine inertia, which necessitates the use of the forceps, and causes post-partum hemorrhage. I think these dangers are not sufficiently appreciated.—A.H.W.]

SUDDEN DEATHS IN LABOR.

Sometimes rapid and even sudden death overtakes women in labor. The chief causes are :

- (1) Solid emboli into the right heart or into the pulmonary artery.
- (2) The entrance of air into the veins.
- (3) Syncope and shock.
- (4) A variety of lesions: (a) Heart disease and rupture of aneurismal sacs; (b) cerebral and meningeal hemorrhage; (c) sudden severe hæmoptysis and hæmatemesis; (d) pleuritic effusion; (e) rupture of a renal abscess.—*Lyon Medical*.

THE SNIVELY-MURPHY BREAST BINDER.

DIRECTIONS FOR CUTTING AND APPLYING.

BY MISS M. A. SNIVELY,

Superintendent Training School for Nurses, Toronto General Hospital.

Miss Snively's directions for cutting and applying the breast binder, recommended in the paper on "The Prevention of Mastitis" in the last issue of THE PRACTITIONER, were inadvertently omitted. I consider them so important that I give them in this number, and reproduce the diagram originally intended to accompany them. I may say that in my practice I toly ignore rule 4, which, as will be seen, Miss Snively does not consider important. The rules 1, 2, and 3 are the important ones. Given a piece of cotton and a pair of scissors, you can easily make the binder in a few minutes. Sometimes the bust measures more than thirty-six inches. In such cases I take a piece of cotton and cut it lengthwise, making it thirty-eight to forty inches long, and sixteen inches wide. I then cut as directed in rules 1, 2, and 3.—A.H.W.

Material. Sixteen inches of strong factory or bleached cotton, one yard wide.

(1) Fold selvage edges together, then fold in the same direction again. Your cloth is now four thicknesses, and must remain so until all cutting is finished.

(2) Your first cut will be on the side opposite the selvage edges. Place scissors two inches from the edge, and cut downward eight inches (this will be just one-half), taking a circular direction outward, after cutting seven inches; this forms the armhole.

The straight edge, thirty-six inches long, is now the bottom, and the opposite side the top.

(3) Now fold the four thicknesses over about four inches. This will bring the selvage edge even with the first seven inches of the opening first made for the arm. Press this firmly with the hand, so as to leave the mark of the fold; then unfold.

Place scissors three inches from top on selvage side, and cut in a semi-circle direction upward toward the top of the mark of the fold; this forms the neck.

(4) Place scissors one inch from top, at opening made for arm, cut diagonally upward four inches to top of fold or crease, remembering that, while you *begin* by cutting off one inch, you gradually cut less and less as you approach the top of the crease; this forms the shoulder.

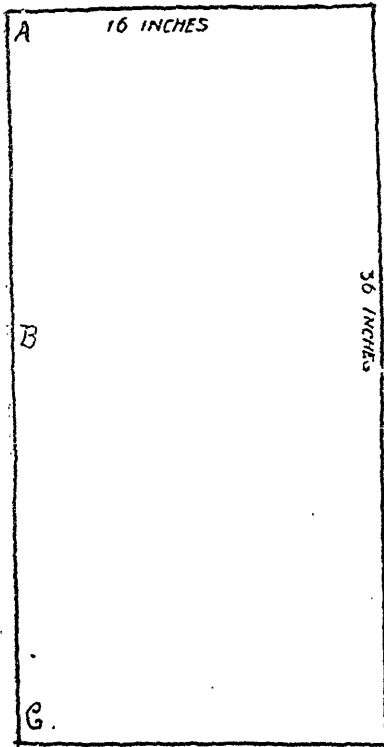
N.B.—No. 4 is not important, as the binder can be made to fit without this cut. [I never use this "cut"—A.H.W.]

(5) In applying binder the shoulder can be joined with small safety pins, while the front is joined with ordinary pins. The front is turned in to fit the patient—no sewing being required.

BREAST BINDER.

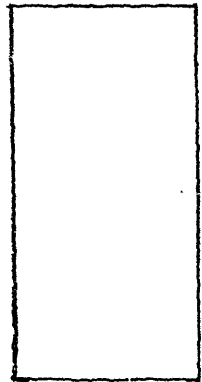
No. 1.

No. 2.

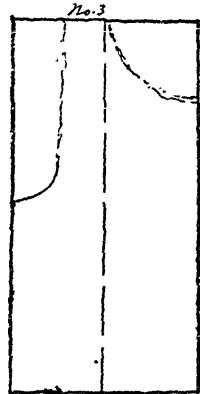


No. 1.
Fold A to C, then
B to C.

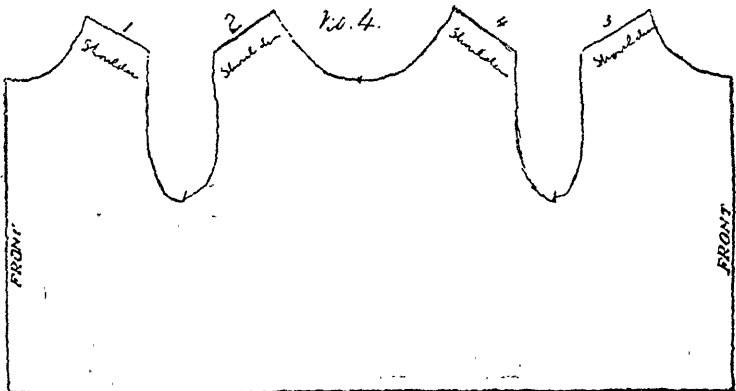
No. 2.
Represents cloth fold-
ed ready for cutting.



No. 3.
Represents by dotted
line the part to be cut
out for arm and neck,
with centre line repre-
senting fold.



No. 4.
Represents binder
completed. Pin No.
1 and 2 together, and
3 and 4 together, to
form the shoulders.



THE USE OF ELECTRICITY IN MIDWIFERY.

Dr. Ogden C. Ludlow, of New York county, read a paper thus entitled. The term "electricity" was used in this paper as synonymous with the faradaic current, and the more important uses of this form of electricity were considered under three heads, viz., (1) its sedative action, (2) its oxytocic action, and (3) its power to prevent and to control uterine hemorrhage. It was useful where chloral or morphine was contraindicated, on account of idiosyncrasy or debility, or where it was not considered prudent to push the use of these drugs further. It was also available where the stomach was too irritable to retain medicine, and, unlike morphine or chloroform, it did not interfere with the progress of labor, but, on the contrary, excited more powerful and efficient uterine contractions, at the same time that it quieted the general nervous irritability. As it did not favor uterine relaxation, its administration did not complicate subsequent operative procedures under anæsthesia. When this sedative action of the current was desired, its strength was carefully adjusted so as to be distinctly perceptible to the patient, but not painful. It was important that the vibrations of the contact-breaker should be smooth and rapid, and that the current should be continuously applied for ten or fifteen minutes. Its power to excite and to stimulate uterine contractions was one of its most certain actions, and hence it was indicated in every case of tedious labor in which the delay was due to feeble or infrequent contractions; or where, owing to a slight disproportion between the foetal and maternal parts, unusual muscular exertion was required to expel the child. It produced a "steady effect" on the uterine contractions when they were severe and almost incessant, making them less frequent and at the same time more efficient. The action of ergot was slow and uncertain in degree; faradization produced its effect instantaneously, and the amount could be accurately gauged. Ergot exerts its influence for a variable length of time, which was entirely beyond control; faradization acted upon the uterus for just so long a period as the operator desired. Ergot produced a tonic cramp of the uterine muscle, which naturally exhausted the mother, and was dangerous to both mother and child; faradization produced a steady, rhythmical contraction, which allowed a proper interval of rest to the uterine muscle and closely imitated nature's method. By virtue of its power to excite uterine contraction, the faradaic current was also of service where there was moderate post-partum hemorrhage. The current was best applied to the patient in all cases with the positive pole over the sacro-lumbar region and the negative on the abdomen, the only precaution being to avoid passing the current directly through the head of the child. The positive pole was a small copper plate covered with wet absorbent cotton and fastened to the body by a belt or bandage. The negative pole was a

flat sponge backed with rubber, or, preferably, the operator's hand. The author then cited several cases showing where this agent had succeeded, and where it had failed to give assistance.—*N. Y. Medical Journal*.

GYNECOLOGY

IN CHARGE OF

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COMPLICATIONS AND ACCIDENTS IN PELVIC SURGERY.

[*International Journal of Surgery*, extract in the *North Carolina Medical Journal*.]

(On this subject many valuable points are to be found. They may not be considered of great value to a surgeon who has done many abdominal operations, but will be found of value to the beginner. Among them I noticed the following, that I have never seen mentioned elsewhere. I arrived at the same conclusion some time ago.)

“One of the most frequent causes of hemorrhage in pelvic work is from a rupture of the vascular arch formed by the anastomosis of the ovarian and uterine arteries. In fact, we should at once examine the broad ligaments in all cases where hemorrhage occurs before looking elsewhere. The vessels are torn off in breaking up adhesions, or in making too great tension upon the pedicle of the appendages when applying the ligature, or finally by the ligature cutting into the broad ligament. The stump of the pedicle must be at once brought up into view, and the upper border of the ligament examined. If the hemorrhage is found at this point, the tissues must be caught with forceps and a ligature applied below it. Where it is impossible to bring the broad ligament into view on account of its being bound down by adhesions, we must enlarge the abdominal incision and manage the case in the same manner as that already described in dealing with hemorrhage occurring low down in the pelvis. Hemorrhage may occur from the stump of a pedicle if the ligature has been insecurely applied. This accident, however, will rarely occur if proper care be taken with the technique. After tying the pedicle, the free ends of the ligature should be at once cut off close to the knot, the pedicle should then be cut partly through, but before completing the separation the stump must be caught with hæmostatic forceps. This enables the operator to examine the stump after the pedicle has been cut through, without in any way interfering with the ligature. A hemorrhage occurring from a stump is of course controlled

by a second ligature. It is important to remember that a hemorrhage from any portion of the broad ligament may always be controlled by passing a ligature through it at both its uterine and pelvic ends."

THE SWALLOWING OF ARTICLES NOT ARTICLES OF FOOD.

A case is reported by Caret, in the *London Lancet*, of a woman who swallowed a razor, thinking that she would in this way destroy her life. As frequently happens in such cases, the surgeons were unable to satisfy themselves as to the truth of her statement. Nothing could be detected by palpation. Chemistry was therefore resorted to, to aid in making a diagnosis. Twenty drops of dilute hydrochloric acid were given, the stomach was washed out, and the washings were collected and evaporated. The presence of iron was detected by the Prussian blue test. This was found to exist in large quantities. On the sixth day after admission the end of the razor was felt through the abdominal walls. The patient was operated upon, but died five days after.—*North Carolina Medical Journal*.

ENDOMETRITIS.

Dr. W. B. Slater has an article in the *Maritime Medical News* for September on endometritis. He deals with the subject in a way that may not suit many of those who imagine that endometritis is a frequent disease, and who find it in almost every uterus.

"We teach and have been taught that the symptoms of endometritis are well marked, or at least sufficiently distinct to permit us to infer that endometritis exists. Those who have had much gynecological practice know how unsatisfactory all this teaching has been. It may do no harm, perhaps, to hold to the old definition, provided that we have in mind just what is meant." He concludes that endometritis is rare, except as the result of gonorrhœal inflammation extending from the vagina and cervix toward the fallopian tubes, or as a secondary result of pelvic inflammation.

He gives an interesting quotation from Dr. Matthew Duncan in proof of the rarity of the disease. "Dr. Matthew Duncan had the cases at the out-patient department of St. Bartholomew's Hospital, and during one winter carefully examined for endometritis. He was assisted by Dr. Godsen in this research. For the winter's work they did not obtain a single case of endometritis." Duncan further says: "Much is said of endometritis, and I remind you that many authors delight in long descriptions of what is little known or not known. I have no doubt there is endometritis, but if it has any symptoms they are ill-defined or unknown."

Smiley, of Dublin, believes that the disease can only be recognized by the use of the microscope.

SURGERY

IN CHARGE OF

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POST-MARITAL AMBLYOPIA (BURNS' AMAUROSIS).

A young lawyer, apparently in good health, and only a few weeks married, was recently brought to me so nearly blind that he could but just see letters of 200 at six feet. On use of the ophthalmoscope, nothing was discovered. He had no other nervous symptoms, excepting a little headache. He was a man of temperate habits and sound health. The failure of sight had developed rapidly in the course of about ten days. I insisted on abstention from sexual intercourse, and gave tonics with mercury. In a few months he was quite well.

In the lecture* from which I abstract the above case, I have narrated another. A gentleman in strong health, and the father of a large family, told me that in early youth he had been brought by his father to a London oculist because he was almost blind. He assured me that the only cause of his condition was that he had been allowed, as being but a boy, to sleep in the same room with a servant girl, who used to persuade him to have intercourse with her. On his being taken away from the company of this girl, his sight returned, and it never afterwards failed in the least.

A third example of this form of amblyopia, and also of complete and permanent recovery both of sight and health, has quite recently presented itself.

A married man of 32, in robust health, gave me the following history of what had happened to him in early life. At the age of 18 he fell suddenly into dissolute habits, and indulged to great excess in sexual intercourse. He smoked also. The failure of his sight developed rapidly from a "dull haze before me" to complete blindness. He had never had syphilis. After about three weeks' blindness the sight returned, and it has ever since been excellent.

These three cases, so remarkably alike in their features, might lead us to believe that post-marital amblyopia is, like that due to smoking, usually recovered from, and that no relapse occurs although sexual indulgence is resumed. Recovery and freedom from relapse are very definite features in the best-marked examples of tobacco amblyopia. The failure of function which I am now describing has, indeed, remarkable features of similarity

* Mr. Burns' case is recorded in a lecture delivered by me in 1876, at the Moorfields Hospital, and published in vol. ix. of the Reports, page 20. I am glad now, after an interval of sixteen years, to be able to complete it.

with that due to tobacco. It differs from it chiefly in being much more rapid in its development, and in passing to a much higher degree of amblyopia. Tobacco cases usually require months to develop, and rarely proceed to any condition approaching blindness. They recover also much more slowly than do these post-marital cases. As regards recovery, it may be remarked that there are in both series a few cases in which the disease advances to complete and permanent blindness. It may be conjectured that this may happen in cases in which the cause is never suspected and never removed. The cases under notice are not, as a rule, attended by any failure of sexual power, nor are the tobacco cases attended by any distaste for smoking, or consciousness on the part of the patient that it is injuring him.

The cases which I have narrated suffice, I think, to show that young men who have recently assumed habits of frequent sexual indulgence (whether in marriage or otherwise does not matter) are liable to have their sight fail rapidly, without other symptoms. The "blindness" resulting from this cause is usually only transitory, and the recovery is complete and without liability to relapse.

The habit of masturbation and great excess in sexual indulgence under any circumstances may each in turn, I feel sure, induce failure of sight, and derange the nutrition of the eyeball. The post-marital form of amaurosis is, however, quite distinct, and never, I believe, occurs excepting to those who have been newly placed under conditions tempting to excessive indulgence. Under the other circumstances the failure of sight is very gradual and usually permanent, and is attended by symptoms of general neurasthenia. In the Burns type it is sudden, and stands alone.—*Hutchinson's Archives.*

OPERATIVE TREATMENT OF TUBERCULOUS PERITONITIS.

Dr. Mader, Vienna, in a criticism of Dr. Koenig's paper upon this subject, read before the tenth International Medical Congress, writes as follows: I endeavor especially to secure intimate contact of the peritoneal layers for a long time, and in the following manner:

(1) Evacuation as complete as possible of the fluid with the trocar and canula. This was facilitated by raising the pelvis, elevating the upper part of the body, by pressure, massage. Adhesion of the peritoneal layers can occur only when they are in close apposition.

(2) By application of compress and bandage. After evacuation of the fluid, a thick layer of ordinary cotton was spread over the abdomen and held in position by numerous turns of a muslin bandage, applied as firmly as the patient could bear it. To prevent slipping upward of the dressing

a few turns of the bandage were taken around the thigh. The bandage was left in place until it became loose, and if necessary was renewed. It was always allowed to remain for several days.

(3) By restricting, as much as possible, the amount of water in food and drinks for as long a time as the patient was able to bear it. To alleviate the thirst, which was not usually very severe, the patient was given pellets of ice, small quantities of cold soda water, slices of lemon. At the end of a few days a larger amount of fluids was permitted. The object of this proceeding is to prevent a new transudation of the serum into the abdominal cavity, so that the peritoneal layers may remain in close contact. The patients always submitted willingly to these measures.

(4) By the administration of opium, the intestines were kept at rest.

The author reports three cases successfully treated by his method. He concedes that it is difficult, in cases not subjected to laparotomy, to be sure of the tuberculous character of the peritoneal affection, but considers his method as curative in non-tuberculous chronic peritonitis.—*International Journal of Surgery.*

DELAYED UNION OF TIBIA TREATED WITH CHLORIDE OF ZINC INJECTION.

A man, forty-three years of age, sustained a compound fracture of both bones of the leg in the upper part. On the third day a plaster-of-Paris splint was applied, and allowed to remain for forty-seven days. No union took place, and the apparatus was reapplied for a month. After similar treatment for five months without union, Ménard injected one and one-fourth grammes of a ten per cent. solution of chloride of zinc on the anterior and posterior surfaces of the tibia and between the ends of the fragments, without an anæsthetic, causing severe pain. Immobilization was continued for fifteen days, and then union had begun and was solid in one month. The method has the serious objection of being very painful.—*Dr. M. Ménard in International Medical Magazine.*

A NEW TREATMENT FOR SURGICAL TUBERCULOSIS.

M. Bier (of Kiel) recommends a treatment that he has used with good results in 20 diverse cases of tuberculosis. It consists in bandaging the lower part of the limb, then above the diseased part to apply an elastic band sufficiently tight to cause a venous hyperæmia in the affected region. From the very first day a distinct amelioration of the subjective symptoms was seen; also there was an improvement in the function of the affected joints.—*Bulletin Général de Thérapeutique.*

J.A.A.

ORTHOPEDIC SURGERY

BY

B. E. McKENZIE, B.A., M.D.,

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OPERATIONS ON TUBERCULOUS HIP JOINTS.

Between 1873 and 1892, Dr. Poore operated on sixty-seven cases of tuberculous disease of the hip in children between three and fifteen. Excision was performed in sixty-five cases, erosion in five, trochanter major trephined in eight, and the central cavity of the ~~femur~~ ^{femur} cleaned out in eleven cases.

In all cases of excision the disease was pronounced, and accompanied by abscess. All abscesses are opened as soon as discovered, the parts are scraped or excised, and of late the tubercular tissue is removed as thoroughly as possible. After removing the capsule, scraping out the acetabulum, and removing carious bone as far as possible, the wound is flushed by mercuric solution (1-1000) and sutured, leaving a part packed to the bottom with iodoform gauze so as to provide free drainage. The author thinks it doubtful whether all infected tissue is ever removed. He has discarded the rubber drainage tube. The incision preferred is one commencing on the outer side, just above the anterior superior spine, and produced downward about four or five inches. Of late he has used the chisel in preference to the saw in excising the bone, and in flushing the wound he uses a modification of Barker's scoop.

Results. Thirty-two children were discharged cured, twenty-five died, three were relieved, two not improved, and four remain in the hospital. The author finds that the riding upward of the femur on the pelvis when the weight is borne on the limb is a serious impediment to walking. This does not occur when only the head has been removed, and when the extension employed has not been sufficient to draw the neck away from the cavity of the acetabulum. It is also desirable to have as much and as dense cicatricial tissue above the point of section as possible, so as to form a buttress to prevent riding upward. For a similar reason, it is not desirable to obtain immediate closure of the wound. A strong hip splint should be worn for at least one year after cure.—*New York Medical Journal*, April, 1892.

FORCIBLE OVER-CORRECTION IN THE TREATMENT OF RIGID FLAT-FOOT.

Dr. Whitman, of New York, has without doubt made, recently, some of the most important contributions to the study of flat-foot to be found in surgical literature.

He bases his treatment on the principle that the proper position and functions of the foot must be regained before we may hope for permanent cure. The operation recommended is that of "forcible *over-correction* of the deformity, not primarily for the purpose of replacing dislocated bones, but to forcibly overstretch all contracted parts and to break up all adhesions which resist and restrain the movements of the extension and adduction, the essential movement for carrying out the normal step." The foot is forcibly moved in every direction to break up adhesions, and is finally extended and twisted inward as far as possible. In this position contracted muscles, ligaments, and fascia are stretched to their extreme limit, and weakened and lengthened ligaments are relaxed. . . . A well-fitting plaster bandage is applied in the over-corrected position, and the patient allowed to walk about. At the end of the week the plaster is removed, a cast taken, as a guide to making ~~and~~ supporting brace. Voluntary assumption of the corrected position becomes possible when the adductor muscles regain their power. These *must regain their normal balance* in order to guard against relapse. The ~~brace~~ brace is constantly worn, and such a shoe worn as will cause the weight line to fall slightly to the outer side. In walking the patient must not evert the feet, but must point them straight ahead, so that he raises the body and flexes the foot in the normal manner by muscular power. The patient must be made to understand that cure is not assured by a brace or by an operation, but by his own exertion.—*Annals of Surgery*, January, 1893.

TENDON ANASTAMOSIS IN INFANTILE PARALYSIS.

In May, 1892, Dr. Parrish, of New York (*Journal of the American Medical Association*, Jan. 28th, 1893), performed this operation by suturing the paralyzed extensor pollicis to the tendon of the healthy anterior tibial muscle. A second operation became necessary in the same child, and Dr. Parrish joined the tendon of the posterior tibial muscle to the gastrocnemius. In September, 1892, Dr. A. M. Phelps, of New York (*New York Medical Journal*, Oct. 8th, 1892), in the presence of the writer and others at the New York Post-Graduate Hospital, sutured the tendon of the paralyzed gastrocnemius and soleus to the tendon of the healthy long flexor of the toes.

At the time neither Dr. Phelps nor those who witnessed his operation knew that it had been performed by Dr. Parrish. The wounds healed kindly and considerable immediate gain resulted, which, no doubt, will increase with lapse of time.

Editorials.

ASIATIC CHOLERA.

No disease is attracting so much attention at the present time as cholera. The general feeling of alarm which exists in Europe and America is probably well founded. The true Asiatic cholera is now in Europe; it will almost certainly reach America in the very near future. It is largely, if not wholly, a preventable disease; and we are glad to see such a general disposition to be up and doing in order that all possible barriers may be placed in the way of the dreaded invader.

Under the circumstances, it seemed a very opportune time to devote a large portion of this issue of *THE PRACTITIONER* to this important subject, and give a goodly portion of the best literature that we could find. Fortunately, we had plenty of good material at our disposal; and our selected articles, written by men well and favorably known to the medical world, form together an admirable exposition of the subject in all its aspects.

Asiatic cholera, as a scourge, possesses wonderful power for evil under certain circumstances, but becomes perfectly helpless in the presence of cleanliness. The remedy is simple enough in a way, but is largely conspicuous by its absence in our cities, towns, and country districts. In Canada we are trying to put our house in order. The Dominion Government is endeavoring to keep out the disease by a rigid quarantine. The Provincial Governments are encouraging the various boards of health to do good work. Physicians generally are taking a deep interest in the subject, and are doing good service. We hope this issue of the journal will be found, not simply interesting, but actually useful.

FORMER EPIDEMICS OF CHOLERA IN CANADA.

Cholera first reached Canada in 1832. In 1831 it was raging in various parts of Europe, and the Imperial authorities sent communications on the subject. In consequence of the warnings thus received, the first board of health in Canada was formed in Quebec in February, 1832. Cholera first appeared in Quebec on June 8th of that year; in Montreal, June 10th; and thence extended to all parts of Canada. The epidemic lasted about four months. The second epidemic appeared in the quarantine station at Grosse Isle in the latter part of May, 1834; mild at first,

but assuming a virulent character in July and August. It also lasted about four months.

The third epidemic entered Canada by Kingston in the latter part of May, 1849. Again it showed its greatest severity in July and August, and lasted about four and a half months.

The fourth epidemic entered Western Canada from the United States in August, 1851, and lasted about two months. Quebec was the last of the large cities to be attacked.

The fifth epidemic occurred in 1854, being brought to this country by two emigrant ships which reached Grosse Isle about the middle of June. Cholera appeared in Quebec, June 20th, and soon spread over the whole of Canada. We have no record of death rates of the early epidemics. An attempt was made by the Central Board of Health to get statistics of the 1854 epidemic, and the records obtained show 4,486 deaths. This is acknowledged to have been far short of the mark, probably less than half. One may form an approximate idea of the terrible ravages of these scourges by doubling the above figures, and then considering that, as far as the whole country was concerned, the fifth epidemic was one of the mildest of the five.

Since 1854 there has been no serious epidemic, but there was a big scare in 1869, and at the same time a few cases of cholera.

THE CHOLERA IN TORONTO IN 1854.

Although the epidemic of 1854 is said to have been one of the mildest of the five which invaded Canada, it was certainly very severe in Toronto and a large portion of Ontario. Among the physicians whose names are prominently mentioned in connection with that scourge are Drs. Richardson, Aikins, Jos. Workman, U. Ogden, H. H. Wright, and the late Drs. Hodder, Rolph, Badgeley, Bovell, Ross, Scott, O'Brien, Telfer, King, Herrick, Small, and Hallowell.

Dr. James H. Richardson, who has a very vivid recollection of events in this epidemic, has given me some important facts and related some interesting incidents in connection therewith. The disease generally followed certain watercourses. It will be interesting, and entirely new to many, to be told that in those days there were a number of streams in Toronto running in ravines to the bay. These ravines have been filled in such a way as to show no trace of the former watercourses. The principal streams were one in the neighborhood of Beverley street; one in St. John's Ward, running in a southeasterly direction past the present

site of Holy Trinity church, and crossing Yonge street near the intersection of Albert street; one through the present Normal School grounds.

Of these the most important at that time was the stream in St. John's Ward. All the drainage from houses, privies, etc., in the neighborhood was into this stream, which was therefore simply an open sewer. The ravages of the plague in this vicinity were, as might be expected, very severe.

The first case in Toronto was that of a man who had contracted the disease in St. Louis. The second case occurred on King street, near Church. A careful examination of the premises revealed nothing wrong; but it was afterwards discovered that there was a foul pool of ill-smelling, muck-like material under the house. Dr. Richardson thought that in nearly every case the specific cause could be discovered, and that it was defective drainage, or filth of some sort. It did not appear to be contagious, in the ordinary sense of the term, but there was great danger from the excreta of those affected.

In the treatment of the disease all known remedies were employed. Woolf's combination of tinctures of rhubarb, opium, and camphor was largely used. Great benefit was derived from the use of stimulants (brandy in large quantities) when the stomach could retain it. In a large proportion of cases people were attacked in the first place with a rather severe diarrhoea, known as cholérine, which developed into true cholera. This, when taken in time, generally yielded to ordinary remedies. Electricity was tried, with little or no effect. Bovell hoped for good results from the intravenous injection of milk. He and Hodder tried it, but their example was not followed by others. As will be seen in other columns of this issue, the subcutaneous injection of an ordinary saline solution is quite as effectual, while it is much safer. In a certain proportion of cases there was no preceding cholérine. Dr. Richardson speaks of one case where he saw a man die in one hour and a half after his seizure, which occurred while he was apparently in the best of health.

The doctor stuck to his patients during the whole epidemic—working, literally, night and day during a great portion of the time. He refused no call from high or low, rich or poor; but the low and poor were in a large majority. In one case he found a man on Elizabeth street in a state of collapse. He gave him a glass of brandy. The patient was able to drink the liquor, turned his face to the wall, and died, as the doctor thought. He left the house with this impression, and his surprise was great afterwards to find that the man had rallied and recovered. In another case a washerwoman, who had probably contracted the disease from washing the soiled clothing of cholera patients, lay in a collapsed condition for three days, with blue, shrivelled skin, rice-water stools, and

other symptoms about as bad as possible. He gave quinine in 10-grain doses every half hour for some time. The woman, contrary to all expectations, made a good recovery, and, strange to say, gave birth to a healthy child five months later.

Dr. Richardson, in speaking of the good effects of the administration of stimulants, referred with regret to the fact that they had no hypodermic syringes in those days. Probably hypodermoclysis will accomplish much in the future. Apart from this, I felt inclined, after our conversation, to ask the question, How much have we learned about cholera in the last thirty-nine years?

We learned from Koch that the specific organism known as the comma bacillus is the cause of the disease; we have more recently learned that some German servants have swallowed quantities of these bacilli, and neither the Germans nor the bacilli suffered much therefrom. The bacilli, however, do not appear to be a fattening food, nor do they seem to cause cholera in a healthy person in the absence of filth. Dr. Richardson knew the important portion of these facts thirty-nine years ago, but he did not then know much about the comma bacillus, either as a cause of cholera or as an article of diet.

THE SOURCE OF CHOLERA INFECTION IS THE WATER SUPPLY.

It is of the utmost importance to be able to trace the outbreak of any epidemic to its source. It is almost as important as stamping it out. The effect of distance is so great that epidemics and calamities occurring in foreign nations do not impress us as do those in our own midst, nor do the lessons derived from foreign sources as to the cause of those disasters have the same weight they should have with the public. We are prone to be careless, and feel secure in our insecurity; we are most liable to neglect attending to matters that have been proven to be great sources of danger to others, possibly with a sense of security only attained by close communication and frequent intercourse with danger, though at the same time the danger is not appreciated.

Familiarity breeds contempt, and a wonderful carelessness is developed in those who continually handle the deadliest of poisons.

The poison that has lurked in the drinking water of Toronto, and the pabulum that this poison supplies for other and more dangerous bacteria to thrive on, do not seem to be thoroughly grasped by the public. Yet it is from the water supply that outbreaks of cholera have been traced in the past.

Cholera cannot arise *per se*; there must be the specific micro-organism, and that implanted in suitable soil. Isolated epidemics furnish great opportunities for scientific study. The Berlin letter in the *New York Medical Record* furnishes us with a most remarkable instance of this. A positive case of this kind will undoubtedly upset all theories on the impossibility of an epidemic of cholera appearing in a previously healthy locality. It was not necessary for a case of cholera to carry the infection—the bacilli transmitted the disease through the water supply.

“Although the cholera was supposed to be extinct in Germany, there has suddenly appeared an epidemic (local) which will give the bacteriologist and hygienist plenty of food for thought. The epidemic is in the provincial lunatic asylum of Nietleben, near Halle, a.S. This institution I am well acquainted with. It has existed since 1844, and was originally built to accommodate four hundred lunatics from Saxony, but was enlarged in the year 1880. It was built on the old corridor system. The newer additions are all barracks. From 1879 to 1884, seven hundred and fifty to eight hundred and fifty patients were lodged here. The institution is on the confinement system, although the patients are allowed out-of-door exercise and kept at work in the fields and gardens near by. It is situated about two English miles from the University of Halle. The first case of cholera appeared on January 14th, 1893, and the patient died the same day. A *post mortem* was made, and after a careful bacteriological examination in the Hygiene Institute no definite diagnosis was arrived at. The following day three deaths were noted, and later two more; there being, in all, six deaths in the first four days. All cases were examined *post mortem*, and in each the intestinal contents revealed the presence of the characteristic Koch's comma bacillus. The diagnosis of Asiatic cholera was made. The government at once sent Professor Koch to investigate the cause and origin of the disease.

“He found the cause lay in the fact of the inmates having drunk water from the River Saale, impregnated with cholera bacilli, and he was able to detect the bacilli in a sample of this water.

“The morbidity up to date has been 109, and the mortality 38. Since the last few days, the most careful hygienic principles have been carried out (a fresh water supply being obtained through pipes), so that the morbidity has at once fallen, proving that the epidemic will be localized.

“The sanitary condition of Halle is at present excellent, and as the institution is isolated the most stringent quarantine precautions will be taken to prevent the spread of the disease.”

Here we have an instance of infection traceable directly to drinking water, with a cessation of the epidemic as soon as pure water is obtained. It is not often that it is possible to demonstrate the bacilli in the drinking

water as was done in this case, but its demonstration proves the case beyond doubt.

The two instances cited in Dr. Hartshorne's papers (page 175) are of a very similar nature, but in neither of these cases had the presence of comma bacilli been demonstrated. It was before these organisms had been discovered by Koch.

THE HAMBURG EPIDEMIC OF CHOLERA.

The late outbreak of cholera in Hamburg has been traced to the drinking water. The report of the epidemic by Dr. T. I. Reinke, the head of the Health Department of Hamburg, published in the *Deutsche Med. Wochenschrift*, is very full and elaborate. He reviews the atmospheric condition for the summer of 1892 as being rather cool up to August 13th, when a sudden and excessive heat-wave passed over the city, lasting until Aug. 26th. The rainfall was much below the average, from which cause the ground water began to fall. The Elbe was lower than has been noted since 1877. Only a small quantity of fresh water flowed down the river, and through the harbor. The flood tide ascended much farther up the river than usual. The foul water of the river, into which the city is drained, was prevented from reaching the sea. The tide was continually driving this warm polluted water up and down the river, without its being replaced by pure water from the sea. The temperature of the river water on Aug. 17th was 71.6° F., and the flood tide reached an unusual height.

The first case of cholera reported occurred during the night of Aug. 14th-15th in a workman engaged on the drainage a short distance below where the emigrant barracks discharges its sewage into the Elbe. Until the 20th, the outbreak was confined to people, mostly workmen, in this same neighborhood. The former epidemic in 1873 originated in the same locality. After August 20th the disease spread to all portions of the city in which the water supply was drawn from the ordinary source. The rapid spread, 1100 cases up to August 29th, and the almost entire restriction of the disease to localities where the people used the water from the ordinary supply, appear to prove conclusively that the water was the source of infection. In a court in Altona, a suburb of the city, containing 345 inhabitants, and whose water supply is Elbe river water, *filtered*, not one case occurred. Several instances occurred where large institutions, with private water supply, escaped without a case, notwithstanding that the inhabitants mixed with the public; while institutions supplied with water from the ordinary source suffered greatly—the workhouse 1230 inmates, 45 cases, 13 deaths; Friedrichberg Lunatic Asylum 1363 inmates, 123 cases, 64 deaths.

As soon as the rainfall increased, the water supply became purer and the epidemic soon died out.

This epidemic was the most severe that has ever occurred in the city. There occurred 18,000 cases, with 8200 deaths, being 45.5 per cent. of the cases, and 1.3 per cent. of the population.

The doctor is unable to trace the cause of the outbreak to the emigrant sheds, since no emigrants suffered until Aug. 25th. This proves that the patients were infected in Hamburg. There existed concurrently with this outbreak one of enteric fever, 866 cases occurring in thirteen weeks.

TORONTO WATER SUPPLY.

It is an unquestioned fact that the citizens of Toronto should be made aware of, that in their water supply lurks the factor of disease that will, to a great extent, determine the danger and severity of the epidemic of cholera that is likely to visit the city during the coming summer. The public are not to be unnecessarily alarmed, but should be warned of all sources of danger. An epidemic of cholera is not to-day the terrible scourge or calamity that it was fifty years ago; we doubt very much if its ravages will be as great as those of la grippe during 1890 and 1891.

Medical science of to-day can cope with cholera as surely as it has with worse epidemics; but to do so we must have our water supply of the best possible quality, in order to remove a very important factor in the propagation of the disease. The carelessness in the management of our Waterworks Department must be stopped, and means adopted at once that will secure for the city of Toronto water that is pure, free from the danger of contamination during its transit through the conduit (or whatever other means of transport is adopted), and of such quantity that the supply would be sufficient for every contingency.

The water supply of a great city is one of the most important subjects in its political economy. Toronto is in an unenviable position to-day in that regard, drawing a water supply from a pure source, but in such a manner that it is contaminated to an alarming extent. The subject of water supply and the disposal of sewage here are so intimately connected that the one cannot be discussed without involving the other. The sewage is drained into the bay, and has been ever since a drainage system was adopted, the total discharge of sewage being, say, twenty millions of gallons daily at the present time. Across this sewerage-polluted bay our water supply is carried. The source of supply is Lake Ontario, which contains water of the highest type of purity. The bay is bounded on the south by the Island, of such a shape that its western arm approaches the mainland so closely that a very narrow gap is left; while on the east the gap is wide, but made very shallow by shifting sands, due to the eastern current. The water in the bay is therefore, to a great

extent, affected only by the currents during great storms, particularly those from the east.

It will not be difficult to see, from this rough description, that the bay is little less than a huge cesspool—its waters contaminated and poisoned by the drainage into it from many thousands of people for many decades.

What a bottom the bay must present! How many feet of solid filth must be there; and, should the water of the bay be changed ever so frequently, how long would it remain uncontaminated with the bed in its present condition, together with the daily deposit of so many millions of gallons of sewage?

We had the exceedingly unpleasant fact of the kind of water we have been drinking brought most forcibly to our attention by the rising of the iron conduit through which our supply is carried, which rising showed us that breaks have existed ever since it was laid. These breaks showed clearly that all the tests that were said to have been made on this conduit by the Superintendent of the Waterworks Department and his engineers were delusions, if not worse. Leaks have been found that would admit, some say, millions of gallons of bay water per day. Bay water, indeed! It is nothing but diluted sewage, and it is horrible to contemplate what results this water has had, and will have, on the health of the city.

There is a proposition before the council now to lay another conduit across this same bay. What are we to do? The people will not be satisfied with water carried across the bay. Tests have proved fallacious before, and may again. Even should the pipe recently relaid be now sound, the liability to a similar break again is great. A small leak may mean a great loss of life to the citizens. We must have pure water brought by a different route than across this cesspool—a route that is not open to the danger of sewage pollution. We believe that Lake Ontario should be the source of our water supply. It appears to be Nature's gift to us. Gravitation and the artesian well system are good; water is purified by being filtered, but not wholly cleansed. Gravitation from Lake Simcoe would be costly and experimental, and the water not as pure as we can get from Lake Ontario. The artesian well, like the natural gas well, is liable to be exhausted, and eventually a return to our present system would be an inevitable result. Any company that would enter into a contract to supply so many millions of gallons of pure water per day could only carry out this contract while the supply lasted.

There are at least two lake currents that have to be taken into account in determining the point from which the supply should be taken. The present in-take pipe, about one-half mile southeast of the western end of the Island, is in fairly good position, although it could be removed farther west without any danger from either current. We take it for granted that some

day the city will have a trunk sewer, and it will drain east perhaps to a farm, but, at any rate, out of the bay. The current from the east, supposed to be caused, partially at least, by the force of the Niagara River's discharge on the opposite side of the lake, sweeps around the southern shore of the Island and meets a current from the west caused by the swirl from Mimico Point through Humber Bay, at a point south of the southwest point of the Island. The current in the bay is slight, but from west to east. We believe that the conduit should be laid entirely through pure water, when, in the event of a break, there would be the least danger of receiving impure water. We also believe that the proper place is farther west, say south of Garrison Common, or possibly as far west as Dufferin street. The only change this would necessitate would be moving the pumping station and plant, and laying a large main from Peter street to the new site. A conduit laid there would be little or no more costly in proportion to its length than one laid across the bay, and pure water would be guaranteed.

There is at the present time one slight objection to this scheme, but that is of very small moment indeed. There are three sewers emptying into Lake Ontario west of the Queen's wharf. They have a capacity of, say, three million gallons daily. This sewage could be conveyed to the bay by a trunk or collecting sewer, which would free that portion of the lake entirely from sewage contamination, besides inaugurating the commencement of the trunk sewer system. We feel sure that the question is of grave importance to us as a city, and to the thousands of guests that visit us during the summer. The coming summer will likely see greater crowds of foreign visitors than we have had before, unless they are deterred from visiting us through fear of the evil effect of bad water—an effect that cannot be too seriously considered.

HEALTH MATTERS, ACADEMIC, PROVINCIAL, AND MUNICIPAL.

At a time when the world is watching with intense interest the movements of the cholera epidemic, this interest must, with us, embrace the actions of our own scientific and executive authorities.

The Provincial Board of Health does not intend to be caught napping, but has already begun to organize a corps of volunteers from whom may be drawn inspectors and other sanitary officers, should occasion arise for their employment. For the last two or three decades the subject of hygiene has been rapidly forging to the front, and the final students and graduates of the past few years have received a good drilling in the following among other subjects embraced in the syllabus to be found in

the calendar of the University of Toronto: "Contagion and infection, management of epidemics, quarantine; duties and functions of medical health officers and boards of health; vital statistics; sanitary legislation, federal, provincial, and municipal." A special course in bacteriology has also been instituted by the professor of biology, and the pathogenic bacteria have been handled both in didactic lectures and in the bacteriological laboratory. And now Dr. Bryce and Mr. J. J. Mackenzie, B.A., under the auspices of the Provincial Board, are directing the members of the volunteer corps above mentioned to details regarding the epidemic which is at present abroad, the latter describing the natural history and peculiarities of the cholera spirillum and the action upon it of germicides and other circumstances, and the former pointing out the specific channels along which it has been conveyed since it started on its travels, and the possible and probable channels of the future, the localities to be guarded, and the precise action to be taken and which can be practically taken under varying circumstances. And what is of the greatest importance of all, he is forming a personal acquaintance with men, some of whom may be called upon to act in concert with him.

We all hope cholera may not come near our borders; in that case no harm will have been done. Should our hopes be doomed to disappointment, it will then be deemed a good thing that the Provincial Board has not built upon them to the neglect of reasonable precautions and preparations.

In deplorable contrast with the action of the Provincial Board is that of the Local Board and Municipal Council of this city, who assume to consider that some defects in bookkeeping and financial management give sufficient excuse (we will not say cause) for the disorganization—reorganization they call it—of the Health Department at this critical period. The capacity for judgment in such matters may be estimated by some of the criticisms of our aldermanic magnates; that "too much milk was supplied" for the poor little diphtheria patients; that "there appeared to be more nurses than patients"—and yet at one time there was only one nurse to eleven cases of diphtheria; that "if the Health Department be wiped out of existence we shall have no cholera!" After contemplating how little sanitary science has done to improve the ideas of some people, it is a comfort to be reassured that "the world moves still."

W. O.

Book Reviews.

For further information regarding the following publications communicate with J. A. CARVETH & Co. Medical Bookstore, 413 Parliament Street, Toronto. Agents for Canada.

PRACTICE OF MEDICINE. By Edwin T. Doubleday, M.D., and J. Darwin Nagel. Lea Brothers & Co., Philadelphia.

This is one of the Students' Quiz Series. It is arranged in the form of question and answer, being compiled from most of the well-known authors. It may be of assistance to the student who is anxious to hurriedly review his work.

ESSENTIALS OF DIAGNOSIS. By Solomon Salis Cohen, M.D., and Augustus A. Eshner, M.D. W. B. Saunders, Philadelphia.

This is one of the series of Saunders' Question Compendes, being arranged in the form of question and answer. The authors are careful to advise the student not to depend upon it to the exclusion of standard works. At the same time a great deal of valuable information will be found here put in a clear and concise manner, and no doubt the work will materially aid the student.

A TEXT-BOOK OF PRACTICAL THERAPEUTICS, with especial reference to the application of remedial measures to diseases, and their employment upon a rational basis. By Hobart Amory Hare, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; Laureate of the Royal Academy of Medicine in Belgium, of the Medical Society of London, etc.; President of the Section of Therapeutics in the Pan-American Medical Congress. Third edition. Enlarged and thoroughly revised. Philadelphia: Lea Brothers & Co., 1892.

This book was first issued two years ago, and the fact that in such a short space of time a third edition has been rendered necessary speaks well for its popularity. It is divided into four parts: Part I. treats of general therapeutic considerations, such as modes of action of drugs, modes of administering them, dosage, idiosyncrasy, indications and contraindications for their exhibition, combination of drugs, incompatibility, etc. Part II. is a compilation of all the drugs now considered valuable, arranged in alphabetical order, presumably for convenience of reference. Each drug is described, and its source briefly mentioned. The physiological action is fully but succinctly set forth, and this is followed by a statement of its therapeutic uses, based both upon its physiological action and the experience of practitioners. A very useful addition to this part of the work is a paragraph on "Administration," which gives the book a practical value to both students and physicians which very few works on therapeutics possess. Another important paragraph is that entitled "Contraindications," in which the factors which render the use of the drug inadvisable are set forth. Part III. deals with remedial measures other than drugs, and gives a list of foods suitable for the sick. Part IV. is an enumeration of diseases in alphabetical order, with an outline of treatment for each. The various drugs

generally used are mentioned, and their relative value in the author's judgment clearly defined. The plan of the book is good, and has been very well carried out. The reader is not left in doubt of the opinions of the author—a statement which cannot be made about all books.

Medical Items.

DR. A. H. FERGUSON, Winnipeg, by invitation, addressed the Minnesota Academy of Medicine on the subject of "Hydatids."

DR. J. F. W. ROSS has been appointed gynecologist to St. Michael's Hospital, Toronto.

DR. FENTON, one of the resident assistants, Toronto General Hospital, who was seriously ill with septicæmia, resulting from a wound received in the *post-mortem* room, has recovered.

DR. HARRY OLDRIGHT, son of Dr. William Oldright, who has been abroad for about two years, has commenced practice in Toronto, 261 College street.

OBITUARY.

WE were promised definite information with reference to Dr. Worthington, of Clinton, whose death we announced in our last issue, but through some accident it has not reached us. However, we may say he was over forty years in practice, becoming a member of the College of Physicians and Surgeons, Lower Canada, in 1851. He was well known and highly respected by his confrères, and had the honor of being a past-president of the Ontario Medical Association. He was one of the chief workers in the organization of the Huron Medical Association.

DR. C. STEWART GRAFTON died at the residence of his father, in Dundas, March 7th, from phthisis, after a long and tedious illness, at the age of 52. He was educated in the Toronto School of Medicine, received his degree of M.D. from Victoria in 1883, and became a Licentiate of the Royal College of Physicians, Edinburgh, the latter part of the same year. He practised for some years in Toronto, until failing health compelled him to give up work. He was in all respects an admirable type of a man and a physician. He was successful in practice, and beloved by all who knew him intimately. He leaves a wife and one child.

DR. JOHN GRANT, of 278 Dundas street, Toronto, died March 3rd. On account of advancing age and inactivity in practice, he was not well known to younger physicians; but in former times he was active, and had a good standing in the profession. He was one of the survivors of the rebellion of 1837, being at that time a surgeon-major of the Volunteer Rifles. He was an L.F.P.S. Glasgow, and became a licentiate of the old Medical Board in 1831.

ONTARIO MEDICAL ASSOCIATION.—As will be seen from a reference to the advertising columns, the date of the thirteenth annual meeting of the association has been postponed from the 7th and 8th to the 21st and 22nd of

June. The executive has been led to this step for the reason that the American Medical Association holds its annual meeting in Milwaukee on the 6th, 7th, 8th, and 9th of June. Another large gathering of physicians will take place in Omaha during the week previous, in connection with the National Association of Railroad Surgeons. Neither of these meetings would interfere with the annual meeting of the Ontario Medical Association under ordinary circumstances, but this year a special effort is being made to organize a large excursion for the medical profession to the Chicago exhibition in connection with one or both of the above gatherings, and the railroad authorities are offering persuasive inducements in the way of reduced fares. The executive in consequence, deemed that it would best conserve the interests of the association by postponing the annual meeting two weeks beyond its regular date. The attention of the members is drawn to the change in order that they may make their plans for the summer in such a way as to allow them to attend this meeting. D. J. GIBB WISHART, general secretary.

THE PAN-AMERICAN MEDICAL CONGRESS.—The section on Laryngology and Rhinology of the Pan-American Medical Congress is now thoroughly organized, with secretaries in all the countries of South America, as well as in the United States and Canada. The president, Dr. E. Fletcher Ingals, of Chicago, is making a thorough canvass to secure a large number of good papers for the section, and aided as he will be by the secretaries, Drs. Murray and Alonso, and the corps of honorary presidents, he feels assured of the success of this department of the congress. All physicians interested in this section are requested to correspond with the secretary (English) for the United States, DR. T. MORRIS MURRAY, Washington, D.C.

ELEVENTH INTERNATIONAL MEDICAL CONGRESS.—Through the courtesy of His Honor the Lieutenant-Governor of Ontario, a communication has been received by the secretary of the Ontario Medical Association, covering an invitation from the Central Committee of the Eleventh International Medical Congress, meeting in Rome on the 24th of September, 1893, to the president and members of the Ontario Medical Association, to appoint delegates to this congress. Any member of the association who may find it convenient to attend this congress should communicate early with the secretary, Dr. D. J. Gibb Wishart, 17 Grosvenor street, Toronto.

AT a meeting of the Windsor Physicians and Surgeons' Association, held February 13th, 1893, the following resolution was unanimously adopted: "Whereas a number of medical practitioners are endeavoring to secure legislation in a manner subversive to the usefulness of the Ontario Medical Council; we who daily contrast the medical legislation of Michigan with the efficient legislation of Ontario beg to express our entire confidence in our Medical Council. And we beg to urge that any change in legislation that we may desire should be brought about only through the Council by the representatives whom we elect. D. E. BROOK, M.D., secretary."