To Professor Gradagan

Thesis
On Asthma

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[Stamp: Universiti]
There are few diseases the
nature of which has been a subject
of greater doubt and difference of
opinion than Asthma. Before particu-
lar attention was paid to its pathology,
it was generally confounded with Dys-
phoena, and it was customary for
physicians to apply the term to all
cases of difficult breathing which
was not produced by some known
disease, or manifest cause. Dyspnoea
is a term which is now used to denote
difficult breathing, and may be due
to various causes. Asthma is dyspnoea
but dyspnoea is not necessarily asthma
in popular language every chronic
Shortness of breath, or dyspnoea, is still termed asthma, and this application of the term has certainly the sanction of many good practical and systematic writers up to a comparatively recent period.

Spasmodic asthma may be defined a constitutional disease which culminates in paroxysmal attacks of difficult breathing, which are of longer or shorter duration. The dyspnoea seems to be immediately dependent on more or less extensive contraction of the smaller bronchi, and due to tonic spasm of their circular fibres. The breathing is accompanied by a wheezing sound, a sense of constriction in the thorax, great anxiety, and a difficult cough. The attack typically terminates by the expectoration of a quantity of mucus from the lungs which varies considerably in appearance and in amount. In some instances the mucus is thick and heavy, in others it is light and frothy, whilst in the severer forms of the disease there may only be a few
dark pellets coughed up before relief is obtained. Although Asthma is not a very common disease in this country it cannot be said that by any means are cases of perfectly pure Asthma, that is without the slightest organic complication are however rare unless they have existed a very short time. And for this reason—that frequent and severe attacks of asthma cannot long exist without inflicting permanent injury on the lungs and even on the heart. But not only is asthma not an uncommon disease but it is one of the most suffering; the horrors of the asthmatic paroxysm far exceed any acute deadly pain; the sense of impending suffocation, the agonizing struggle for the breath of life, are so terrible, that they cannot be witnessed without shocking the sufferer's friends.

Pathology.

Asthma is essentially, and
with perhaps the exception of a single class of cases, exclusively a nervous disease, depending on a constructed state of the smaller bronchial tubes, exerted through the nervous system. Notwithstanding the extremely difficult and difficult pathology of asthma it seems impossible to avoid referring its most obvious symptoms to some kind of irregular action of the muscular apparatus of the air tubes. The copious expectoration again, with which the attack concludes, and by which it is immediately relieved, appears to indicate that some accumulation of mucous has been taking place, while the absence in some instances of all cutaneous symptoms appears to demonstrate that this accumulation is directly connected with the spasm of the bronchial tubes (which produces the paroxysems). The connection of these two phenomena is by no means different to
understand, for the inordinate mucous secretion, the expulsion of which gives so much relief at the termination of a paroxysm of asthma, is the result of the congestion into which the capillaries have been thrown by the long continued imperfect respiration. And this secretions injected by re-inloading these capillaries, believes one of the most pleasing causes of dyspnea. Again, if the removal outward of the pulmonic mucous depends in the normal state upon the regular peristaltic contraction of the bronchial muscular fibres, it is obvious that accumulation must accompany the arrangement of that action, just as constipation is the invariable concomitant of the analogous arrangement of the colic or ileus. In both cases the paroxysm ceased when the normal action is restored. And in general there is in both a copious discharge of the previously retained excretions. The accumulated mucous
is, in doubt, an additional source of dyspnoea by blocking up the bronchial tubes, when the bronchial spasm ceases. This is the only source of dyspnoea that is left, and its expectoration is therefore attended with immediate and complete relief. Expectoration cannot take place till the intensity of the dyspnoea is subsiding and until the bronchial spasm is passing off sufficiently to allow the chest to be fully filled with air, so that efficient cough, adequate to the free discharge of the accumulated sputum, may be effected.

We notice that from this view, upon this mind, the conception that Asthma is essentially a nervous disease is very erroneous. We see in the first place, that the causes of Asthma act such as affect the nervous system, and such as give rise to this disease acknowledged on all hands to be nervous. Thus fatigue and physical...
exhaustion, sudden or violent mental emotion, and general excitement will bring on an attack. Again, the remedies of asthma are such as appeal to the nervous system—antispasmodics sedatives, direct nervous depressants, tobacco, stramonium, antimony and chloroform. Perhaps the effect of chloroform is, of all remedies, the most striking, and at the same time, the most striking illustration of the purely nervous nature of the affection—a few whiffs, and the asthma is gone; a dyspnoea that a few seconds before seemed to threaten life is replaced by a breathing calm and tranquil.

Now, remembering the action of the drug, that it is to the nervous system to which it appeals, it is impossible to help being in this the most conclusive proof that the symptoms are due to a nervous cause. Mental emotion, every string of sudden passion, such as fear, fright or surprise will
put a stop to the paroxysms, circumstances that eminently prove its nervous nature. The periodicity of asthma, and the associated and precursor symptoms of an attack, implies its nervous nature. The quantity of lumpy water passed in the early part of the paroxysms, like the urine of hysteria or that of cervical headache, the nervousness and languor of the previous day by which the approach is foreshadowed, or in the other hand a peculiar and unwanted hilarity and animation of spirits— all these phenomena are just such symptoms as are met with in various diseases of the nervous system such for example, as hysteria and epilepsy. Again, post mortem examination in cases where the disease has been of long standing reveal no appreciable organic change, a circumstance in favor of its nervous character, while the incessant phenomena of asthma...
is all but proof positive that the
nervous system is the seat of the
primary arrangement. The structure
of the air passages and bronchi evidently
shows that these parts are susceptible
of preternatural or spasmodic con-
traction, or rather, contraction, while
the main phenomenon of the Asthmatic
paroxysms are precisely such as would
result from a morbid contraction of
the bronchial muscles. The very intensity
of the dyspnoea, too, its agonizing and
laboured character implies that the
situation of mischief is in the air passages:
the dyspnoea is essentially remediable,
and tends directly both by its density
and muscular phenomenon, to diminish,
and relieve its cause. As soon as dys-
panoa is not going on satisfactorily,
the sense of dyspnoea or want of breath,
at once prompts to more violent respirator
efforts which tend to relieve it. The
gristful sensation is an essential
link in the chain — it gives warning.
of the condition to be remedied, and is the irresistible stimulus to the remedial efforts which are called forth. We recognize therefore in this very urgency of asthmatic dyspnoea evidence that the mischief is in the air passages, and that it is of such a nature as to shut off the air supply. We know in health that respiration is noiseless but that when the breathing becomes asthmatic it is accompanied with a short, thick, and whistling noise. We know too that elastic tubes give no musical sound when air passes through them, if they are of even calibre, but if they are narrowed at certain points, if their calibre is varied, the air in them is thrown into vibrations, and they become musical instruments. The whistling of asthma then is as positive evidence of bronchial contraction as if we could see the points of structure. It is in fact physical demonstration. It may be asked in what way may the bronchial tubes be narrowed? The narrowing may be produced
by any one of the following conditions, such as, congestion or inflammatory thickening of the mucous membrane, plastic exudation thrown out in the sub-mucous capillary vessels. Acute respiratory disease, such as acute bronchitis, which undergoes subsequent slow contraction, and by contraction of the circularly disposed organic muscle which exists in the tracheal tube. In all these ways the column of air in a tracheal tube may be constricted, and the tube converted into a musical instrument, the sounds being of a high or low pitch, according as the tube is large or small. For these reasons we think it must be allowed that tracheal spasm must and does exist in asthma. The normal function of the tracheal nervous system may be said to be excito-inhibitory, or reflex in its action; seeing that it is necessary, in order to procure contraction of the tracheal tubes, that an impression or stimulus should operate on the
numerous filaments distributed to the mucous surface, along which it travels to some of the scattered ganglia of the pulmonary pleura, and these returns by other filaments to the bronchial network to which these are distributed. It is in this way that the bronchi know when and when to contract; that a plug of viscous produces a circumferential strain through which cough drives it with greater force, that inspiration occuring the capillary bronchial tube is expelled by their peristaltic contraction; that offending material that has found ingress though the sputum is shed off by bronchial structure from reaching the ultimate lung structure thus in asthma resulting from the effluvium of say, one of certain animals, as cats and rabbits; asthma produced by certain airs, and from involving the transmutations from spermaceti powder — in all these the bronchial spasm is of this natural physiological
Character, the seat of the application of the stimulus and its reflected path being the same as that by which ordinary stimuli move, and produce contraction of the smooth fibres. But one of the peculiarities of Asthma is that it may be induced by stimuli applied to denuded parts: in these cases the nervous circuit is much longer, and the phenomenon of reflection clearer and more conspicuous. Reflex Asthma, for instance, one of the most common of all the varieties of Asthma, may be induced or prevented by the state of the digestive organs, in which an error in diet is due to bring on an attack; while a certain diuretic abstraction is as certain to be attended with immunity from the disease.

The reflex character of this phenomenon is clear, and the nervous circuit by which the reflection is completed conspicuous and evident. Finally, there is a class of cases in which the exciting cause of the paroxysm appears to be essentially
Humoral. We have already stated that the most frequent of the exciting causes of asthmatic attacks are alimentary, and that an error in diet, or the mere introduction of food into the stomach, produces bronchial spasm by reflex stimulation, through the intervention of the pneumogastric nerve. But this is not the only way by which the lungs can be affected by what is put into the stomach. For, although the pneumogastric nerve is the only single structure that has a distribution common to both organs, yet the bronchial system affords a close and intimate bond of connexion between the stomachs and the bronchi, for any material which is capable of being easily and readily absorbed, introduced into the stomach, is at once taken up by the bronchial capillaries of the gastro-pneumogastric membranes, and within a few seconds, having passed through the liver and the right side of the heart, finds itself in the pulmonary circulation.
In this way the blood in the lungs is liable to constant change in its composition from admixture with it of the different materials thus taken up by the gastric juices; and, from the absence of digestive power on the part of these juices, is ever at the mercy of the food. The chief parts of the normal result of healthy digestion, or the marked results of deranged digestion, are that numerous classes of bodies which are at once taken up without any change, are then thrown directly before the lungs.

It is in this way by the action produced in the vessels of the lungs of the materials taken up from the stomachs and intestines, that the introduction of food into the alimentary canal frequently gives rise to tachypneous spasms. A contaminated blood (to be sure) is the irritant and inflicts the tracheal tube to contract, through the intervention of the pulmonary nervous system, just as the effluvium of hay, or an irritating gas would; in the one
Like the irritant affects the surface to which the nerves are distributed, in the other the capillaries among which they lie. The blood may by perfectly normal and yet produce Asthma, the disease may be everything that it should be, and its results in no way different from that of a perfectly healthy person and yet they shall, lie an Asthmatic, produce Asthma, the moment they arrive at the lungs. This is quite evident when we remember that some of the materials that give rise to Asthma are such as undergo no change, but are at once absorbed, and must therefore necessarily the identical in the lungs of the sound man as are Aed in the lungs of the Asthmatic. In this, as in lay, cephalic acid, and other Asthma, the irritant differs not in the Asthmatic and healthy person, but in the irritable state of the pulmonary nervous system, which in account of its instability, is exposed that into a stimulant.
which should not be a stimulant,
and venous that which is should not
be, and thus the pulmonary allows
lacteal registers (or if ever) in the
tracheal tubes those changes in the
constitution of the pulmonary blood
of which is should be unconscious.
Thus can, however, certain articles of diet
which, either from their being peculiarly
offensive to the widely present
in the lungs, or specially irritating
to the gastric portion of the vagus, or
apt to give rise to dyspepsia, are very
apt to induce Asthma, such as
Cheese, nuts, almonds, and raisins,
and sweet things in general.
Having thus entered pretty fully
into the pathology of Asthma, we
proceed next to observe some of its
most important clinical phenomena.
Those who are subject to fits of
Asthma have, generally, more or less
warning of the approaching paroxysm.
The precursory symptoms, however,
very greatly in different cases both as to their nature and the period of their appearance. Some patients have indications of the coming one or two days previous to an attack; most have distinct notice of its approach, at least for some hours, but in occasionally attacks with scarcely any previous warning. The patient generally feels very slowly and sleepy, and is unable to hold his head up or keep his eyes open, and that without having undergone any particular fatigue, or done anything that could account for it. The drowsiness is probably due to the commencement of that particular nervous condition of which the succeeding phenomena is but the more complete development. Thus, again, know by extreme wakefulness and unusual mental activity, or incoherency of spirits, that an attack awaits thee. At other times, the precursory symptoms are connected with the stomach, and consist of loss of appetite, flatulence, constancies, and certain peculiar cutaneous
Sensations in the epigastrium. The time at which the Asthmatic paroxysm occurs varies in different individuals, in some it invariably comes on in the early morning, from three to six o'clock, and in others the usual time is the evening, just after getting into bed, before going to sleep, while in another class of patients there is no particular time of attack, it may come on at any hour day or night, on the occurrence of some exciting Cause, such as a fit of laughter, a full stomach, change of wind &c. Two reasons may be adduced for the attack coming on at midnight, first the horizontal position of the body which favours the afflux of blood to the right side of the heart, and therefore to the lungs; secondly the greater facility with which forces of respiration operate during sleep than during the hour of wakefulness, the lowered sensibility concomitant with sleep preventing the wrought state into which the preparation may be getting from being at once.
appreciated. Purify diuretics and
neuralgic pains in limbs and joints
may be treated among the common
precursory symptoms of a spasmoid
attack of Asthma. Let us now consider
the phenomena by which an attack of
Asthma is generally ushered in. The
patient goes to bed in his usual health,
with or without premonitory symptoms,
sleeps for two or three hours perhaps
during which the characteristic wheezing
commences, he may half wake up and
change his position, by which he gets a
little ease, and then falls asleep again,
and dreams perhaps, that he is under
some Circumstances that makes his
desperation difficult. The increasing
difficulty soon awakes him, he sits
up in bed in a distressing half con
sciousness of his condition, sits perhaps
a temporary Abatement, sleep or
powerless, and he falls back, to be
again awoke, and to
this miserable fight between Asthma

And sleep may go on for an hour or two. Soon, however, sleep is no longer possible, the increasing dyspnoea does not allow the patient to forget himself for a moment, he becomes wide awake, sits up in bed, throws himself forward, plants his elbows on his knees, and with fixed head and elevated shoulders labours for his breath like a dying man. The catatonia offers now a very shocking and very distressing spectacle. If he proves at all it is with great difficulty, creeping by stages from one piece of furniture to another. But most commonly he sits fixed in a chair, immovable, unable to speak or move his head in answer to any question. His back is rounded, and his feet stooping, his chest, back, shoulders and head are fixed, his shoulders are raised and his head thrown back, and buried between them, he leans generally forward on a table, or sits across a chair, and leans over the
back of it. His expression is anxious and distressed, the eyes wide open, his face is pallid, and beads of perspiration flow down his face. If the timelike spasm is restrained and intense, the heat of the body falls; the oxygenation of the blood is imperfectly performed, from the sparing supply of air, that it is inadequate to the maintenance of the normal temperature. The pulse is always small, and irregular, in proportion to the intensity of the dyspnea, it is so feeble sometimes that it can hardly be felt. The breathing of the asthmatic, though intensely difficult, is not short; on the contrary, it is even sometimes longer than natural, so that not more than nine or ten respirations are taken in the minute.

The coincidence of respiratory difficulty with prolonged respiration always implies structure of some part of the air passages, the required quantity of air can only be got in and out
by long and tedious efforts on account of the difficulty of ingress and egress. When the symptoms finally subside it generally does so coincidently with the first appearance of expectoration. Up to that time the wheezing had been dry, and there has been no cough, or, if any, a short dry one; the first appearance of moist sounds and loose cough is the harbinger of relief. Hæmoptysis, although a very infrequent symptom, sometimes occurs when the deoxygenation of the blood is arrested to such a degree that capillary stasis is produced; the vessels, under such circumstances, give way under the pressure of their contents, and relieve themselves by rupture.

With regard to the general features of asthma, that characterize it as a whole, several circumstances may be taken into consideration. First of all it is one of the few diseases that can be strictly pronounced periodic. It is not merely fluctuated it is periodic. The periodicity is more constant in those cases that are in other respects the most uncomplicated, and their marked specimens
of it, while in others it is but slightly
marked, and may be entirely lost.
In the length of the intervals of an attack, there
is the greatest variety, from a day or a year.
Diurnal Asthma is very common especially
when it is associated with Chronic Indigestion
or Heart Disease. The condition of sleep, and
the recumbent posture, being a diurnal
aggravation of the permanently existing
conditions which give rise to the hemiasthmatic
spasm. But here it is not for the organic
disease, the diurnal sleep and horizontal
position would not induce that embarrass-
ment and arrest of the respiratory
function which induce the asthmatic
spasm. The diurnal occurrence of Asthma,
however, does not necessarily imply that
it has an organic basis, it may be
dependent on the state of the digestion the
patient may have an attack every after-
noon after dinner, lasting for two or
three hours till digestion is over. Asthma
occurring once or twice is almost always
founder Asthma, and is generally w
Complication of Asthma with Rhinitis.

We have also a Summer or Hay Asthma, which exists as long as the grass is in flower. Monthly Asthma occurring in females have generally some connection with the function of menstruation.

Weekly and fortnightly intervals are also often observed in the attack of Asthma which is probably due to the partaking of some external luxury once in seven or fourteen days. The periodicity of Asthma, known though a common is not an invariable feature of the disease.

There is one curious circumstance connected with Asthma that clearly shows its periodicity to be inherent, and part of the disease. It is, that each attack, in some people seems to impart, for a time an immunity from a repetition of it. For some time after the attack (the time varying according to the interval characteristic of that particular case) the patient may expose himself to the ordinary
exciting causes of the paroxysms without
the slightest fear of inducing one.
Besides the periodicity of asthma it
has a tendency to habituate, and is dis-
posed to maintain and constantly repeat
recurring periodically; it may have acquired
it has also a tendency to change its type
in the course of years, but these changes
are gradually brought about by slight
and almost imperceptible variations
in its recurrent phenomena. From
being irregular the symptoms have
perhaps become confirmed, from
being occasional they have become
stated. Remedies that were formerly
infallible have now become worthless
and to one. Asthma is a very cap-
picious disease as seen in the ex-
treme unlikelihood of different cases
to one another. Not only are the unlike,
but they exhibit the strangest con-
tinuities and oppositions in their
behavior to remedies, in their causation,
in their paroxysms, in every point,
is fact, of their clinical history. The case is better in clean, crowded cities, another in the open country, one flies from the place which another seeks, one knows when he is going to have an attack, another has no warning, his reiterate paper acts like a charm for another it is useless. If this presents a degree of Caprice perhaps not possessed by any. This disease except hysteria Asthma is generally believed to be hereditary, sometimes the inheritance is direct, and sometimes remote. It is in general more confined to the male sex than to females, probably because that men are more exposed than women to the predisposing and exciting causes of this disease. The circumstances under which Asthma may occur are very various, although so far as its essential pathology goes there is but one Asthma - one in its mother Anatomy, and one in its Characteristic Phenomena. Seeing that Asthma may occur in individuals in all other respects perfectly healthy.
(in whose lungs, heart, stomach and nerves system but the slightest lesion can be traced) and that it is present in other merely as a complication or appendage to a grave organic disease; a natural division of once suggests itself into two principal species — idiopathic or uncomplicated and symptomatic or complicated asthma.

A great many varieties are contained under these two heads or forms of asthma. The idiopathic group includes all those forms in which the provocations of the attack are manifest, whether they be irritant, applied to the lungs themselves, as that of fog, smoke, animal emanations, effluvia from decay and decomposition: or are reflex in their nature, (the source of irritation having a distant seat from the pulmonary organs) as is observed in those forms of asthma which result from dyspepsia and organic nervous irritations. It must be remembered, however, that cases of uncomplicated asthma are not uncommon.
the best marked specimens of which are periodic Asthma, in which no exciting cause of the attacks can be detected. In the complicated forms of Asthma it is the organic lesion itself that is the exciting cause of the spasm, and the cause, being in its nature arbitrary, the result is, in a great degree, the same. In the majority of cases the organic disease that gives rise to bronchial spasm is such as affects the vascular condition of the bronchial mucous membrane, the inflammation or congestion of the mucous surface, as in bronchitis and Cardiac disease. Appears to be the stimulus that, through the nerves of the air tubes, excites the muscular wall to contract.

The Aetiology of Asthma. This is one of the most obscure and difficult parts of the subject. The causes of Asthma may be divided into three classes: the causes of the paroxysms, and the causes of the disease. Some of the immediate excitants of the Asthmatic spasm have already been referred to.
Such as errors in diet. Food may induce asthma in this way; by being of low quality, by being excessive in quantity, and by being taken too late in the day. Respired irritants such as dust and certain impurities, emanations from hay, from radickeys, and from certain animals constitute the most numerous class of the excitants of asthma. Again, psychological stimuli (such as fear and excitement) or any source of irritation affecting the psychic nervous system, brain or spinal cord, are capable of acting as the immediate excitants of asthma. With regard to the essential cause of asthma as a disease it will generally be found that there is some organic injury of the lungs at the root of the asthmatic tendency. The bird, for instance, that asthma frequently takes from some disease that complicates the lungs, and air such a way as to imply injury of an organic nature, though apparently temporary, as for example, whooping cough.
Bronchitis and phrenes. In these diseases the bronchial mucous membrane is the seat of inflammation, often intense and prolonged. And it is probable that some organic alteration inappreciable change has been brought in it, producing a morbid alteration of its sensibility to which the tendency of spasms is immediately due.

But it is not at all probable that there is some organic peculiarity in the lungs of all asthmatics. In a large number of cases there is not the slightest warrant for entertaining such a supposition. In many and many cases asthma occurs generally no history of previous disease, the excretions being absent, the lungs may give the most positive evidence of their anatomical and physiological soundness. The cause of asthma in these cases may be referred to a special irritability of the pulmonary nerves by sneeze, constituting an asthmatic idiosyncrasy, with which the individual was born.

It may not be out of place here to offer...
A few Remarks on the Consequences of Asthma. If we examine the chest of an asthmatic, who has but recently been affected with this disease, or whose attacks have been infrequent, we shall very likely find evidence of perfect anatomical soundness of all its organs, but if we examine them again in ten years we shall see certainly, if the patient has in the interval suffered constantly from attacks of his malady, find evidence of organic disease of the larynx, and very likely of the heart. The bronchial tubes in asthma, from their excessive action, become more or less thickened, the nutrition or development of the tubes being proportioned to their activity; and in consequence of this hypertrophy of the bronchial muscles, a permanent thickening of their walls, and consequent narrowing of their calibre is produced. Dilatation of the bronchial tubes is another morbid condition that has been found in asthma. When dilatation occurs it must be
Attributed to the effects of bronchitis complicating Asthma, for the bronchial spasm could not possibly generate it. Intra bronchial inflammation destroying the vital + physical properties of the bronchial walls would easily explain its production. Asthma is a state of partial asphyxia; the right chambers of the heart become distended with blood which they are unable to empty into the engorged lungs; the left side of the heart receives hardly any supply by and by the spasm yields, air is fully admitted, the pulmonary vessels unburden themselves, and all is well again. But such a state of things cannot long exist without producing other organic changes; the engorged pulmonary vessels will gradually lose their tone in proportion to the frequency of the asthmatic attack, they will yield to the descending force of the blood, so that congestion becomes more and more considerable, and if more and more...
Easy induction, the second portion of the accumulated blood will transude through the walls of the vessel, and, escaping into the areolar tissue and air cells, give rise to oedema. By putrefaction and dilatation of the right side of the heart has long been a well known and recognized complication of asthma. Why this should be is easily intelligible from the fact that uncounted efforts in the part of the right ventricle are called for when the pulmonary circulation becomes obstructed. After a time the ventricle yields to the distending force of the accumulated blood, next the auricle, and finally the great veins and the whole venous system, so that ultimately asthma may lead in general venous congestion and thrombosis just in the same way as primary cardiac disease.

Emphysema is certainly the commonest of all the morbid changes that asthma tends to produce. Emphysema is essentially a compensatory dilatation, and implies the neighborhood of non-expansible lung. It is produced in the following
Mucous. The bronchial spasm, by shutting off the air from the air cells, produces capillary states, the congested vessels relieve themselves by the characteristic mucous secretion. And if the spasm does not yield, the mucous will be prevented from escaping, and its presence will prevent efficient cough, from bariring up the access of air, so that the escape of the mucous will be prevented by direct obstruction, and by the want of the natural machinery for its expulsion. The tubes are thus narrowed by spasm, and completely occluded by mucous infraction. When inspiration becomes thus obstructed, the inspiratory muscles make violent efforts to fill the chest, and air, in fact, keeping it in a state of extreme tension, but the lobules whose branches are occluded cannot yield to the resistive force of the inspiratory muscles, therefore the whole resistance of inspiration is spent in those portions of the lung which
communication with the external air is free. The open lobules of the lung thus expand for themselves and their occluded neighbours, and they must necessarily undergo an excessive inflation in proportion to the amount of lung that is non-occupiable, in other words they become emphysematous. It is this that asthma produces emphysema just as the same way that bronchitis does. The two processes are essentially identical. In the one case the bronchial tubes are narrowed by inflammatory thickening of their walls and occluded by inflammatory exudation of mucus; in the other, they are narrowed by spasm of contraction and occluded by the exudation of congestion of blood vessels. The narrowing and occlusion of bronchitis however is generally of longer duration than that of asthma.

Diagnosis of Asthma. The distinction of asthma from every other disease cannot be difficult.
if we carefully bring accentuation and
precaution to our assistance. The
sudden attack of the paroxysms, the
short period of their duration, the violence
of their symptoms, their returning after
intervals of ease and of tolerable health
are sufficient to characterize the disease.
It is only when Asthma complicated
other diseases that its diagnosis may
be obscure and its treatment uncertain.
The diseases with which it has been con-
founded are, (a) spasmodic affections
of the larynx, (b) some cases of sudden
and acute bronchitis (c) Asthma Pectoris,
(d) hydrothorax. (e) Spasmodic affections
of the larynx may be mistaken for
Asthma, but they may be readily
distinguished from it by the sound
occurred by the passage of air through
the narrowed passage, which is very
different from the wheezing sound
of the Asthmatic Inspiration. Besides
all affections of the stomach, the patient
readily points to it as the seat of
his sufferings. The patient also feels much more alarm of impending suffocation
whereas in asthma he is seldom apprehensive
of the result, however severe the attack
may be. (f) Severe Cases of Bronchitis, owing
to the spasm excited in the glottis, bronchi,
and trachea during the expulsion of the
copious, thick, expectorations which is always present in these Cases;
are often accompanied with fits of difficult
and spasmodic respiration to severe
as to approach nearly to the Character
of the Asthmatic Paroxysm. The presence
of inflammatory fever however, in bronchitis,
the expectoration, the absence of the
Distressing sense of Stricture of the Chest
and dyspnea which attend asthma;
its Continued Character and slow subsi-
dence), will be sufficient to distinguish
it from the Hemoptoic form of Asthma.
(g) Angina pectoris may also be mistaken
for a fit of Asthma. But the Circumstances
inducing an attack of both Affections
and the periods of their accession are
widely different. Besides the fit of angina
pectoris is attended with a feeling of
immediating dissolution—a sensation
which never accompanies the asthmatic
paroxysm. The precordial pains also, under
the sternum, and pain and numbness
of the left shoulder, arm etc., character-
izing the former, are not present in
the latter affection. (d) Hydrotherapy
is frequently attended with suffocating
symptoms of difficulty of breathing
occurring during the bath. But it may
be readily distinguished from asthma
by the clear, thin sound, by external oedema,
the dead sound furnished by percussion,
and the history of the case.
Asthma is sometimes associated with
the development of lesions of the heart,
and great vessels. The dyspnoea,
ever accompanying heart disease,
is intolerant of the slightest exertion,
or of the recumbent position; the breathing
too, of heart dyspnoea has a panting
and gasping character, and not
the wheezing, laboured Character of Asthma. There is a Considerable Amount of dyspnoea which Always Accompanies more or less the emphysematous Condition of the lungs. But unlike the Dyspnoea of Asthma it is abiding, varies but little and has no

Prognosis of Asthma. In the progress of Asthma needs no formal Accusation, it never hardly proves fatal as Asthma, that is, in the paroxysm, but its frequent recurrence not merely aggravates the pathological states in which it has originated, but leads directly to the production of other disease. The influence of age in determining the tendency of Asthma constitutes a very constant and characteristic feature in its Clinical History. In young Asthmatics the tendency is almost invariably towards Recovery, whereas, in a person who is Attacked with it after forty-five the tendency is generally towards a progressive Severity of the Disease, and the production of...
Aggravation of those Complications by which Asthma Kills. In Asthma, as in all other Constitutional disorders, we have in the young much more room for hope from these Changes in the type and build of the Constitution which in these are so marked and striking, whereas in the old the Constitution is set and fixed and we have but little to hope on this score. The presence or absence of organic disease in the Respiratory and Circulatory organs is a very important point affecting the prognosis, and is of itself, sufficient to turn the Scale, for if the heart and lungs are perfectly free from organic disease, recovery is possible, but if they are not clear of such organic disease as is found to underlie Bronchial Spasms recovery is impossible. The Cause is precipitate and therefore its consequences. The length and frequency of the attacks have an important bearing on the prognosis, because the pulmonary congestion becomes formidable.
intractable in proportion to the length of time that they have lasted. If the intervals between the attacks are so short that the lungs have not time completely to recover from one attack before the occurrence of another, the case is very bad, for the organic arrangement becomes thus accumulative, and the case one of progressive disorganization. An unfavorable impression is also drawn from the persistence of expectoration, combined with a chronic cough, as it indicates that the lining membrane of the air passages is the seat of organic change. The prognosis may finally be summed up in the words of Salter: "If the patient is young, the chest sounds the attacks short, the intervals long; if there is no permanent shortness of breath, no cough or expectoration; if the attacks are getting broader and rarer, and if the exciting cause is clear, and such as may be obviated, then a favorable prognosis may be given. But if the
Patient is old, the lungs damaged, the attacks frequent and severe, the breathing never quite free. Coughing and expectoration constant, the disease apparently gaining ground, and the exciting cause occult or irremediable, then, second all or any of these circumstances, there is no alternative but to give an unfavourable prognosis.

Treatment. The treatment of asthma, like that of all paroxysmal diseases, naturally divides itself into the treatment of the paroxysm, and the treatment in the intervals of the paroxysms. If the paroxysms are mitigated by any means, the disease is rendered proportionally trifling, and if they are prevented the disease comes to be extinguished.

The persistence of the asthmatic tendency is of no moment, as long as the fits are branded off; and thus the more negative treatment of abstinence from the exciting cause of the paroxysm may amount to a virtual and final cure.
When called to a patient in a paroxysm of asthma, the first thing to do is to ascertain if there is any exciting cause actually present and in operation, and if so to remove it. An undigested meal or a loaded rectum may, as peripheral irritants produce tympanical spasm, the one through the pneumogastric nerve, the other through the sympathetic, and thus an emetic which relieves the one and an enema which evacuates the other, may put a stop to the attack.

It is also important to ascertain the state of the air the asthmatic breathes, for if there is in it any known or unknown irritant, any of those subtle emanations of which asthmatics are so sensible, such as Spencelian powder, dust or fume; if the patient has ever been seized with an attack in the same place before, if he has any reason to imagine that that particular air does not agree with him; and in any of these circumstances the exciting cause or causes
must be removed. When that is attainable, or the sooner the patient is transported to some other place, or situation known to agree with him, the better; for as long as he is under the influence of the injurious air or exciting Causes, all treatment will be powerless. During the Paroxysm, the patient should be placed in as favourable position as possible, he should be bolstered up in the arm chair, and a table placed before him of convenient height, with a pillow on it, on which he may rest his elbows and throw himself forward. These preliminary measures will add greatly to his comfort. During the paroxysm, if no exciting Cause can be discerned by whose removal the paroxysm may be arrested, we must next look out for some remedy by which we may hope to cut it short. The class of Remedies that exercises the most singular and powerful influence over the Asthmatic Condition is the Direct Depressants or Contra Stimulants. As soon as this...
Characteristic effects are established, the dyspnoea ceases, no matter how intense. The Spasm may have been; the moment the sensations characteristic of Colapso are felt, it yields, the respiration becomes free and the patient passes from agony to ease. The three drugs of this class generally used are Atropine, an Opium, tobacco, and tobacco. They all act in the same way — by lowering innervation, depressing nervous vitality or irritability, and enfeebling the contraction of the smooth muscle, just as they weaken the heart's action, or the Spasm of Colic. Remedies of this kind, given with the view of cutting short the paroxysm, should be given as early as possible and for two reasons. First, because it is much easier to break through the asthmatic condition when it is but just established, while the longer it is allowed to go on, the more intense and unendurable it becomes, and the more difficult it is to arrest it. Indeed
its giving way at all may depend on the earliness with which the remedy is applied. In the earliest stage of the paroxysm, a very slight thing will determine its advance or retreat, and in proportion as it advances and deepens, in just such proportion do remedies become imperative. The second reason for administering remedies early is that if the spasm does yield in spite of having been sometime established, the recovery is not to complete. All if the spasm had been applied im-
mediately on its appearance, and although the tracheal spasm may completely give way, then generally remain a certain amount of shortness of breath and incapacity for exertion, which would not have been the case had measures been taken to arrest the spasm in its first appearance. Once by administering not less than twenty grains of cricaceous powder, or accumulating doses of tartar emetic,
or by smoking tobacco and Nascaum is produced. The very common and
favourite remedy for Asthma is strong
Coffee. The rationale of its efficacy consists
in the production of its physiological effects,
the particular nervous condition that it
produce is manifested by the state of
mental activity, alertness of perception,
and energy of volition which supervene
on its administration. Now if sleep,
or the suspension of the will as is
generally believed, favours the production
of excitatory phenomena, and thus
favors the development of Asthma, it
is evident (that since the effect of Coffee
is to dispel such suspension or
depression of volition) that the ad-
ministration of strong Coffee the effects
of which tend to arrest the will, and
disfavor the development of excit-
atory action is very conducive to
counteracting that tendency which
predisposes to an attack. Unless
the Coffee is sufficiently strong to produce
its physiological effects, it does no good, but rather harm; if given very strong, it made me sick. Given in much bulk, it is best given very hot and without sugar or milk, and in an empty stomach. The same interpretation as we have endeavored to give about the action of coffee applies to all other stimulants of undoubted value in Asthma, such as strong tea, alcohol, ammonium, indinac, Kemp, and mental treatment. The modus operandi of sedatives, in the treatment of Asthma, is doubtless by allaying nervous irritability, delaying for a time that morbid sensibility of the pulmonary nervous system that constitutes the most essential part of the disease. One of the most powerful and specific remedies which we possess for Asthma is Chloroform. The sooner it is given after the commencement of an attack the better, for if the spasm has lasted for some time, it is apt to recur as soon as the influence...
of the chloroform passes off. The
smoking of stramonium has been
much employed as a remedy for the
asthmatic paroxysm. In a certain
class of cases it is the remedy, calming
the paroxysm like a charm, while
in others it is utterly inoperative, and
in some positively injurious. This
ixture of lobelia is a favourite anti-
dasthmatic with the Americans, and in
certain asthmatics it certainly has been
productive of great and immediate relief.
It is also very serviceable in fits of dysphoria
accompanied by asthma which attend largely
attacks of the lung and organic disease
of the heart. It appears however to lose
its efficacy by frequent repetition, and
in some cases it also fails to afford
any relief. It is given from two to
fifteen minims doses every quarter
or half an hour, increasing each dose
a minium till the disease yields, or
the drug seems to disagree with the pa-
tient; cheap vomiting and headache.
Come on the medicine must be left off for a time, and continued where the headache is removed, not increasing the dose beyond the last given. The inhalation of the fumes of burning nitric paper has likewise been often attended with very successful results but like the preceding Anti-Asthmatic is an open or failure. The inhalation of oxygen gas should also be tried during the paroxysm. The great thing that is wanted in Asthma is Oxygen, for the distressing sensation that attends the Benchei Spasms is caused by the shutting off of air from the lungs. Oxygenation being thus suspended the capillaries refuse to transport the blood the secret of which is pulmonary congestion, and a condition of partial anaemia. If these instead of a remedy the end of the dilute oxygen of which the atmosphere consists, a more concentrated form could be supplied, its concentration might make life for its tenacity, and, would
Spasms might still exist, those results which alone make it important seemed to suspend. the blood would be oxygened and fully pass on, the vessels would unload themselves, and the congestion and distress be at an end. Various other means are employed for arresting the paroxysm of asthma.

Dr. Sethson recommends a mixture containing about an ounce and a half of camphor mixture, a drachm of the spirit of pitons ether, and the same quantity of the solution of hydrochloric of morphia. If the head seems to be affected by the opium, some smaller quantity should be substituted. A tincture of hyoscynam us to the extent of about fifteen drops for each dose. In other cases or in other attacks, alcoholated, beller, mutual, or hydrocyanic acid, to the extent of M. III., every two hours, may be substituted. If the attack be long, arrow root or sage, with small quantities of wine or brandy, should
be given to support the patient during his laborious and exhausting sufferings.

But it is the treatment during the interval which is all important; so much so, that few cases will be found of true spasmodic asthma which is not entirely under the control of well regulated dietetic treatment. During the interval of the paroxysms no food should be taken after such a time in the day that will allow digestion to be completed, and the stomach empty before going to bed. The asthmatic should breakfast early and heartily. And the quantity of food he takes should be in general small and of a highly digestible character. Avoiding at the same time all articles of diet that have a special tendency to produce asthmatic fits. Mr. Putharm of Bedford has been very successful in the management of asthma cases, as narrated by Dr. Nettleship, by extremely strict dietetic treatment, and by keeping the patient in a quiet atmosphere.
the intervals of fit paroxysms. He corrects the secretion from the bowels by administering a pill at bedtime, consisting of Pel. Hyd. gr. vii; Pelv. Specie. gr. i, which is followed in the morning by a gentle saline mixture. Having thus attended to the secretion for about a week, the strict dietary system is to be commenced. It prohibits the patient from drinking any fluid whatever within one hour before his dinner or supper, and not until three hours after either of these meals. Three hours after dinner, a little sherry and water may be allowed, but not lemon. At any time, Dr. Pridham does not limit the asthmatic as to drinks otherwise than that all malt liquors are to be prohibited. Sedatives are to be given as follows: Three grains of the extract of Conium are to be taken four times a day — namely, at the hours of eleven, twelve, five, and ten — the dose to be gradually increased to five grains four times a day. To each of the
pills a fourth of a grain of the extract of Indian hemp may be added which may be gradually increased to one grain in each dose. This therapeutic influence of locality is one of the most remarkable circumstances connected with the history and treatment of asthma. Residence in large, populous and smoky cities will often radically and permanently cure asthma permitting all treatment in other localities. The special curative influence of the smoky, damp, foggy, dense air of London has been clearly demonstrated in the treatment of many asthmatic patients. Many asthmatics having occasion also to remain in business, or perhaps for the purpose of consulting some eminent physician, are surprised to find that while they remain there they are free from asthma, but when they return back again to their former kind they are as liable to the asthmatic affection as ever. Many cases of...
Asthma has thus been, permanently caused by a London residence—not experiencing a partial relief, nor a mitigation of their symptoms; but coming to be asthmatics altogether and seeming like other people. In this class of cases, it would seem that the worse the air is for the general health, the better, as a rule, for asthmatics. But this is not always the case, for many asthmatics are benefited only by the tracing, pure, spec. air; a city air being quite intolerable. There is thus no end to the apparent capricies of asthma in this respect, the most varying and opposite air, in accountable producing a cure. The hygienic treatment of asthma must be also strictly attended to, for everything which tends to elevate the standard of general health, and impart to it a increased robustness, exerts a very marked efficiency in diminishing the tendency to that special
nervous perturbation which manifests itself in the asthmatic paroxysm.

Exercise in the open air is an important matter to be attended to. The stimulation thus imparted to the function of the skin, -teenth, less work on the lungs, and gives to the asthmatic a lightness and freedom of respiration. Astriken at other times he is a stranger. The shock of the cold shower bath, or sponge bath, or sea bathing is often of great service to asthmatics; by raising the standard of general health they tend to prevent those humoral arrangements which are often the exciting cause of asthma.

Tonics have the same value and for the same reason. Of all tonics in asthma quinine is considered to be the best and next to quinine is iron. Asthmatics should wear flannel next their skin, varying the amount of their clothing in proportion to their temperature; they should avoid all exposure to cold, especially after perspiring, taking care always immediately
Up to change but garments, and taking
till other precautions for excluding Cataract.
A rigorous uniformity of life should be established, our dog made the exact
counterpart of another; for Asthma often
seems as if it were lying in ambush, watching
its opportunity for some loop hole through
which it might make its attack, and
there is hardly any change of life or
habit of which it will not, as it were,
take the advantage, such as change of
air, change of sleeping, alteration of
meat, seasons etc.,

The writer believes that he has
now reviewed the disease of Asthma
in all its leading features; the facts
he has stated have been compiled from
various sources, but chiefly from
Dr. Lister's treatise on Asthma, and
before leaving the subject he would add
today, in extenuation of the want of
originality very apparent in this
dissertation, that comparatively
few students have either the capability
on the leisure requisite for prosecuting original researches. And that the average man must be content if
content to reflecting upon subjects which
should occupy his attention. He is
able to present the abstract of the present
state of medical opinions on some
given topics, together with such
observations as may occur to a
mind possessing but a slight,
practical acquaintance with the subject.

Alexander Richardson Haughey