ON CROUP.

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THE following papers were originally communicated to the Boston Society for Medical Improvement, and to the Suffolk District Medical Society. The first of them was published some years since in the New England Medical and Surgical Journal, but, as it is closely connected with the subsequent ones, it seemed desirable to reprint it with them. The whole substance of these papers might have been easily condensed and presented in the form of a single essay. As they were, however, prepared at different times, and in the course of a continued series of observation and inquiry, I preferred offering them to the profession in the form originally given to them.

I.—*Contributions to the History and Diagnosis of Croup.*—Read before the Boston Society for Medical Improvement, in 1842.

Every physician who has much practical acquaintance with disease, will have observed that there are great differences of character among the cases to which he finds it convenient, in accordance with the custom of medical men, to give the general name of *croup*. He finds that a certain portion of these cases—and by far the larger portion—yield readily to the means which he employs, and very often to the ordinary domestic remedies of mothers and nurses. He has indeed reason to believe that a considerable number of them would spontaneously subside if left to themselves. On the other hand, he finds that there are some cases, fortunately but few in proportion to the whole, which exhibit throughout their course a character of obstinacy that bids defiance to treatment, and which, with few exceptions, pass on to a fatal termination uninfluenced by any remedies he can employ.

Different views may be taken of the nature of these cases. It is believed by some that the former are not, for the most part, essentially different from the latter; that the difference is more in degree than in kind, or that the difference in the severity and result depends on difference of management; that the favorable character and course of the former are mainly owing to early and judicious treatment, and the fatal event of the latter to the inefficient or too tardy application of remedies. A long, and I trust a faithful examination of this disease has, however, satisfied me that this opinion is not correct. I have been led to believe that there is an original and essential difference in these cases; that those of the first kind are pathologically different from the second; that the former, even if they terminate fatally, which happens in some rare instances, do not terminate in the same way, or at least do not exhibit the same morbid conditions; and that no variety or deficiency of treatment will cause a case of the one kind to assume the character of the other.

I do not, however, mean to imply that all the cases to which I refer, are capable of being classed under two varieties. Among those which I have characterized as the more mild and tractable sort, we still find great differences in the mode of attack, course, and mode of termination, and also in the degree in which they appear to be influenced by remedies. The object of this paper is to endeavor to contribute something

towards determining the nature and extent of the distinctions referred to. With this view I have made an examination of all the cases of croup of every kind which have occurred during the last twelve and a half years, in my own practice, and of this examination I now submit the results. Upon certain points relating to the severer form of the disease, I have included the examination of a number of other cases, extending over a period of twenty-five years, witnessed partly in my own practice, partly at dissections, and partly in consultations.

It should be first observed, that, in noting cases in order to this inquiry, I have set down as croup, all those which in the common language of the profession are included under this name—viz., all those which, at any stage of their progress, present a fair question of diagnosis; all those in which is heard that shrill, sharp, ringing cough, which is regarded as the cough of croup, accompanied by a distinct embarrassment of respiration, however slight, and by some affection of the voice. It follows, of course, that many very slight cases must have been included among those on which these remarks are founded—cases which yielded or subsided almost at once. Yet it is right that these should form part of the materials of our examination. When we are in search of means of diagnosis, our attention should be directed to all those cases which have, at any period of their progress, exhibited symptoms that give rise to a well-grounded suspicion of their character. Although many cases which excite the apprehension of severe croup on their first attack, pass away very readily, and by their result show themselves to have been of very moderate severity; yet, on the other hand, it is to be recollected, that many cases, which at last terminate fatally, do not, at their beginning, exhibit symptoms at all more severe, or excite apprehensions at all more serious, than those which have so readily subsided.

Of the cases to which this inquiry relates, occurring during the period extending from January, 1830, to July, 1842, the number is 131. For the convenience of examination, these may be divided into four classes. I do not intend by this arrangement to express the opinion that they constitute four distinct diseases. I would not even be understood to assert positively, with our present amount of knowledge, that they are not different manifestations of the same disease. The purpose now is to speak of them as groups of cases distinguished by certain differences in their symptoms and course, which may or may not be connected with an essential difference in their nature. These classes may be designated, with a view to their probable character and for the purpose of referring to them more intelligibly, by the terms membranous, inflammatory, spasmodic and catarrhal. Of the whole number there were :—

	Cases.	Deaths.
Of membranous Croup,	22	19
Inflammatory "	18	0
Spasmodic "	35	0
Catarrhal "	56	0
	131	19

In the first class are included those cases in which there is reason to believe that a false membrane has been actually formed lining the larynx and trachea.

In the second class, those cases in which the symptoms are for the most part of the same character as in the first, but in which there is reason to believe that no membrane has been formed. The grounds for the opinion formed of the nature of these two classes will be stated subsequently.

The terms applied to the third and fourth classes, require no particular explanation.

The symptoms on which we depend for the diagnosis of croup, relate to the cough, the voice and the respiration.

In the early stage of the first form of croup, the cough is by no means peculiar. In the advanced, it assumes a somewhat different character. In the early period it is sharp, shrill, ringing; it does not vary from that which we hear in the other forms, except perhaps that in some of the less formidable cases it is much louder and more violent at their beginning, than it is in those which prove ultimately more alarming. In the latter period it becomes less loud and ringing, but is equally sharp—it often becomes almost inaudible, bearing the same relation to a common cough, that a whisper does to the common voice. The cough, then, affords no certain means of distinguishing this form of croup at that period of it in which the diagnosis would be most valuable.

Of the state of the voice, nearly the same remark may be made. In the advanced stage of a case it is sufficiently characteristic. It becomes a sharp, and almost inaudible whisper. But early in the disease it is not always affected at all; and, if it be, cannot with certainty be distinguished from the hoarse voice of common catarrh.

The condition of the respiration affords us far more important information. In the early period of the disease, however, when we most need means of diagnosis, it is not a symptom which always attracts attention, even from the physician; much less from others who are around the patient. The common description of the breathing in croup, does not apply well to the beginning of the membranous variety. It seems rather taken from cases of a less dangerous kind, in which the breathing is from the first, loud, harsh, suffocative; attended with great efforts, and much loud coughing; creating great alarm, and calling at once for efficient means of relief. But the breathing in membranous croup does not excite attention in the very commencement of the disease. It is comparatively quiet and unobtrusive. Its true character is not at once to be detected, but only by a careful and accurate observation. The patient has not the ordinary aspect of difficult breathing; in fact, the breathing is not difficult at the very first. He probably experiences no distress. There is no real deficiency in the performance of the function, and no obvious embarrassment. There is only a little more effort in drawing in the air, and a little more force exercised in its expulsion, whilst the amount of air admitted and expelled is fully equal to the necessities of life. This perhaps would not be noticed on a casual glance at the patient, but will be at once perceived on attending to the muscular movements subservient to the function, which are—to use an expressive French term—somewhat exalted. It is indicated very soon, also, by a slight dilatation of the nostrils, and a little whiz or buzz accompanying the passage of air through the rima glottidis. This sound is distinguished either by placing

the ear near the mouth of the patient, or by applying the stethoscope on the back of the neck, or directly upon the upper part of the larynx.

This at its very beginning is the essential respiration of membranous croup, and it affords far more aid in diagnosis than either the cough or the voice. It is not, however, always found as pure as has been described. It is often mingled with, and obscured by, other sounds. Thus the disease is often attended by paroxysms of irregular and spasmodic breathing, accompanied by violent muscular efforts and great distress, and of course producing other and more obvious sounds than those described. There is often also present in the air passages, either above or below the glottis, a quantity of mucus, giving rise to a constant or occasional rattling, which seems to mask the proper sound of croup. These adventitious sounds, being also as frequently heard in the other forms of croup, are therefore of no service in diagnosis. Generally there are intervals of relief from these superadded symptoms, especially immediately after vomiting or bleeding, but the essential breathing of the disease will be found to be unchanged and unmitigated in these intervals of ease; although the apparent relief may be so considerable as to give rise to strong, but fallacious hopes of recovery.

We occasionally hear, in cases of considerable enlargement of the tonsils, a kind of breathing which closely resembles the early breathing of croup. Usually in such patients the respiration is loud, sonorous, unequal and irregular, but in a few it is quiet, steady, with a muscular effort occasioned by a mechanical obstruction like that in croup. The distinction between them can, however, be readily made, by attending carefully to the seat of the obstruction, which is above the rima glottidis in the one case, and at it in the other; by the sound of the cough and voice, which are not croupy, and by the fact that the obstruction varies in degree and sometimes vanishes, with change of position.

I have endeavored to describe this respiration as it exists in its slightest appreciable degree, at the earliest period of its manifestation. As the disease advances, it becomes very strongly marked, whilst the condition on which its peculiar character depends, viz. a mechanical narrowing of the orifice through which the air passes, becomes much more obvious.

The muscular effort, in the latter stage, becomes very strong, both in inspiration and expiration. During inspiration, whilst all the muscles concerned in it are in the highest state of activity, the mechanical impediment against which they act, is often strikingly displayed by the falling in of the soft parts about the neck and clavicles, at the epigastrium, and between and along the lower edge of the ribs—the air not passing in through the narrowed opening of the glottis so rapidly as the dilatation of the chest by the increased muscular effort would render necessary. The expiration is chiefly characterized by the amount of force employed to expel the air. In health the expiration is easy, and accompanied by little effort. Where there is no unusual obstruction, the mere tendency to collapse of the lungs would be sufficient for the expulsion of the air, as we see in the dead body; so that the walls of the chest have merely to follow up this contraction, without adding to its force by any muscular effort. But in croup, this is not enough; and we often find that the air is blown out forcibly against the mechanical resistance occasioned by the

disease. We find the same strong contraction of the muscles concerned, especially of the abdominal muscles, which is observed when air is blown out forcibly through a narrow passage.

This is the proper breathing of croup; becoming more and more intense as the disease approaches its termination, till the whole life of the individual seems, as it were, to concentrate itself in this one effort. The patient in this extreme condition seeks, by a multitude of changes of place and position, to find some alleviation of his agony; the cough, and with it the voice, have become nearly extinct; and his inarticulate appeals and beseeching looks for relief to those from whom he is accustomed to look for it, constitute one of the most touching scenes which we are called upon to witness in the practice of medicine. Happily the extreme suffering usually, though not always, subsides towards the close of life, and death takes place at last with comparative ease.

In the advanced stage of croup, the breathing is often modified by circumstances other than the mere mechanical obstruction at the upper part of the larynx. After a certain period the false membrane is in some places separated from its adhesion to the mucous surface, by the secretion of pus. The passage of air to and fro, and the efforts of coughing, detach it partially from its adhesion, and break it up more or less into shreds, which however still adhere at one of their ends. These ragged portions of membrane, mingled with the pus, move up and down the air passages, causing some variety in the sounds and also in the actual difficulty of breathing. Death is sometimes very suddenly produced by a collection of this material into a mass which becomes impacted in, and thus plugs up, either the upper or lower part of the larynx. This at least, from the state in which the parts are found on dissection, would appear to be the mode in which death takes place.

The respiration may also be modified in croup from a congestion or inflammation of the lungs, which occasionally supervenes. The embarrassment of respiration has also sometimes appeared to be increased by an accumulation of air in the lungs, which arises from a deficient balance between inspiration and expiration. Owing to the greater ease with which we can make extraordinary and continued efforts of inspiration than we can of expiration, a greater quantity is admitted than can be readily expelled, before the suffocative feeling of the patient impels him to a new effort for relief.

But although there may be a combination of the respiration of this disease with that produced by other affections of the throat or lungs, yet the respiration of croup is in its nature and character essentially distinct from them. In them the difficulty of breathing and the unusual muscular effort may arise from a variety of causes, producing great varieties in the modes of dyspnœa; in croup the one essential condition is the mechanically contracted state of the passage through which the air passes, and all the peculiarities of the dyspnœa proceed from this condition. In one particular the breathing of asthma resembles that of croup, viz., in the intensity of the effort by which the current of air is made to move in both directions against a mechanical resistance; but the point of the resistance and consequently the other circumstances of the function prevent the resemblance from extending to other points.

The *first* form of croup, then, is distinguished by the cough, the voice, and by a peculiarity of the respiration, which I have attempted to describe, and which, for the sake of distinguishing it in this essay, may be called *intense.*

In the cases of the inflammatory croup, which constitute the *second* form of the disease, the condition of the voice, cough and breathing are precisely the same as in the cases of the first class. There is no certain way by which, so far as these symptoms are concerned, cases of the one kind are to be distinguished from those of the other. The cases enumerated among the second class were of all degrees of severity, but none of them were fatal. Cases, however, of croup which terminated fatally, and in which no membrane was found on dissection, are recorded upon the best authority. To these we shall have occasion to advert hereafter. In addition to the symptoms proceeding from the character of the cough, voice and respiration, I have noted, in a few examples of this form of the disease, a tenderness of the larynx on pressure.

As cases of this class are then usually favorable in their termination, whilst those of the first are usually fatal, the diagnosis between them, in the early stages especially, becomes of very great importance, both as regards prognosis and treatment. Of the means by which this distinction may probably be made, and of the grounds for believing these two to be essentially distinct diseases, and not different states or conditions of the same disease, I shall take occasion to speak, after considering the other two classes which have been enumerated.

The *third* includes certain cases which are generally designated as *spasmodic croup*, and sometimes as *spasmodic asthma.* The attack is always sudden, and usually occurs after the subject has been, for some time, asleep. Very often it occurs in the evening, during the first sleep of the child, before its parents have retired to bed; but perhaps as frequently at a later hour of the night, or very early in the morning. The patient wakes in great distress for breath. His inspiration is attended with great effort; it is loud, ringing, shrill, somewhat resembling the hooping inspiration of hooping cough, but louder and more sonorous. The expiration is comparatively quiet and easy. The voice, at the same time, is hoarse and broken, and there is a loud, hoarse, barking cough, which closely resembles that of the preceding kinds, and indeed alone, would not serve as a mark of distinction from them. These cases seem occasionally to rise from indigestion; but more frequently we can trace their occurrence to cold, especially as they have been often preceded for a few days by symptoms of catarrh. When left to themselves, they will usually subside spontaneously, but from their suddenness and violence, they cause great alarm, and call for immediate assistance. They rarely fail to yield to an emetic or venesection, leaving behind them for a longer or shorter period, rarely for more than twenty-four hours, some hoarseness and some degree of the croupy sound of the cough, with a little huskiness or stuffness of breathing. At no period is there any proper *intensity* of respiration.

These cases, from their suddenness, the time of the attack, the great violence of the first symptoms, and the consequent alarm which they

create, produce a stronger impression on the minds of common observers and even of many practitioners, than those of the other kinds. This mode of attack is most closely associated in their minds with the term croup; and it is regarded as tending, if not checked, to terminate in the same state of things with cases of the first class. So far as the cases before us are concerned, however, this never happens, and of the whole number included under this examination, no one proved fatal.

The fourth class includes cases not falling under either of the above, and yet frequently presenting a very close resemblance to them. The subjects usually exhibit at first the symptoms of common catarrh. After a few days the voice becomes hoarse; the cough becomes croupy, and there is tightness, oppression, and some approach to the croupy sound of respiration; there is, however, no intense or exalted action of the respiratory muscles, and no indication of that mechanical impediment to the current of air which exists at the rima glottidis in the two first forms of the disease. Still the resemblance is sometimes quite close enough to cases of these forms, in their earliest stage, to occasion some anxiety, and there is also sometimes a sudden attack of dyspnœa, with loud, shrill and sonorous breathing, which imitates the symptoms of the third form, and is perhaps to be regarded as an attack of the same kind.

The cases of this form yield gradually, the croupy character wearing off in a few days, and leaving behind simply catarrhal symptoms. I suppose them, from the mode in which they come and go off, to be properly a catarrhal inflammation of the mucous membrane covering the organs of voice. We frequently observe that the catarrhal affection of the same membrane which occurs in the first stage of measles, is accompanied by the same croupy symptoms as those which have been now described—going off with the other catarrhal symptoms. In a few instances the attacks of this form of croup have terminated in severe bronchitis, or in inflammation of the lungs themselves. But among the 56 cases included above, there was no one fatal.

Having thus described these several forms of this disease, and stated in general what seemed to be their nature, the question now arises as to the justice of the distinction which has thus been assumed to exist. Is there any sufficient ground for such a distinction? Are these different cases different diseases? Are not the favorable ones, which constitute so large a proportion of the whole number, similar in their nature to the more severe; but either of less severity in their origin, or else modified and controlled in their course, by the influence of treatment. These questions it is obviously of great importance, to the prognosis and treatment of the cases in question, to be able to answer correctly. If we can with regard to a large proportion of them confidently predict from the outset a favorable issue, the practitioner and the friends will be saved much unnecessary anxiety, and the patient many annoying and debilitating remedies.

I proceed, therefore, to state the grounds for a belief that the first form of croup is a disease essentially distinct from all the others, and that it depends on a peculiar pathological condition to which they have no tendency. Whether there be any equally marked distinction between the other forms, it is not of the same practical importance to determine; and

and as we have no sufficient materials for a satisfactory inquiry into this question, our attention will be confined to the evidence for the distinct character of the first form.

Every physician is familiar with an affection of the throat, both in adults and children, consisting in an inflammation of the mucous membrane, of that peculiar character which produces the effusion of a layer of coagulable lymph, or false membrane. The connection of this affection of the throat with croup was long since pointed out; and it is well known to practitioners among us, that this complaint, known familiarly, though inaccurately, under the name of "ulcerated sore throat," often accompanies or is followed by croup, and that croup thus connected is peculiarly fatal in its character. This circumstance in the history of croup was many years since strongly impressed upon my mind by an eminent practitioner in this neighborhood.* I was in consequence led, in all cases of croup, subsequently to this period, to make a careful examination of the fauces, with the view of determining exactly the extent to which this visible affection of the throat was connected with the more important disease.

Two causes prevent the completeness of these observations. We are very apt, in making record of cases, especially of those which appear of a slight degree of severity, to omit the *noting* of negative facts, even when they have been actually the objects of attention. Hence, although I have very rarely failed to examine the fauces in any case of supposed croup, I have often in the lighter cases, and sometimes in the severer, failed to note their condition. The second cause of incompleteness is the impossibility in some patients, from their terror and consequent resistance, of getting such a view of the parts as would authorize us to pronounce decidedly what their state is. Notwithstanding these circumstances, the state of the throat has been noticed and recorded in a sufficient number of cases to afford very fair materials for inference.

With a view to this examination, I may include a considerable number of other cases, besides those which constitute the particular subjects of inquiry in this paper, which have been noticed at other times, or in the practice of my friends. Including these cases with the 22 above referred to, I have memoranda, more or less complete, of 39 cases of what I have denominated membranous croup. The state of the fauces was observed and noted in 33, and of these, in 32 a false membrane was present; most frequently, and sometimes only on the tonsils, sometimes on other parts also, as the palate, uvula and pharynx. In one case no such membrane was present; but it was found to exist in the larynx after death. In 3 of these 33 cases, recovery took place; all the others were fatal. In 14, an examination was made after death, and the usual appearances were found to exist in all of them.

On the other hand, I have memoranda of 109 cases of what I have classed as the other forms of croup, and of these the state of the tonsils and fauces was noted in 45. In no one was there such a condition of the parts as was found to exist in the membranous form. In 3 cases there was indeed a thin, slight exudation on the tonsils, of the color and

* Dr. William J. Walker.

appearance of starch, like that which is sometimes seen on the edges and surface of the tongue. This I apprehend to be a formation of an entirely different nature from that which exists in the other class of cases. Of the 45, 12 were of the second, 11 of the third, and 22 of the fourth class.

From this statement, it seems probable that the appearance of a false membrane upon the tonsils or other visible part of the throat, in a case of croup, may be regarded as a pretty certain diagnostic sign that it is the membranous form of the disease; and its absence as a pretty certain indication that it is one of the other forms. Still there will be exceptions. There will be cases in which the membrane is formed in the larynx, although it has not appeared in the throat; and there may be those in which a membrane exists in the throat, unaccompanied by a similar condition of the air passages. Of the former I have recorded one example; of the latter, none. How frequent such exceptions will be, must be determined by more extensive observation. If they are not more frequent than they have been among the cases here recorded, the observation of this symptom will afford a sufficiently safe guide, since of 75 cases in which it was looked for and the result noticed, it failed as a diagnostic sign in but a single instance.

The question now presents itself, what are the grounds for believing that the two forms of the disease which I have distinguished as membranous and inflammatory, are not the same in different degrees or in different stages? and may not pass one into the other? The grounds are—

1. The very great preponderance of fatal results in the membranous croup and a similar preponderance of recoveries in the inflammatory, and the evidence which exists that in the few cases of recovery from the former, the membrane has been formed, and in the few cases on record of death from the latter, that a membrane has not been formed—afford strong reason for believing that the diseases are essentially different.* .

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* No fatal cases having occurred of inflammatory croup under my own notice, I am happy to be able to avail myself, in support of the views above taken, of an account of four such cases, contained in the first volume of the New England Journal of Medicine and Surgery, by James Jackson, M.D, formerly Professor of Theory and Practice of Physic in Harvard University. The symptoms in all these cases were unquestionably those of croup. In one of them bronchotomy was performed.

In the first case, "the mucous membrane of the larynx was much inflamed, and smeared over with a quantity of loose mucus, but without any false membrane. The inflammation extended into the trachea as far as could be examined without opening the chest."

In the second case, "the appearances in the larynx were the same. The lungs were more full of blood than usual."

In the third case, "there was not any coagulable lymph, the mucous membrane was highly inflamed and swollen, and the rima glottidis was thus very much narrowed. The membrane was smeared over with a thick mucus."

The fourth case I give at length in the words of the author.

"I was called to this on Sunday, July 5, 1812, at 3 o'clock, P.M. The disease had commenced 20 hours before, and was very strongly marked. The symptoms were considerably mitigated after vomiting. I tried in vain to take blood; the child was very fat, and the veins were all hidden, even the external jugular. The respiration grew bad again before morning, but the patient lived till the next morning, the 7th, so that the disease continued two days and a half, or 60 hours. In 8 hours after death, Dr. Bigelow examined the body, and the following is his report of the appearances. 'The trachea with the larynx was removed. The whole tube was pervious as usual, excepting the presence of a large quantity of mucus of the ordinary consistence. On dividing the larynx and trachea at the posterior side, and exposing the internal surface, the mucus being removed, a number of distinct red spots were discovered, of considerable size, on the lining membrane. One of these was immediately below the glottis. Between the mucus and the lining membrane there was no factitious substance whatever, nor any appearance the least resembling the membranes which I have seen formed in some other cases of croup. The lungs were not examined.'"

"In the other cases I had thought it possible that the disease had not continued long enough to allow the effusion to take place, as the patients all died in less than 48 hours from the attack. But

2. The formation of a false membrane does not seem to require either an advanced stage or a very intense degree of the inflammation from which it proceeds. It is rather the result of a peculiarity in the kind of inflammation, than of any period or degree of it. It appears to be a very early product of the inflammation, if it be not indeed almost contemporaneous with it. It resembles in this respect the similar effusion taking place on the serous membranes, which in them occurs very early, and has even been supposed to be the first act of inflammation. In the common inflammation of the tonsils which is accompanied by this symptom, a layer of lymph is observed to be effused over the surface of the part as soon as any signs of disease exist.

3. The circumstances attending recovery from simple inflammatory croup differ materially from those which accompany recovery from membranous croup. In the former the amendment is rapid and speedily complete. There is left behind only a moderate soreness of the larynx, and, in the worst cases, some hoarseness. There is at no time any copious or solid expectoration. In the latter, recovery is slow, unequal, and accompanied by phenomena which must necessarily attend the separation of the membrane, and the process through which the diseased mucous surface must go in order to its restoration to a healthy condition. The natural cure of the disease takes place by the occurrence of the suppurative inflammation upon the diseased surface, by which the false membrane is thrown off, and the mucous membrane then gradually returns to its natural state. In examinations after death, we usually find that this process has begun in the trachea, the membrane being there separated and often broken up into shreds, whilst the inflamed surface is covered by a layer of pus. Above, in the upper part of the larynx, around the glottis, the false membrane usually remains closely adherent. It is obvious that recovery might always take place could the parts be spared long enough from their functions to go through the necessary steps—and it is also obvious when it does take place, that it must be accompanied by a copious expectoration of pus, and of the membrane either in pieces, if firm enough, or else broken up and partially dissolved by the pus. Now these appearances do not accompany recovery from even the severest cases of the inflammatory croup, whilst they do accompany recovery from well-marked cases of the membranous form.

Of the three cases of membranous croup which are noted as having recovered, there are but two of which I have such an account as would justify me in presenting them as fair examples of the processes through which the parts pass in recovery. These were both of the most decided character, and had arrived at that stage of the disease in which we expect a fatal event to occur almost from hour to hour. In the first of them, six

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in this last case such a supposition cannot be admitted; for I have in my possession a preparation in which the false membrane is exhibited in great perfection, and this came from a patient of Dr. Channing which I had seen with him, and in which death had occurred in about 30 hours after the seizure."

The history of these cases, especially with the authority upon which they are recorded, affords very satisfactory evidence of the existence of a class of cases like those which have been above described, of a disease with the symptoms of croup, but without the formation of a false membrane either in the air passages or upon the visible parts of the throat.

days elapsed before any sensible mitigation of the symptoms, and even then the progress to recovery was very slow and apparently doubtful. Improvement was attended by a copious muco-purulent expectoration, in which it is true no large pieces of membrane were ever detected, but of such a consistence and appearance as would favor the belief that the membrane had escaped in a comminuted or partially dissolved state. After the probable removal of the membrane, there was for some days a bloody expectoration, the voice did not return, and it was indeed many weeks before it resumed its natural tone.

In the second case, a considerable portion of the membrane was spit up in a tubular form, after a violent fit of suffocative cough, and this was followed by the rejection of smaller pieces, mixed with a muco-purulent, at first, and then a bloody expectoration. There continued an entire loss of voice for more than a week, and for at least ten weeks after recovery it had not regained its natural tones.

The contrast is very striking between the protracted character of these recoveries, and the speedy return to health of all those who labored only under the other forms of the disease, however severe.

The observations to which the preceding remarks relate, were all made in this city and its immediate neighborhood; how far they correspond to the disease as it appears in other places, must be left to others to judge. So far as they go, they appear to me to justify the following conclusions.

1. That the only form of croup attended with any considerable danger to life, is that which is distinguished by the presence of a false membrane in the air passages.

2. That the existence of this membrane in the air passages is in a very large proportion of instances indicated by the existence of a similar membrane in the visible parts of the throat.

3. That this affection differs not in stage or degree, but in kind, from all the other cases which are commonly known by the same name, and that the latter have no tendency to become converted into or to terminate in the former.

As my intention has not been to write a complete history of croup, I have omitted all such notices of the symptoms, cause, morbid anatomy, &c. of the disease as have no direct bearing on that point in its character which it was my desire to illustrate. It may not be amiss, however, to record, in connection with this paper, a few circumstances with regard to its history, which have been incidentally determined from an examination of the cases before us.

Croup is often regarded as a disease which attacks suddenly and violently. This is only true of the milder forms. Genuine or membranous croup is commonly rather gradual in its approach, and consequently often insidious. It supervenes often on the common sore throat of children; and in such cases, though its development is frequently rapid and apparently sudden, yet a careful examination of the past history of such a case will generally satisfy us, that although it may have had a sudden outbreak of violence at the time it was supposed to begin, yet that it had really been coming on for several days. Of 30 cases in which I have had an opportunity of determining the mode of attack, in only

two could it in any proper sense be called sudden, although in many, the attention of friends was called to it quite unexpectedly, by a rapid increase in the violence of the symptoms. A sudden and violent attack is, therefore, to be regarded as affording a favorable indication of the character of the case in which it occurs. The unexpected manner in which croup sometimes steals upon the common sore throat of children, should lead always to the careful inspection and watching of such cases. It is true that but a very small proportion of them do terminate in this way; but as it is the only considerable source of danger, and the only way in which they are likely to have a fatal termination, the possibility of such a course of things should not be overlooked. No case of this kind can be regarded as entirely safe from such a result. The danger is even not confined to childhood. Two of the above-named cases of fatal croup occurred in females of 12 years of age, in which it had supervened on this affection of the throat.

The membranous croup also sometimes occurs as a sequel to the affection of the throat in scarlatina. The most common primary affection of the throat in this disease, is of the same kind with that denominated the ulcerated sore throat, viz., an inflammation, with an effusion of false membrane upon the parts inflamed. When croup supervenes upon this, the case is usually very rapid and inevitably fatal. Of the cases above enumerated, two were of this character. A third occurred to me, not enumerated among them, in which there were no symptoms of croup during life, the patient apparently dying from affection of the brain, but in which the usual appearances of croup were found after death. The subject of this was a young man 17 years of age. These cases all occurred between eight and ten years since. None have been observed during the more recent periods of the prevalence of scarlatina.

Croup varies considerably in its duration; I mean its duration after its characteristic symptoms are fairly developed and there is reason to believe that the membrane is formed. Of 23 cases,

1	continued 1 day	from distinct croupy symptoms.
6	" 2 to 2½	
9	" 3 to 3½	
3	" 4	
1	" 5	
1	" 9	
1	" 11	
1	" 19	

Nineteen cases, or more than three-fourths, therefore, were of four days duration or less.

Croup, in this form, rarely attacks children under two years of age. Of 30 deaths and 3 recoveries, of which the ages were known,

Deaths.	Recoveries.		
1	0	took place at	12 months.
1	0	"	18 do.
5	0	"	2 to 2½ years.
3	0	"	3 to 3½ do.
8	0	"	4
6	1	"	5
2	0	"	6
0	2	"	7
1	0	"	8
2	0	"	12
1	0	"	17

Twenty-two, or two-thirds of the cases, occurring between the ages of 2 and 5.

It will be seen, by the following statement of the ages of 95 patients affected with croup of the other varieties, that the tendency to the disease in them exists at a much earlier age. Whilst but 1 case in 16 occurred under two years of age in the first class of cases, 23 out of 95, or about 1 in 4, happened under the same period among the others.

Age.	Second form.	Third.	Fourth.	Total.
Under 1	1	1	3	5
1 to 2	2	5	11	18
2 to 3	6	6	11	23
3 to 4	2	8	5	15
4 to 5	1	6	3	10
5 &c.	1	3	3	7
6	1	1	2	4
7	1	2	5	8
8	0	0	2	2
9	0	1	0	1
10	1	0	0	1
11	0	1	0	1
	16	34	45	95

In cases of the first kind, the tendency to the disease seems to be about equal in the two sexes. Of the 22 cases embraced in this inquiry, the number of each sex was precisely the same—11 males and 11 females. Adding to them 12 other cases in which the sex is noted, we still have numbers too nearly equal to indicate any peculiar tendency to the disease in either sex, viz., 16 males and 18 females.

In cases of the other forms of croup, the difference seems too great and too uniform to be merely accidental. In

18	cases of	2d	class,	11	males,	7 females.
35	"	3d	"	25	"	10 "
56	"	4th	"	33	"	23 "
				69		40

As it is of some interest to observe the degree of influence which season is capable of having on disease, I subjoin a table containing a statement of the numbers of the cases referred to in this paper, occurring in the different months. As the number of cases, however, is too small of the first class to afford any very satisfactory result, I have added in another column the number of deaths from croup, occurring in the several months, out of 263 cases, drawn from the bills of mortality for this city. I have made the table to begin with November, for the sake of comparing more easily the cases and deaths of the colder half with those of the warmer half of the year.

	Membranous Croup.	Other Forms.	Deaths from Croup.
November	2	11	31
December	2	11	31
January	9	14	31
February	2	18	22
March	2	9	33
April	2——19	17——80	18——166
May	4	9	14
June	3	6	11
July	1	3	13
August	2	0	13
September	2	5	16
October	3——15	7——30	30——97

I should observe that the several years vary very much in the amount of mortality of the several months. Thus in the month of January, there

was in one year 13 deaths, in another year only 1, and a similar though less remarkable inequality in other months. Still the results are upon the whole too uniform to leave any doubt of the greater tendency to these diseases in certain periods of the year.

[To be continued.]

TREATMENT OF SCARLET FEVER.

To the Editor of the Boston Medical and Surgical Journal.

Sir,—As everything relating to the treatment of scarlet fever—a disease almost as fatal and destructive as cholera itself—is of great interest to the profession and the public, I desire to call the attention of your readers to the mode of treatment recommended by Dr. Schneemann, Physician to the King of Hanover, as contained in a recent number of the London Lancet. The plan proposed by Dr. S. has not received the attention from the medical profession in this country, or in England, so far as my knowledge extends, that its importance demands. My experience with it is now considerable, and I think I can safely recommend it as a very valuable addition to our means of conducting this dreaded disease to a satisfactory termination. It is philosophical and rational in theory—simple and efficient in practice.

Its *modus operandi* will be seen at a glance, and will commend itself to every discriminating physician, for every one, I think, will admit that the chief weight of this disease falls upon the skin; and of course whatever tends to restore the deranged functions of this important part of the body, will contribute most materially to alleviate all the symptoms. The employment of this remedy of course will not prevent the use of such other means as experience sanctions and each particular case calls for, as laxatives, febrifuges, applications to the throat, internal and external, &c.

I hope a fair trial will be given to this mode of treatment by the profession, and the results made known through the journals, that its true value may be definitely ascertained. I subjoin the most important directions given by Dr. Schneemann, in a somewhat abbreviated form.

Harvey Lindsly, M.D.

Washington, D. C., April 11th, 1850.

Treatment of Scarlet Fever by Inunction.—"From the first day of the illness, and as soon as we are certain of its nature, the patient must be rubbed morning and evening over the whole body with a piece of bacon, in such a manner that, with the exception of the head, a covering of fat is everywhere applied. In order to make this rubbing-in somewhat easier, it is best to take a piece of bacon the size of the hand, choosing a part still armed with the rind, that we may have a firm grasp. On the soft side of this piece slits are to be made, in order to allow the oozing out of the fat. The rubbing must be thoroughly performed, and not too quickly, in order that the skin may be regularly saturated with the fat. The beneficial results of this application are soon obvious; with a rapidity, bordering on magic, all, even the most painful, symptoms of the