The report contains much valuable information, but as our paper is only to show that the diseases of children which are attended with the greatest fatality are being brought under such sanitary conditions as tend to lessen the mortality, we will follow it no further.

If we accept the estimate of statisticians of the actual cash value of each male and female who live to attain adolescence at one thousand dollars, then add to this financial value the intellectual worth of hundreds of thousands of children who perish annually from infectious diseases—that are in the main preventable—we have but a faint conception of the vast loss the world sustains by this fearful mortality.

In view of all this, humanity is ready to bow at the footstool of science, and beg that the ratio between those who live and those who die at the tender age be diminished, and that they have thrown around them the protecting care of hygienic medicine. The progress of science in none of its departments has ever reached the highest degree of perfection by steady, monotonous and gradual advancement. For long it has appeared to be so, until some fortunate individual, endowed with rare genius, utilizing the knowledge gained from all sources, has evolved from the womb of time some hidden truth which in a brief period has effected more than years of patient toil, and marked his epoch as an era, sending his name across the empyrean of thought like a meteor flashing across the heavens, winning for science incalculable benefits, and for himself glory and renown.

ORIGINAL ARTICLES.

ON THE TREATMENT OF DIPHTHERIA.¹

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This paper is on the treatment of diphtheria. It is brief, for in this presence it would be inopportune to specify in minute detail all that would be required for the tyro. Nor shall your time be taxed by the recital of cases.

A summary of the treatment of diphtheria would hardly be intelligible without first defining in some particulars the nature of the disease. This will involve the question: Is diphtheria a local disease? If this disease consist essentially in the redness, swelling and soreness of the mucous membrane of some part of the throat, followed by the exudation and formation of a pseudo-membrane upon that part, then topical applications will constitute the rational and efficient mode of treatment.

The fascinations of science are liable to bias the mind and lead the judgment astray; as, for instance, the mycologist finds certain organisms—the bacterium termo and bacilli—in the pseudo-membrane in the throat; he observes further that these microbes multiply with great rapidity, and with the exudate

constitute the pathognomonic membrane of diphtheria. Moreover, he may trace these micro-organisms, as they penetrate into the tissues, enter the blood-vessels and lymphatics, and through these channels, he assumes the general system and distant organs become affected. If this be true, and the only mode of attack, then the doctrine that the constitutional symptoms are secondary, and arise from the migration of germs from their nidus in some part of the faucial membrane, must be accepted. Again, because the local symptoms are sometimes severe while the general symptoms are mild, it is held that diphtheria is a local disease.

Diphtheria a general disease.

1. It is characterized by a period of incubation.
2. The general symptoms appear before the local.
3. The introduction of the germs by inoculation upon a distant part of the surface is followed by the appearance of the false membrane upon the faucial mucous membrane.

4. The membrane may form, under favorable conditions, upon various parts of the body.

These assumed facts would seem to be valid reasons for the belief that the throat affection is a local manifestation of a general disease.

Diphtheria is not croup.

1. Croup is infectious.
2. Diphtheria is a general disease.
2. Croup is local.

3. Diphtheria is an epidemic asthenic disease.
3. Croup is a sthenic local inflammation.

4. Diphtheria may be followed by paralysis.
4. Croup not.

5. Diphtheria may be complicated by albuminuria.
5. Croup not.

6. The diphtheritic membrane involves the subjacent tissues.
6. In croup the exudate becomes a solidifying membrane upon the mucous surface.

In the management of diphtheria it is of the first importance to recognize the infectious nature of the disease. For the protection, therefore, of the healthy, isolate the sick. The room assigned to the affected should contain only the simplest articles of furniture. Carpets, curtains and upholstered furniture should be removed. The atmosphere of the apartment should be kept at a uniform temperature of about 72°, and good ventilation should be secured without exposing the patient to draughts of air.

After the termination of the case, the thorough disinfection of the room, bedding and furniture should never be neglected, and the same may be affirmed of the clothing and persons of the attendants, and of the convalescing patient, as well.

The indications of treatment may be formulated as follows:

1. Destroy the septic germs in the blood.
2. Eliminate effete material from the system.
3. Prevent the formation of, or remove the pseudo-membrane.
4. Control pain and restlessness.
5. Sustain the strength of the patient.
6. Prevent the sequelæ.
7. Perform tracheotomy (?) or intubation.

The asthenic nature of the disease should be borne

¹ Read in the Section on Diseases of Children, at the Thirty-Seventh Annual Meeting of the American Medical Association.

in mind, even in the earliest stage, that the treatment may be preventive of the possible sudden prostration which precedes the dangerous complications. The alimentary canal should be freely evacuated. This may be accomplished by exhibiting some unirritating agent, as castor oil, rhubarb, or a suitable dose of the compound cathartic pill ($\frac{1}{2}$ grain or 1 grain).

Keeping in mind the indications which have been tabulated, some combination of remedies may be devised which will meet most of the requirements of the case. And it is fortunate that the remedies from which experience justifies an expectation of benefit are not incompatible, and may therefore be grouped. It is also worthy of consideration, that medicines intended for children especially should be rendered as palatable as possible. For this purpose the syrup of lemon may be substituted for the glycerine and water in the following prescription.

The following prescription is suggested as an example of such combination:

R.	Tr. ferri chloridi.....	3j.
	Potas. chlorat.....	3ij.
	Acid hydrochloric dil.....	m xx.
	Tr. capsici.....	3j.
	Morph. muriat.....	gr. ss.
	Glycerine.....	3ij.
	Aq. destil.....	3ijss.
M.	S. Give a teaspoonful every hour or two or three hours, according to the urgency of the symptoms.	

Of course the proportions of the several ingredients will be varied in different cases to adjust the doses to the age and condition of the patient. The directions for taking the mixture given above, however, convey but an imperfect idea of the most efficient mode of using it. The patient should be required to take a drink of water, then immediately take the mixture undiluted. By this mode several indications are fulfilled at one and the same time. An efficient local application is made to the throat each time the mixture is administered, and the constitutional tonic, antiseptic and anodyne effects are also secured. The water which was taken before the medicine will be sufficient to properly dilute the remedies in the stomach, and thus prevent any irritation of that organ.

In mild cases this prescription will fill all indications, and a large proportion of cases in which this treatment was commenced early will progress and terminate as mild cases, which under some other course would prove severe and endanger the life. It will be unnecessary to annoy the patient by making other local applications. Moreover, there is good reason to assume that the paralysis which is sometimes a serious complication during the convalescence is due to impoverishment of the blood, the restoratives contained in this mixture should therefore prove a powerful preventive of this complication. Experience justifies this expectation, for paralysis will be encountered but seldom during the progress of the disease or in the convalescence.

The same may be affirmed of the effects of this mixture upon the local symptoms and upon the formation of the pseudo membrane. The local pain, the congestion and swelling are relieved, and it is not unusual to see the forming membrane disintegrate

and disappear within twenty-four hours after commencing the treatment. The earlier suitable topical applications are made to the exudate the more easily may it be removed. Unquestionably the case is sometimes made worse instead of better by the frequent resort to the probang, charged with escharotics or irritating agents. Besides, the excitement produced by this procedure must result in injury to the patient, especially when force is required to overcome the resistance offered by the child from fear and dread of the operation.

The importance of surrounding the patient with a warm atmosphere has been asserted. It is also important that the air be kept moist. The inhalation of simple warm aqueous vapor will produce benefit by its solvent effect upon the exudate, and also by allaying irritation and discomfort of the fauces. While this is being done additional benefit will be attained by charging the vapor with some agent or agents of recognized power in resolving the membrane, and also efficient as antiseptics, as aqua calcis, eucalyptus, oil of turpentine. Pepsin or trypsin may have a beneficial effect in dissolving the membrane, when the ordinary remedies fail.

The steam atomizer will be found efficient in utilizing the vapor. After a certain age, no difficulty will be experienced in directing the spray into the throat. And even in cases of very young children, the timidity may be readily overcome by placing the atomizer when in use (and it should be in use while the false membrane persists) at a distance from the face, and gradually approximating it till the vapor is inhaled freely. The same object may be attained by causing the vapor, charged with the solvent, to rise from an open vessel placed contiguous to the patient.

Of albuminuria it need only be said that it is present in a large proportion of cases, and that while the kidney is large and pale, it is not indicative of the serious renal complications, as in scarlatina, and it is exceptional when any serious effects from it become chronic. Iron and chlorate of potash would seem to be indicated for this phase of the case, and these are contained in an eligible form in the prescription already given.

Too much stress cannot be laid upon the importance of sustaining the strength by the liberal use of nourishment. Though the patient may feel no desire for food, he may be induced to take it, if it is offered in a concentrated fluid form, which should be repeated at short intervals.

In conditions of great depression stimulants are indicated. It is a fact of common observation that alcoholic stimulants are well borne in diphtheria, and that intoxication is not likely to follow even the free administration of whiskey. So beneficial are stimulants, that the free use of spiritus frumenti is considered by some as specific treatment (?) in diphtheria. Under the same condition it will be natural to cast about for other active tonics, and quinine will be among those selected. That quinine produces any specific action in diphtheria is problematical, and when administered, it should be for its tonic effect.

Strychnia is the remedy frequently prescribed for the removal of paralysis complicating diphtheria, as

if this drug had some specific influence in restoring muscular power. Query—Can strychnia be relied on for restoring innervation in this, as in some other forms of paralysis? Are not the indications here first, to establish assimilation, and second, to improve the quality of the blood?

Galvanism is an agent of undoubted value in the treatment of these paralyses, by stimulating nervous power, by exciting muscular contractions and by increasing the nutrition of all the structures involved in the paresis.

Should tracheotomy be performed, even in extreme condition of the patient in diphtheria? It is true this operation has been performed many times when the patient was in great peril; and sometimes recovery has followed. It would be just to say that the recovery in at least a minor proportion of cases has been due to the operation. This, however, has happened so seldom that the procedure has long been regarded by the laity with disfavor; and were the whole truth stated, undoubtedly the profession regard tracheotomy as the forlorn hope. And furthermore, there is reason to believe that in a proportion of cases, the fatal result might have been avoided, had the surgical interference not been interposed.

When we review the past we can see but little in the results of tracheotomy that is reassuring. Any procedure, therefore, which promises equal benefits, and is at the same time free from the objections indicated, will surely be hailed as an improvement. Intubation, it is now claimed, offers these advantages. Since the revival of this procedure by Dr. O'Dwyer a little more than a year ago, it has been tested in many cases, and the results as reported have been so satisfactory as to encourage the hope that it will soon supersede tracheotomy, at least in the majority of cases. It is certainly free from the objections which render cutting so unpopular. The consent of the parents is easily obtained. No solution of the continuity of tissues is produced, to add to the complications which already exist. It is therefore bloodless. It is not particularly difficult of performance. The relief is many times immediate.

INTESTINAL ANTISEPSIS.¹

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Cathartics have constituted no small part of the means employed in all ages in the treatment of disease. They have probably introduced the treatment of more cases of disease than any other class of remedies. Having been universally used they must have been found beneficial or they would have fallen into disuse. Their salutary influence has been explained by saying "they corrected the secretions," "opened up the portal circulation," cleansed the "prime viæ;" that they acted by depletion, and derivation; that they stimulated the liver to increased secretion of the bile, and thus wrought out their errand of mercy.

All this has been very satisfactory in times agone; but it is no longer sufficient for the demands of an exacting, if not an exact, professional science. Among cathartics, mercury in some form has readily held the first place, because it was easily administered, prompt in action and more certainly followed by good results than any other agent of this class.

Now is there any scientific basis for this confidence in the value of cathartics, and especially in the value of mercurials, or is it simply "a rule of thumb"? Is all which can be said on this subject contained in the maxim "*Experientia docet*"? Certainly there must be some reason for the use of these remedies aside from those already given, and it will be the object of this paper to see if it can be found out, and stated in clear and definite terms.

In order to get at the bottom of this matter let us take an inventory of the stock we have on hand, bearing on this subject. When we have accomplished this we shall find, I think, we can explain the beneficent action of cathartics, on the theory of antiseptics in a satisfactory manner, and at the same time find a solution for certain morbid processes hitherto imperfectly understood. We cannot hope to elucidate everything that lies in this direction, but we can perhaps "blaze a way" along which some wiser one will build a royal road.

Digestion is partially, not wholly, accomplished by bringing the food into contact with the unorganized ferments. These are ptyaline, pepsine, pancreatine, etc. Ewald says that at its last reduction digestion is a process of hydration. By the action of the saliva and the pancreatic juice, starch $C_6H_{10}O_6$ becomes $C_6H_{12}O_6$ or $C_{12}H_{22}O_{11}$, as the change results in glucose or maltose. By the action of the gastric juice albuminoids are changed into albuminose, or peptones. They are readily soluble in water, immediately absorbed, and cannot be recognized in the blood; being, as it is believed, reconverted into albumen. On the pancreatic juice we depend for still further action upon starches, the proteids, and fats. A peptone is produced in an alkaline fluid which differs but little from that produced in the stomach in an acid medium (Foster). Leucin and tyrosin are also produced from the proteids. The fats are split up into glycerine and acids, as well as emulsified by the action of the pancreatic secretion.

So much is accomplished in the process of digestion by means of the unorganized ferments. These are chemical agents, and as such can have but a single course of action, other things being equal. The organized ferments, of which we shall speak hereafter, may be modified in their action apparently in a variety of ways—either by the liquids in which they grow, the presence or absence of air, etc. The action of organized ferments results in putrefaction; while the statement is made on authority that the gastric juice *arrests* putrefaction. Whether this be so or not is not deemed important in this discussion.

Putrefaction, then, is the result of bacterial action. A great number of bacteria enter into this process. By their action starch is changed into sugar, and sugar is changed into lactic acid, butyric acid, and mucilage, alcohol into acetic acid, urea into carbon-

¹ Read before the Ohio State Medical Society.