On Spasmodic Asthma.

After the classical work of Dr. Hyde Salter to which we owe much of patient investigation and careful induction on established facts, one feels considerable difference in approaching the subject of asthma. Any plea in favor now must be assigned to the interest which the literature of this disease has afforded me, and also to the fact that during a long period I suffered as an asthmatic.

The pathology of asthma has been always a vexed question. Perhaps more particularly owing to the absence of any specific lesion after death: so constant are some of its clinical features that it has been well said that no other disease but hysteria presents such wonderful caprices or undergoes such odd metamorphic changes.

Of recent years the theory of the worms pathology of Asthma has been advanced, and although it met with adverse criticism by Rosan, Louis, and Mr. Beau, has been established by Ironson, Sir Thomas Watson, Blemner, Selici, Gardner, and Sanderson. The points on which this theory is maintained are best given by Dr. Salter.
and are briefly these:

a. The causes of Asthma - innately worms in origin e.g. fatigue, physical exhaustion, mental emotion, and many phenomena of reflex action.

b. Remedies - such as appeal to the nervous system, antispasmodics, sedatives, direct worms depressants, stimulants and tonics.

c. Periodicity - the period is an integral part of the pathological condition.

d. Precursory symptoms - purely worms in character e.g. colorless urine, frontal headache, languor or unwonted activity and sense of health.

e. Post-mobus examination - absence of any specific cause, or of any organic change in the tissues pertinent to it.

f. The phenomena of the disease are muscular, in almost all such cases the primary disease is worms.

As tending to prove the essentially worms nature of spasmodic asthma, I have been much interested in the annual seizures occurring in one of my most intimate friends - a medical student.

For many years he has suffered so severely from Asthma that not once during that time has he been able to lie in bed without a seizure; he always sleeps sitting in bed, his
back being firmly supported by fellows. Although the dyspnea, if he assume a horizontal posture, is intense, he sleeps comfortably in this unsupervised position. The most remarkable feature in this case is the splendid resources and power of his respiratory system in the daytime, a striking contrast to his embarrassed breathing at night. In summer, during the day he indulges in gymnastic exercises in which he is unquestionably an expert. Time after time at the swimming bath in a large town I have seen him perform aquatic feats requiring extreme physical exertion, and turning the resources of his lungs to a wonderful extent. Of all amateur experts in natation I know none so proficient in the long dive as this asthmatic—having plunged he will swim underwater (without once replenishing the oxygen in his lungs) a distance of 40 yards, a feat necessitating complete suspension of breathing during 39 seconds. Aithian observes that asthmatic people are generally gifted with extraordinary energy and talents: as an instance of unwanted energy in an asthmatic I consider the case of my friend unique.

That spontaneous asthma is essentially a nervous disease all pathologists seem to be agreed, but
when some assign to asthma a proposiite pathological condition and ultimate cause situate in the muscle of the smaller bronchi, and describe the lesion as one of spasm of that muscle, a difference of opinion arises.

So accustomed is one to accept any theory of the morbid process in disease which appears adequately to explain the cause, manifestation, and consequence of the same, that any other theory, having as its basis conditions opposed to that which we have considered established, is regarded with unmitigated feeling of disapproval if not of condemnation. After this was my feeling when first I read in Dr. Stevenson's Thesis on Spasmodic Asthma, "Dr. Stevenson's view of the nature of the disease and its ultimate cause. One cannot but admire the way in which this theory is here explained and discussed: Dr. Stevenson writes as one who believes most thoroughly the views he enunciates and does not hesitate to bring them to the test of scrutiny and practice.

He says: "I consider the symptoms of asthma are not produced by a spasmodic contraction of the muscles surrounding the smaller bronchi, but on the contrary, by spasmodic contraction of the muscles of inspiration." Dr. Stevenson maintains that during an asthmatic fit the glottis is narrowed as during a
normal act of inspiration; and that this contraction causes the loud wheezing which is transmitted to and heard in the lungs. That the tonic spasm of the muscles of inspiration causes the lungs by their intimate connection with the pleura to follow the chest wall, the air vesicles and bronchi thereby becoming distended and held in a state of permanent dilatation during an asthmatic fit. That as the first factor in the formation of an asthmatic paroxysm is the spasm of the inspiratory muscles, so the first step in the return to health is the cessation of this spasm and following it and extending over a considerable period is the recoil of the elastic vesicles and bronchi.

It occurs to me that one fact which militates against the generally accepted theory as held by Salter is the very suddenness of onset of the asthmatic fit. Many patients, as myself, perceive no sense of fulness of lungs which might be expected to follow contraction of the bronchi more or less sudden, but what is first experienced is a feeling of contraction at the lower thoracic circumference and of a more or less complete immobility of the chest wall — it is fixed. If simple structure of the bronchi were the sole
causal agent of an asthmatic fit, the exaggerated action of the accessory muscles of inspiration and expiration, still healthy, would be able to effect an efficient interchange of gases within the lungs; whereas it is quite evident that whatever be the condition of the lungs and bronchi during a paroxysm of the Causal factor be sparing of the respiratory muscles an adequate interchange of gases in the lungs cannot take place much less be maintained.

Again, were the condition of the bronchi one of contraction or of partial structure during the paroxysm, and were the respiratory muscles still efficient, the hindrance to the perfect aeration of the blood in the pulmonary capillaries would act as a stimulus to the respiratory centre in the medulla, causing an increase in the frequency of the respiratory rhythm. But in an asthmatic fit does this occur? We know it does not: even the reverse, the respirations sometimes fall so low that not more than nine or ten are taken in the minute. But if the fault be situated in the thoracic wall and not in the lungs, then an explanation adequate to account for the clinical evidence of an asthmatic seizure is easily found. Let us suppose that during a paroxysm
the bronchi assume their normal calibre, but that the accessory muscles of inspiration are in a state of spasm, their natural function is thereby arrested, the muscles of respiration contract powerfully to overcome the resistance of their opponents, which, effect under these conditions occupies a longer period than in health, hence the diminished frequency of the respiratory rhythm. In all the instances in which the normal aeration of the blood is impeded or imperfectly performed, and where that defect is intra-thoracic (e.g. partial closure of bronchi by a foreign body or viscid secretion, by thickening of the bronchial tubes, or by capillary obstruction as in fat embolism) the action of the respiratory muscles being healthy, an increase in their contraction invariably occurs, always in frequency and generally in force; and were the obstruction of the bronchi by partial closure the cause of the phenomenon of an asthmatic fit we should naturally, and with good reason, expect the number of respirations to be much exceeded.

Jenner in his Clinical Lectures, when speaking of the pathology of asthma, remarks:—“The researches of Reissert, which have been confirmed by

more recent investigations, and in particular by those of Guatetlot, who had the opportunity of studying the anatomy of the lungs in the elephant that died in the Zoo, have demonstrated the existence of muscular fibres in bronchial tubes of a smaller diameter than those in which there are no cartilaginous rings. Why should it be denied that these muscular tubes may be the seat of spasms when it is admitted that spasms may occur in other organs having a similar structure? Why should bronchial spasms be denied when no one questions the existence of vesical, intestinal, gastric, or urethral spasms?

With all deference to the skill of one of the leading physicians in modern times, and mindful of the splendid work he did for medical science (work so varied and unique) — and the valuable legacy he has left to the profession in his clinical lectures, I cannot but think that the pathology of asthma must continue to be obscure and without explanation of its clinical phenomena if it rest on suppositions and inferences having nothing to recommend them but the possibility of their own validity, and this is all the remarks of Jamesan imply.
No one denies that the bronchial tubes may be the seat of spasm—indeed, in certain cases I suppose no one would doubt the presence of spasm of those tubes (e.g., inhalation of fumes of nitrous acid or of chloric) and this seems to be but a manifestation of reflex action consequent upon the irritation caused by the noxious vapors, and much the same may be said of the other spasms enumerated by Stoneman, viz., vesical, intestinal, gastric, and vaginal. In these cases the spasm is almost always the result of an irritant applied to the mucous membrane and induces reflex contraction of the muscular tube.

But in spasmodic asthma similar conditions do not obtain, at least in some cases, or rather in some varieties (e.g., peptic asthma, lachrymal asthma, asthma consequent upon emotion, asthma caused by a loaded uterus or an irritated uterine, and asthma induced by shock as cold to the instep) in which there is no foreign body causing obstruction or irritation of the bronchial tubes. In such cases the irritant, if any, can only be conveyed by the blood, and here we discover a marked difference in the origin of the assumed contraction of the bronchial tubes and the contraction of other muscular tubes such as
the urethra. Moreover we have ample and conclusive evidence of the contraction of some muscular tubes e.g. urethral spasm, and the induced spasm of the stomach of rabbit and of its sphincter contraction during digestion, but no such evidence has been brought to prove the occurrence of spasmodic contraction of the bronchial muscles.

Furthermore Toussenel says of these bronchial spasm's "if physiology leads me to infer their existence a priori they cannot be denied when pathological cases are studied. The patient has a constriction of contraction within the chest. The inspiratory action of his inspiratory muscles cannot accomplish the act of breathing. It seems as if there were, and there is certainly, indeed, an obstacle to the entrance of air into the bronchi, because if you apply your ear to the chest of an asthmatic you will, during the fit, neither hear the sound of pulmonary respiration nor the bronchial respiratory murmur which becomes audible after the paroxysm is over. And yet the muscles contract violently enough to create a vacuum inside the chest into which the air does not penetrate; the obstacle to the entrance of air is therefore in the bronchial tubes, not at the lungs, since the air passes through the
glottis, and passes the trachea freely.

From these arised at this result by a process of exclusion; but unfortunately he omitted to consider two of the possible factors operating in an asthmatic fit, viz., spasm of the diaphragm, and spasm of the respiratory muscles. I find no mention of these anywhere in Grussewin's works, and his omission discloses a fatal objection to this method of reasoning as he used it.

Were the hypothesis of bronchial spasm proved beyond doubt, it would still fail to account for the form of the chest during a paroxysm, for, as Saltzer remarks, "the chest is in permanent distension, its walls are kept fixed in a condition of extreme inspiration." For if the respiratory muscles were free to contract under the rhythmic stimuli of nerve force, the respiratory pump would continue unless the condition of all the bronchi were one of complete occlusion, which would be impossible, and instead of the chest being fixed it would undulate more than during health.

On the other hands, if spasm of the inspiratory muscles be the cause in Asthma, the chest during a paroxysm must be in permanent distension.

One feature of unquestionable moment in Con-
sidering the pathological nature of this disease is the 'modus operandi' of its remedies. Now, we know the wonderful efficacy of Chloroform in suddenly arresting an asthmatic paroxysm: we know that a few whiffs of the vapor suffice to terminate most forbiddingly a seizure so severe as apparently to threaten life. If the ultimate cause of the paroxysm be contraction of the muscle of the bronchial tubes, this being involuntary in character, we should expect it to yield only during complete anaesthesia; indeed, that it would deposit itself in respect to chloroform, as other involuntary muscles, as other sphincter-like muscles do—but this is not the case—before any influence on other tubes containing similar circular bands of unstriped muscle is manifest, complete subsidence of the supposed bronchial structure has occurred. But if in Asthma the lesion be situated in the voluntary muscles of respiration, as I am of opinion it is, we should expect that Chloroform just sufficient to lower the tone or tension of these muscles would allay the paroxysm, and no use of the anaesthetic in this disease shows this inference to be correct.

Dr. Stevenson suggests that a common cause for the exacerbation of Asthma may some day be proved to
exist in the electrical condition of the atmosphere on
the electrical condition of the locality taken in relation
with the electrical condition of the patient at the time
of the outbreak.

He says, "from a few hours
after sunset, the amount of the positive electricity in
the atmosphere begins to decrease, and is very feeble
about sunrise. " As this amount of free positive
electricity approaches its lowest point, namely in
the small hours of the morning, my attacks, and the
attacks of most asthmatic patients, commence and con-
tinue in augmenting severity until some hours after
sunrise, when as the amount of positive electricity
again increases, the attack passes off, and about
eleven o'clock in the morning, when the electricity
attains its maximum I am often free." I first
relieved them, the attack lasts on me until the fol-
lowing day at eleven o'clock, or sometimes two or three
days, but however long its duration it invariably lasts
me during the forenoon." It seems well that
Dr. Stenon has qualified his statement relative to
electricity by the remark, "the electrical condition of
the atmosphere taken in relation with the electrical con-
dition of the patient." For my experience of the wonder-
ful caprice of asthma would lead us to think that
electricity if it have any direct connection with asthma does so more by reason of the peculiar electrical condition of the patient than by any peculiarity in the electrical condition of the atmosphere or locality. For we often find such instances of contrariety of results as cited by Dr. Hyde Salt, among them is the following:—"Captn. A. B. was well in London, Paris, and the sea-side; while Mr. A. B. could not breathe in London and Paris, while Brighton cured him." Again I know of other cases that cannot breathe near the Coast as opposed to three which were cured by the sea-side." As Dr. Stewart remarks when discussing the cause of asthma "that which produces an attack in one asthmatic patient is totally inert in the case of another." So close seems the association of ideas between asthma and electricity—rememering the storms that appear in both, that discharges of wave energy peculiar to the asthmatic patient, and the sudden discharges of electricity under storms both being followed by a period of continued calm, a time of complete immunity from its attendant, that one does not wonder that scientists strive to show a distinct causal connection between them—"the former in some peculiar way, and under conditions..."
peculiar to the asthmatic, causing an outburst of nerve energy culminating in an attack of spasmodic asthma.

So varied are the phases and the fates of asthma that the symptoms in two cases may be the same and the exciting causes utterly different — I am of opinion that while such occurrences seem inexplicable, and while our knowledge of electricity, as applied to medicine, remains so imperfect, both as a factor in the health of the animal organism, and as an exponent of pathological conditions, we cannot maintain a definite connection between asthma and electricity.

Dr. Blackley and Stevenson found that lying on the back at full length succeeded in not bringing on a regular fit of asthma, but a patient of mine tells me that he is easier in that position and that it has no tendency to induce an attack.

Such idiosyncrasy illustrates one of the many vagaries of the disease and reflects doubt on the accuracy of either of the two theories of the causation of asthma by this position of the body. The one, suggested by Dr. Blackley, assigns the cause to congestion of the bronchial muscle; the other, by Dr. Stevenson refers the cause to the respiratory center, which by an increase of blood flowing to the
medulla is stimulated more than consistent with health.

If either of these theories be tenable, then such a position of the body in all persons subject to asthma should induce an attack, for Congestini of the bronchial membrane or medulla would be always present, but we know that the horizontal posture provokes a paroxysm in only a few asthmatics.

In considering the nature of the morbid process in Spasmodic Asthma I am of opinion that too little attention is given to the dyscrasia or diathesis peculiar to it, and by which it is related most closely to one or more of a series of diseases having many characters in common and which Dr. Buelos has called "herpetic." We rarely pursue an inquiry into the medical history of the complained asthmatic without finding that when young he was subject to eczema, or herpes, or in later life to rheumatism, neuralgia, gout, hemianemia, or hemorrhoids; and so closely united seem to be the links in this chain of disease, that a patient at one period of life suffers, as a rule, from one and only one, and then either by reason of change of circumstances or some modification of his dyscrasia we find that disease disappearing to be replaced by another of the same group.
Interesting as this is throwing some light on the general character of all, and instructive as is our clinical experience while watching the gradual evolution of one morbid condition from another, our interest in this group of allied diseases is at its height when we consider each in its relation to the rest, as elucidating a rational principle of practice and indicating a beneficial method of treatment. In his classical work on Diseases of Infancy and Childhood Dr. West writes: — "So marked is the connection between asthma and eczema that I have never known eczema to be extensive and very long continued without a marked liability to asthma being associated with it. It cannot, however, be said that the two conditions always alternate; the asthma being worse when the cutaneous affection is better; but the radical cure of the eczema is usually followed, though often not till the lapse of three or four years, by cessation of the liability to asthma."

My attention being drawn to the remarks of Dr. Ringer on his experiments with the inhalation of *Speenamntha* spray, I was induced by the apparent success of the remedy in the hands of himself and

As William Murrell to try it in properly selected cases—and this I did during a period of two winters.

I made observations in twenty-four cases and found its use followed by benefit in twenty-three: I attribute the exceptional result in the isolated case more to the modification of the disease than to any inherent fault in the remedy.

My patients varied in age from 12 to 70 years and among them were some of those well-known cases of chronic bronchitis complicating asthma and attended by secondary lesions such as dilated right heart, continued pulmonary congestion, and frequent occurrence of anasarca; and in two of these cases so grave was the condition that a slight exacerbation of the disease either from cold, undue exertion, or prolonged physical exercise caused the pulmonary circulation to become so embarrassed as to appear hardly compatible with life.

During the two years of my experience of medical practice, since my graduation, I never saw a case of spontaneous asthma in which the dyspnea was so intense as that of one of my patients whose clinical history with the treatment he received I propose briefly to narrate.
Joseph A. -- Age 32 years. Married. Formerly a fumaceman, during five years a grocer's agent and traveller. First attack of asthma 17 years ago, subsequent to Acute Pneumonia. Respiratory symptoms are a feeling of increased activity and an unwonted sense of health, the passage of a good deal of colomel, urine, and sometimes coldness of feet. These are followed by a feeling of fulness at back of neck, which generally comes on six hours before the paroxysm. Each seizure is ushered in by sleep, the breathing becomes laboured and interrump the patient wakes and finds a paroxysm upon him.

The first day or two he is drowsy, and although his breathing is very difficult, he feels much disposed for sleep but can get none. During the first six hours of a fit there is no spitting; he sits up in bed with a cord and broad elastic band to support his head, the latter passing round the forehead and temples, the cord being attached to the headrail behind him -- he experiences much relief from this simple mechanical support, it keeps his forehead in position during the intense dyspnoea, being elastic it yields to the excessive strain of pickings (usually consequent upon a dose of ipecacuanha powder) and supporting his forehead
and temples during cough. Dr. Stetten writes: "nothing comforts a patient struggling with a fit of asthma so much as having the pillows arranged nicely, so as to support the whole back and particularly the head." He never complains of want of breath, but of having too much in his chest and of the great difficulty in getting rid of it; it feels as if a firm band were fixed around the lower and greater thoracic circumference and that the chest-wall could not move. After the first day of labor brought the sweating, which during that time has been evident, now becomes profuse and with this increased secretion comes marked relief of the paroxysm. This to him is a good sign of the crisis being reached, but the best is the change which occurs in the character of the spontaneous: during the latter part of the first day, and the early hours of the second it is thin, watery, and frothy; but after this it becomes copious, is thick, slightly yellow, and copious; this change is hailed with satisfaction for it heralds the advent of relief. It feels to him as though the obstruction to the air passages by these thick gelatinous pellets were causing all his trouble, for as soon as they are removed it ceases. During an asthmatic seizure his mouth is pale and copious, but
when the attack is over it is small in quantity, dark, and of high specific gravity.

Enquiry into his family history discloses an hereditary tendency to the disease on his mother's side—a maternal uncle and his maternal grandfather were subject to spasmodic asthma. The patient says that when at school he always had an attack on Monday morning, which he attributed to his confinement in a heated and impure atmosphere during the hours of evening service the preceding day.

On discovering this supposed connection he ceased to attend the Sunday evening service, and with this change the weekly attack was at an end. As illustrating his marked predisposition to asthma, he says that emanations from a pig sty, stable, or hay are sufficient to induce an attack, and so sensitive is he to some atmospheric changes that as soon as he raises his head in bed in the morning the character of his breathing infallibly discloses to him the prevalence or not of an East wind.

He has travelled but little, yet has often noticed the constancy with which he is seized with an attack in one place and the unusualility he enjoys in another. Even his parts of the same town (e.g. Dudley) distant only 3/4 of a mile affect him.
so differently, that he can live with ease and comfort in one but can hardly exist in the other, indeed he says of the latter part he could not live in it.

From points near Country does not. Several times he has visited Oswestry and has suffered from Asthma each time. I am informed of another confined Asthmatic in Dudley who could never sleep. He has beautiful new house situated as it is on some of the highest inhabited ground in England, but could sleep comfortably in a small house in the same town in a thoroughfare not only smoky and dirty, but so narrow as to render savage emanations in it particularly prevalent. Among further notes of my patient I find that long walks seem to ward off an attack if imminent, but in the ordinary condition of his health they are almost invariably followed by an attack on the day after the exercise. He says that while walking he experiences a sensation as though his lungs were rising into his shoulders, an idea suggestive of the probability of the abnormal contraction of the respiratory muscles beginning at least some time prior to the asthmatic paroxysm.

Among the internal excitants of an attack in this patient are some varieties of food, especially
those not easy of digestion e.g. meat, either alone or in pieces. (Dr. Hyde Salter says that meat pies are very asthmatic, and so in a peculiar degree for some reason or other, are beef-steak and kidney puddings), potatoes, nuts and candied peel. Coffee taken with food makes him worse, or if so taken when he is well, tends to induce an attack; although when he is suffering from an attack he finds great relief from strong coffee taken alone. Dr. Salter tells of an asthmatic who never took the usual after dinner cup of coffee: it would make the simplest dinner disagree with him; but the same patient found in strong coffee on an empty stomach, one of his most valuable remedies. My patient believes that hot coffee taken every morning before he gets up tends to ward off attacks. Among other exciting causes in this asthmatic is singing, which practises when he was young was always followed by an attack. Beer too is pretty sure to induce a paroxysm. Another common seat out of asthma is Costipation, and this fact is peculiarly familiar to my patient; he knows well that irritation to the main channel of excretion renders him liable to an attack. I too during a period
of two years, when residing in Devonshire, was const-
antly being reminded by my own experience of the
very close connection existing between constipation
and asthma: indeed I was in the habit of regard-
ing the former as the measure of the latter — an ag-
ggravation of the constipation being invariably asso-
ciated with an increase in the asthma; and as shew-
ing the accuracy of my opinion of the connection be-
tween these two pathological conditions I may state that
when I left that district and came north my change
of residence was immediately followed by a change in
my diathesis which has become permanent — the constip-
ation has quite disappeared and with it my old foe spas-
motic asthma.

One other feature of clinical interest in this case is the presence of another
nervous disorder which usually displays a remarkable peri-
docity, always alternating with a paroxysm of asthma —
it is neuralgia — he has for years been subject to acute
facial neuralgia situated over and in front of the left
temples. Strictly in accord with the rule that
two acute diseases never pursue a similar taneous course,
or at least without one modifying the other, the neuralgia
and asthma are never synchronous. "The neuralgia
puts a stop to the asthmatic state by the establishment
of a new nervous condition." Transcribed in his Clinical lectures reports the case of a gentleman "who for two years had been subject to fearful fits of asthma — so violent were they that for several months he was unable to sleep in bed and was obliged to sleep standing reclining against the mantel-piece in his room. Once when coming out of a theatre he caught a cold, which was followed by acute broncho-pneumonia causing his life to be in jeopardy. During the course of this complaint he has never had a single paroxysm of orthopnea."

For a period of more than nine years I have known a Chemist living in the South of England who is slightly asthmatic: so susceptible is he to the pricking influence of spicework powder that if only the stopper of the bottle containing it be temporarily removed in his presence, he is sure to detect it speedily, by the onset of an asthmatic paroxysm, which usually lasts an hour — sometimes the seizure is quite sudden and of a most distressing type. He always leaves his shop when this drug is powdered, dispensed or sold. No other powder, no other dust, provokes an attack.

As tending to establish the opinion of a

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specific dyspepsia in Asthma, and the necessity of constantly bearing in mind the peculiar physical condition of the asthmatic, rather than attributing an exaggerated importance to the circumstances, influences and conditions surrounding our patient. I cannot withhold from citing two cases of asthma recorded by Troussseau: "I had under my care two brothers, twins, so exactly like one another that I could not tell one from the other unless I saw them side by side.

This physical likeness went further, for they had if I may be allowed to say so, a still more remarkable pathological likeness. Thus, I was attending one of them at the实例homes in Paris on account of an attack of rheumatic ophthalmia, and he said to me at this time my brother must be suffering from an attack of ophthalmia like myself. As I had expressed a doubt at this, he showed me a few days afterwards a letter which he had just received from his brother, who was then in Vienna, and in which the latter wrote:—

I am suffering from Ophthalmia; you must likewise.

However singular this may appear, it is a fact, which has not been related to me but which I have seen, and I have met with other analogous instances in practice. Now these twins were both asthmatic, and that too a far

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five degrees. They were born at Marseilles, but they could never stay in that town where business often called them without being seized with asthma; they never suffered from it in Paris. Furthermore, they had merely to go over from Marseilles to Lyons to get rid of their asthma. As they were constantly travelling from one country to another on business, they had noticed that certain localities were fatal to them, while in others they were free from all difficulty of breathing.

From anecdotes such as this, amusing and remarkable, I turn to consider a branch of my subject more useful though less pleasing, yet almost as replete with versatility as the symptoms of asthma—it is the treatment of the disease, first during the paroxysms, and then during the intervals.

I was sent for to attend my patient (Joseph A.), whose clinical history I have related, during one of his asthmatic paroxysms. His wife, who had been near him in many, said this was the worst. He could not speak; he could only whisper, and did this reluctantly; he was sitting in bed with his head supported by the elastic band as I stated elsewhere, his hands firmly pressed upon his knees: his face wore an anxious look, his breathing laboured as though each
successive inspiration would be the last, and his pulse was so feeble as to be barely perceptible.

As I had told the patient while attending him during the previous seizure I would treat him the next time by means of spray: I did so now.

The spray, composed of equal parts of hot water and officinarum wine, was generated by Clarke's hand bell spray-producer. The aperture from which the spray issued was about eight inches from the patient's mouth, which was held widely open. It was applied for two minutes, then after a short interval, a second time for a similar period.

His breathing at first so embarrassed as to allow with difficulty the entrance of spray into the lungs, speedily improved, and shortly the accompanying shivers, the anxious haggard look, and feeble fluttering pulse, the satellites of this insidious foe, disappeared.

When the spray had been used for a short time longer expectoration became copious, and the tussini within the chest gradually subsided: it is the patient's opinion that this treatment not only mitigated the severity of the attack but considerably diminished its duration. About a month after this he told me he felt no attacks coming on, and at
my request took to his bed, and used the spray precisely as before, but this time at a much earlier stage of the asthmatic fit.

The next morning while walking I met him, and expressed my surprise on doing so: he then told me the paroxysm had been entirely avoided by means of the spray, and expressed his pleasure at having met with such a remedy.

As previously stated his attacks prior to this treatment lasted about four days. Since that time the value of this remedy in this case has been abundantly confirmed, and it is now the patient's custom to send for the spray apparatus as soon as he is warned of the onset of an attack.

For a year or more I had dosed this patient with many of the well-known and popular remedies, and none save the smoking of stramonium were of use to him, and this only relieved the paroxysm for a short time, and in his opinion did not diminish its duration.

Of all the remedies he has tried he has found the spray of Spicenux the most agreeable, the most beneficial, and the most constant in its unity of result.

The following case also illustrates the value of this treatment of Asthma.
Mary V. Age 43. Has suffered from winter cough and dyspnea six years. Has frequent attacks of Bronchial Asthma during the Cold months, each attack lasting as a rule three weeks, and during the greater part of that time is associated with intense expiratory dyspnea. The patient during the attacks has to keep her bed, and her chest then presents all the physical signs of Bronchitis with sennons rales throughout both lungs, most marked in apices. She has the voice peculiar to the asthmatic so graphically described by Saltire, the lucidity and excellence of which description must be my plea for quoting it. "Feeble and slightly huskly and rough; she speaks as a healthy person would speak if she were to expire as long as she could and then begin to speak, as if she were making use of the last breath in her lungs; her sentences are short and frequently interrupted by a single dry cough." Her eyes too are 'tired, watery, and prominent. Her complexion dusky, and her physique that peculiar to the Confirmed Asthmatic. There is a slight dilatation of the right heart, and his lungs are always more or less congested; but the dyspnea has ceased to be paroxysmal, lasting as it does through the whole attack, and
does not subside until the bronchial inflammation is at an end. During the intervals she enjoys health and is able to discharge her household duties easily and well. Although in this case the asthma appears not to be purely spasmodic, there is some indication that at times it departs itself as though it were for the work other than household which this woman sometimes does, is one peculiarly fatal to asthmatics,—picking fowl. When trade is good she devotes a day, sometimes two, to this work. It is pretty sure to induce an asthmatic seizure, yet being poor she will not abandon it because of the small gain it brings to her.

The medicines most in favour for asthma shared in this case a common result, inasmuch as all were powerless to mitigate her suffering for more than a brief period, and only one deserves the name of remedy for the patient's attacks—the spray of Speaenum he used as in the preceding case. She has told me it suits her better than anything else, and now she fears a seizure less because of the relief it affords.

Of the twenty-four cases of asthma of which I have notes, I find that nineteen were either of the class known as Bronchial Asthma in which
asthma complicated bronchitis, in cases where the asthma was antecedent and spasmodic in type, and by its intensity or long duration, thereby causing continued congestion of the bronchial tubes, led to chronic bronchitis with emphysema and cardiac dilatation. So that in all these nineteen cases, be the early clinical history of each what it may, the ultimate condition of the lungs in all was virtually the same.

Of these twenty-four patients, twenty were men exceeding thirty years of age, three were women, and one a boy of twelve years. The disposition of all under the treatment by the inhalation of spray of ipecacuanha was so similar that a description of one will suffice for all.

The urine of ipecacuanha and hot water were mixed in equal proportions and placed in a small widemouth bottle to which was fixed Clark's hardball spray-producer. The first administration was in the morning. The patient seated in a chair or in bed was directed to keep his mouth wide open, and to inhale the spray as much as possible. The spray, issuing from a glass jet about ten inches from the patient's mouth, was projected in a volume, as equal
and constant as possible, against the pharynx.

The inspiring effort, in some cases very feeble, in
others fairly good, drew the medicated spray well into
the lungs, and so effectively that I have often been told
by patients it was felt as far as the parts to which
they pointed, viz. the lowest lateral margin of chest
and the invertebral cartilages.

Each administration was maintained for two minutes,
then after a short lapse of time, by which the patient
became rested, it was again applied, and repeated in
the evening.

The immediate effect
of this remedy (particularly in cases of bronchial Asth-
ma) was a marked increase in the expectoration
which became copious and continued for several
hours; the dyspnoea and feeling of tightness of chest
were thereby much relieved.

Of all the interesting features in this treatment its
lucency to induce sleep was the most constant.

In nearly every case prior to the administration of the
spray, rest in bed was impossible, but after its use god
nights were the rule, the patient being able to sleep much
as usual. One man, who for years had been
subject to paroxysmal dyspnoea (and during excres-
cations which were frequent the asthmatie condition gen-

rally was most pronounced), told me that although many remedies had been alike futile in relieving him of his protracted sleep at night; after he had inhaled the spagy during the day his slept better than any night during six months preceding, and his improvement was permanent.

Another patient who had been unable to sleep in bed, remained for several nights seated in a chair with his head and hands resting on its back; but after he had used the spagy as directed he could lie down in bed and sleep.

In order as far as possible to ensure the exclusion of any other remedial agent by the combined use of which an inference from this treatment would be depreciated or rendered void, no other remedy was used. This power of the drug to induce sleep is not due to sedative properties for if used in the morning the result is the same. It must be due to the clearance it effects in the bronchial tubes ridding them of the secretion which obstructs them, and so by promoting free access of air to the air-cells the embarrassed breathing disappears, and sleep supervenes. This is precisely what we should expect for during an asthmatic fit one would
Patient is drowsy, and longs to sleep but cannot because of the dryness, consequent on this administration of Spermacoction. The drowsiness lapses into sleep.

This method of using the drug has its advantages, inasmuch as by introducing it into the lungs where it is non-irritant, it becomes absorbed by the pulmonary lymphatics much more gradually than if introduced into the stomach; and with this prolonged absorption is associated an equally prolonged remedial action. Moreover, this manner of administering Spermacoction avoids the nausea which might result from swallowing the same quantity, always me, sometimes two drachms of the wine.

Again nausea is rarely experienced, and sickness almost never occurs, yet the expectorant action of the drug is maintained for at least ten hours.

Dr. Hartshorne of Philadelphia has found the Spermacoction Wine with tincture of lobelia administered in small doses every half hour until nausea is induced very useful. While Dr. Duclos has met with good results from the administration of ten to twenty grains of bowers of sulphur daily before breakfast for six months, he says it is a remedy "of prodigious efficiency."

"Essentials of Practical Medicine" (Phila. 1871) p. 446.
Sanford recommends the inhalation of concentrated
Stramonium fumus. The smoke is to be puffed
into an inverted glass; when nearly full the patient
is to apply it to his mouth and to take a deep
inspiration. He says "the result is a momentary
suffocation, then copious expectoration ofropy mu-
cous and immediate relief."

Dr. Saltire says
of Stramonium, the great thing is to give it in time,
and for this purpose since the patient is generally
awoke from his sleep by the paroxysm he should put
his pipe, already filled, with the mean of lighting it
by his bed side over night, so that on awaking with
the dry smoke he might immediately use it.

Dr. McVeagh affirms the efficiency of the bruised seeds
and the herb of Datura stramonium mixed in equal propor-
tions. When smoked it gives relief in many cases
where Stramonium fails, it is more antispasmodic
and less narcotic than the latter.

Belladonna by stimulating the respiratory centre and
paralyzing the motor nerves is of undoubted efficacy in
many cases. It is best given in big doses,
ten minims of the tincture every two hours during the
asthmatic fit.

In American Grin-
delia Robusta, a plant of the order Compositae has

1 "On proper use of Stramonium in Hay Asthma" Richmond J. Med. 1869
2 "On Asthma" 2nd Edit. 1869 Ch. p. 236.
3 "On Asthma" 3rd Edit. 1869 Ch. p. 126.
attained a very high reputation as a remedy in asthma, it is said to diminish not only the tendency to fits but also their duration.

During the intervals, for prevention of attacks, it is recommended to give 3 grains of the extract three daily, and on the approach of a paroxysm twenty minims of the liquid extract every half hour.

Dr. Talford Jones of Breen found nitre of amyl of great service in astroitic attacks, allaying the dyspnoea immediately and assisting a paroxysm. Dr. Lander Bruntmeter believes the relief it affords in asthma due to its causing partial paralysis of the sympathetic ganglia and their motor fibres.

The inhalation of the white fumes from burning nitre paper will sometimes relieve a paroxysm.

To prevent attacks, Arsenic in the hands of many physicians even from Berosus or (A.D. 54) to Thomsford has been attended with good results.

No remarks on the treatment of asthma would be complete without reference to dietetic measures, and for this reason, rather than from the hope of stating anything new, I subjoin a few hints as to the dietary of the asthmatics. There are many articles of food especially provocative of asthma which
must be studiously avoided by the patient. Foremost of these are nuts, meat-pies, broths, real, preserved meats, raisins, candied peel, cheese, beer, stout, particularly heavy malt liquors and those containing much carbonic acid, as bottled ales and stouts. Coffee if taken with food.

The diet should be light, nutritive, and easily digested; meat is seldom borne well by asthmatics unless eaten early in the day. The breakfast should be the best meal, because of its being the first, and following a prolonged period of rest, the stomach is able to digest them than at any other time. Many asthmatics may indulge with impunity in dishes and articles of food at breakfast which they could not do at any other meal.

Fish has the least tendency of all meat to provoke asthma. Dr. Beamfoot found that beef and mutton digested in 3 to 3½ hours, fish in 2 hours.

A dietetic plan of treatment is given by Dr. Smith, which he affirms is attended as a rule by improvement fast relief by those who have witnessed it. He observes that in the treatment of asthma it is of prime importance to keep the quantity of the blood as uniform as possible and to prevent those considerable variations which occur in health when a large meal follows a long
fast. The deficient respiration also tends to lower the amount of the vital transformations below the healthy standard, and hence indigestion is as common a feature as inflammation. The two leading principles in the treatment of such a case are to supply very small quantities of food at a time, and to render the dietary highly nitrogenous. In no case of confirmed asthma should more than 603 of fluid and solid food be given to a female, and 803 to a male at one time. It is therefore necessary to administer food frequently, viz. at least six times in twenty-four hours. Suppers should be given during the night and at the early morning, when attacks of dyspnoea cause weariness and distress. The others may be given at intervals from two to four hours during the day. In the selection of food it is important to avoid lush bread or other starchy material, and to supply milk and beef tea largely. In many cases fats are well borne and may be given with advantage, but in all cases it should be remembered that a somewhat rapid and material increase in the bulk of the body is a pure precursor of an attack of the disease.

During an exacerbation particularly if it extend over
a period of several days, the best kind of food is one of a class introduced by Dr Robert of Manchester, on coming whose preparations and use much valuable information is contained in his admirable monograph on the digestive ferment. For nearly two years I have been in the habit of prescribing one of these preparations — the peptonized milk fluid — with very good results. It is palatable, easily assimilated and highly nutritious. It is made by first preparing a thick fluid of Oatmeal, to which while still hot is added an equal quantity of cold milk. The mixture should have a temperature of about 125°. To each pint of this is added two teaspoonsful of liquors panacotans (Bengals) and twenty grains of bicarbonate of soda. It is set aside in a warm place, or under a cozy, for two or three hours until it becomes slightly bitter, then boiled and strained.

By way of conclusion I would have remarks that as far as I can judge of the asthmatic paroxysm I am of opinion the new theory (if I may so term it) of the ultimate cause of Asthma as first suggested by M. Lacassine, enunciated by Rosenkohl and others and disproved by Dr Stevenden, anticipates the symptoms and explains their meaning more satis-

factually than the old one as held by Dr. Salter. And, moreover, it introduces to medical science a pathology more rational, inasmuch as it reveals an ultimate cause of asthma more in harmony with our knowledge of the disease as derived from therapies which we ought never to overlook—for if spasm of some of the voluntary muscles of respiration be the chief factor in asthma we are not surprised that the administration of a very little chloroform should relieve a paroxysm.

In the treatment of asthma we must never overlook its essentially nervous nature, its intimate connection with a morbid exhalation of sensibility, sometimes of the central nervous system as in emotional asthma; sometimes of peripheral nerves as in Coli-asthma; sometimes of trophic nerves as lumbar asthma, and asthma induced by eating certain food; and sometimes of sympathetic nerves as asthma dependant upon certain lesions, organic or functional, of the former. Such cases as complexo-biolar, of the latter those connected with irritation in distant organs (as uterus and stomach), and lesser indisposition as colds of feet, also some atmospherie conditions.
With such an array of portals to the entrance of the exciting cause in a subject possessing an inherent tendency to the disease, it is of preeminent importance that such asthmatics be subjected to a most searching medical examination; and that due regard at all times be given to the possibility of the excitant invading the system by anyone of these channels, or to being present in anyone of these separate seats.

Dietetic measures in asthma are of unprecedented importance, and must receive the careful consideration of the physician, and be observed by the patient by the exercise of resolution and self-denial.