Observations on the Pathology and Etiology of Bronchial Asthma.

The term Asthma (derived from the Greek ἀσθάμα, ἀσθαμάτωσις, ἀσματικός, to blow or breathe) is applied to the Dyspnoea arising from many morbid conditions, for example: Uremic Asthma, Cardiac Asthma, Thoracic Asthma, but in the following remarks I shall confine my observations, to what is commonly known as Bronchial Spasmotic Asthma, an affection characterised by a paroxysmal Dyspnoea, manifesting itself suddenly and, after a variable length of time subsiding with like rapidity and suddenness.

It is, I consider, unnecessary, and to some extent misleading, to divide Bronchial Asthma into the two varieties of (1) Primary or Idiopathic, and (2) Secondary or Spasmotic, seeing that spasmotic asthma occurs in—
dependently of any secondary local irritation in some cases, and we have a distinction which is illogical, under such a division. However, one can imagine that as so many cases of Asthma are secondary it might be useful, when applied to treatment. After these preliminary remarks I will pass on to the consideration of the different theories, as regards the Pathology of the attack.

The theories as to the nature of the Pathology of Bronchial Spasmodic Asthma are many; the most important will be now considered in detail.

1) Willis in the year 1670, suggested that the attack was due to spasm of the smaller Bronchioles or Bronchia, a view (according to Goodhart) affirmed by Reissmann, who discovered the presence of circular muscular fibres in the Bronchial tubes. This view is now generally accepted, as being a satisfactory explanation of the symptoms, and,
after experimental observation, its correctness is shared by many observers such as C. J.A. Williams, Paul Bert, Biermer, Lazarus, Riegel, and others (Goodhart). As a good deal of controversy has, however, arisen over this theory, the arguments in its favour may be briefly stated as follows:

(1) On inspiration, the chest is seen to be overdistended, and usually in a position of extreme inspiration. The chest walls do not expand. Inspiration is short; but expiration is prolonged to the extent of four or five times the normal. The inspiratory muscles cannot raise the chest walls, nor the expiratory depress them, and (as Hyde Satter, a well-known opponent of this theory states) "the thorax can neither inspire nor expire."

(2) On percussion, the chest is hyper-resonant, owing to the air being locked up in the lungs.

(3) On auscultation, the respiratory murmur is in great measure lost,
As sudden as a flash of lightning, the brain, as if touched by electrification, is overwhelmed by a feeling of intense, overwhelming, and exhilarating sensations. The body is filled with a sense of vitality and energy, a surge of emotions that cannot be contained. The mind races with thoughts that are both chaotic and vivid, leading to a state of heightened awareness and perception. This phenomenon is described as a sudden, almost instantaneous experience that alters the perception of reality, leading to a profound sense of déjà vu and emotional intensity.
pressure within the air passages, as in forced expiration, speaking, singing, blowing &c. The idea that these muscles assist in expelling mucus, is objected to by some observers.

Furchenmann's theory, is that of a localized inflammation of the smaller bronchial tubes – Bronchidritis Exudativa (see "Uber Bronchiditis Exudativa und ihr Verhältniss zum Asthma". Furchenmann 1883): but Asthma is not usually accompanied by pyrexia, and, of Exudation, there is little or none, except in the later stage of the attack, when it may be profuse. Further, the spasm is often sudden, as well as the recovery. "Furchenmann's Spirals" (see "Some Remarks on the Spirals occurring in Bronchial Secretion" Deutsch. Archiv. f. Klin. Med. Bxxvi Leipzig 1887) of peculiar elongated plugs, the nature of which is still uncertain in the Expectoration of Asthmatics, are possibly allied to the plugs found in the Bronchial Tubes in Plastic Bronchitis, but Furchenmann objects to this view, al-
though their formation is due to an acute process. These bodies are, however, found in other diseases, such as Pneumonia and Abscess of the lungs, according to Gericke (see "The mode of production of Hirschmann's Spirals of the Convolutus Urinary Casts" Deutsch. Arch. f. klin. Med. B.7111. 1874, and also "Dtsch. Arch. f. Vol. 1802 p. 450") in certain secretions from the Conjunctiva, and their presence does not appear to explain a condition like that of Asthma. The presence in the Sputum of Charcot-Leyden crystals, and eosinophile cells--the latter in the blood as well--(see "On Eosinophile Cells in the Sputum of Bronchiät Asthnae" Deutsch Med. Koch 17. Sep. 1891, and Hoffmann in Nottinagil's Spec. Path. und Ther. Vol. xiii 1896) may also be dismissed as having an important place in the Pathology of Asthma.

(3) Stevenson suggested the idea of &apos;Spasm of the Inspiratory Muscles, and further, he held, that the difference in the amount of the free positive electricity in the individual
and in the air, might have an effect on the generation of Asthma, this positive
electricity in man, being least in the early
hours of the morning. With regard to the
Inspirationary muscular Spasm, it would not
explain the presence of the rhonchi. Ac-
cording to Stewmon, the Sounds heard in
the chest, originate really in the Lungs, and
are transmitted through the Bronchial tubes
to the Lungs. If this were so, the Sounds
would be heard equally well all over the
chest, not varying at different points, and
at different times, as they do in Asthma.
Again, Asthma may be unilateral, and
localized rhonchi would be impossible, if
the Sounds originated in the Lungs.
(4) Jodle theory, if the poisoning of the
Respiratory centre or nerves by toisons, can
scarcely be maintained for many reasons,
for instance, (1) The sudden collapse of
the Spasms (3) Asthma may be excited
by emanations, fright, etc. (4) The early
morning onset as a rule i.e. It may
be mentioned, however, that it is very
probable, even in health, that toxic substances are constantly excreted by the cells of the body, and may accumulate in the system, under certain circumstances. Bouchard, Moore, Gantier, and others have extracted toxic alkaloids from healthy bodies. (Ransome). All we can say is, that, along with carbonic acid, these toxines help to explain some of the symptoms of Dyspnea.

(5) About the year 1807, Bree advocated, that Asthma was due to a specific, and irritating mucus, which caused expiratory spasms, and convulsive attempts, to expel the morbid material from the Bronchial tubes. D. Marché, in "The Croonian Lectures" 1895, stated, that an attack of Asthma may be precipitated, by the "momentary want of air produced by a bad fit of coughing", and showed that in coughing, there is a tendency to a want of Oxygen, and to a distinct Excess of Carbonic Acid in the blood. In Asthma, however, the Dyspnea is at first mostly inspiratory, and expectoration as a rule is not pro-
fuse, and only occurs at the end of the attack, and in fact there may be none at all.

(6) That Asthma, i.e., the dyspnoea of Bronchitis can be also dismissed, seeing that attacks of the latter occur, unaccompanied by the former, in fact, Asthmatic patients may have intercurrent attacks of Bronchitis without Asthma: further, the symptoms and physical signs are unlike. Kraube, however, considered it to be a very acute Catarrh, and Tappe says, that the Dyspnoea is exactly like that which accompanies Acute Bronchitis; and Dr. T. Williams says, 80 per cent. have permanent catarrh of the Bronchial Tubes.

There is a variety of Bronchitis in young children, and infants, that is paroxysmal and peculiar. It comes on with great suddenness, but is associated with fever. It is attributed to a great variety of causes, such as Chill, Vaccination, errors in diet, &c. They are mostly nervous children, or those inheriting a nervous
history. Under treatment, it clears up with remarkable quickness and certainty.

(7) Humoral theory. This may explain the Dyspnea due to Uroxnia or "Renal Asthma".

Uroxnie, also known as Coffis or Millais Asthma, a rare condition, associated with the Thymus gland, and ascribed to "spasm of the glottis," might possibly be placed in this category, but questionably, as we know so little of the pathological effects of this organ.

With regard to Renal or Uroxnic Asthma, I may state that, Dr. W. Howship Dickinson in his book on Albuminuria (2nd Edition 1877) suggests, that spasm of the Pulmonary artery may be the "modus operandi" of the spams. Dyspnea, as severe as that produced by obstruction to the entrance of air into the Lung, may be produced by cutting off the blood from it, as in cases of Pulmonary Embolism. Uroxnic Asthma, however, is not ordinary Bronchial Asthma: the bronchi may take some part in the attack, but the Cardio-vascular System is essentially concerned, and Uroxnic the
cause. It is like an attack of Bronchial Asthma, with cardiac superadditions. In those patients "charged with the poison" mental emotion will produce an attack of Uremic Asthma. Mental emotion will also excite an attack of Bronchial Asthma, and curiously, the same emotion may also remove it completely and almost instantaneously.

About ten years ago, I was attending a little patient aged 7 years, suffering from an ordinary cold, which was passing off, when she was suddenly frightened at the appearance of a mouse, and a first severe attack of Asthma appeared. She was a very excitable little girl, and, so far as I am aware, no other attacks followed, and I attended the family for years until they left the neighbourhood.

(8) Landis & Stirling (Text Book of Physiology), already referred to (Vol. iv p. 822) suggest, that, temporary paralysis of the Pulmonary nerves (afferent), which Excite the Respiratory Centre (Excit to respiratory), may explain the condition of Asthma. These afferent
fibres of the Pulmonary nerves, are normally constantly in action, and stimulate the respiratory centre. Though we find afforad fibres in the Optic, Auditory, and Cutaneous sensory nerves. A paralysis causes slowing of the respiratory movements, though the amount of air taken in and Carbonic acid given off is not changed.

Asthma Dyspepticum, a condition described by Henoch, is produced, according to Landou, reflectly through the Vagus. It is often associated with the gastric dyspepsia of childhood, usually with a neurotic inheritance. It comes on suddenly, rapidly disappears when vomiting takes place. A Clinical Lecture on Dyspeptic Asthma, appeared in the "British Medical Journal" Nov 11, 1879 by Landi. He says notably there is an increased bulbar receptivity in these cases, and reflexes are more easily excited than usual. Acetonuria is not infrequently present. It is interesting also to note that, Striphulsus, and Urticaria, are cutaneous affections that accompany this dyspepsia; and Urticaria appears chiefly...
at night time. Though long noted, Carl V. Norden has specially drawn attention to this connection between Eczema, and Asthma. See "Beiträge zur Pathologie des Asthma Bronchiale" Deutsch. Archif Klin. Med. Berlin 1892". The following notes of a case, in my own practice, may be of interest. A girl, now aged 13 years, when 9 months old suffered from Eczema, lasting more or less 1½ years, then it disappeared, and Asthma supervened, and she still suffers. If this child takes oatmeal porridge, she has an attack of Asthma, and Urticaria also appears. Washing in oatmeal water, in her case, produces Urticaria, but not Asthma. With regard to Psoriasis, Brooke in "Albutt's System of Med. Vol. VIII p. 570" says "It is true, that Psoriasis has sometimes a definite association with Asthma, the attacks being either concurrent or alternate (Bateman, Bulkley, Holscher, others). But this only shows that, like Eczema or Rhinitis, it may serve at times either as an excitant of the Asthmatic Neurosis, or as a counter irritant.
I have never seen a case of Asthma in the blind or deaf.

(9) Berkart thought that Asthma is an acute paroxymal, almost erysipelasiform inflammation, spreading upwards and downwards from the Pharynx, and accompanied by copious exudation. There are many facts against this view; Asthma, for instance, often subsides as quickly as it commenced, it is not accompanied by pyrexia. Further, this theory would not explain the cases arising from animal, plant, emanations, or fright.

(10) That Asthma is the Dyspnea of Emphysema cannot be maintained. It is often associated with that condition, but only in the degenerate, and those suffering from pathological changes. Emphysematous patients may not suffer from Asthma.

(11) Wintrich and others consider that Asthma is due to tonic spasm of the Diaphragm, but as Wilson Fox says "the phenomena of this condition are altogether different." We should get no pneumonia with this condition.

(12) Kingseate maintains that in all cases...
With the few exceptions, the heart has been dilated and suggests that this condition may have something to do with the genesis of the attack. The dilatation, however, appears to be a sequelae, and depends upon either impaired quality of the blood, or, in combination with it and increased strain, thrown on the right side of the heart. Certainly, a dilated heart is not always accompanied by Asthma.

(13) Rapid production of Collapse of the Lungs has also been suggested. Atelectasis, in infancy is not infrequent, but the Physical signs are against this view of Asthma.

(14) Haig, maintains that it is a acute Acid storm, and due to Colicemia or blocking of the bronchial, and probably also the Pulmonary capillaries, by the combination of Acid with Colloid Wastes; and he describes it as Dysphaea, with inspiratory efforts, depending on congestion, or hyperemia of the smaller tubes, with, or without, contraction of their muscular coats. The fact that Asthma Migraine, Epilepsy, etc., which he ascribes to
Colicemia, improves when the metabolism of the body is increased, as during pregnancy, he asserts, confirms his theory. The diuresis, which sometimes follows an attack of asthma, is ascribed by him to the excess of urates; we, however, do not frequently find profuse diuresis as an aura. There are many obvious objections to Halig's theory:—

(1) The sudden attack, and equally sudden termination.

(2) Relief by antispasmodics.

(3) Blood pressure is not always increased.

(4) Occurrence in the young, in preference to the aged with impaired metabolism.

(5) Rapid timefraction of the Bronchial mucous membrane, spreading from the nasal, is another theory; but the stenosis of the smaller tubes takes place at the beginning of an attack, as shown by the bronchi. Sir Andrew Clark considered asthma, to be a visuo motor neurosis, by which changes analogous to those of urticaria upon the skin, are produced, and Stöckl actually observed with the laryngeal
mirror, that in most cases of Asthma observed, the whole length of the Trachea, and part of the right bronchus, were deeply congested. (Aubert's System of Med. Vol V. p. 300)

A good deal can be said, in favour of this view of the presence of the Bronchial tubes, and though not the primary, it is an important factor. The scanty expectoration in the initial stage, to be increased later on, and with relief, and also the symptoms of cases of paroxysmal sneeze, point in this direction. Blackley states, that the surgescence which causes the Asthma of Hay Fever, extends from the nose to the bronchi. Hering also found that, inflating the lung to 50 MM. Hg pressure caused a fall in the blood pressure, and also accelerated the heart beats, due to the depressor fibres in the Pulmonary nerves. Vascular engorgement of the Nasal mucosa, is not uncommon in gouty, and dyspeptic patients, and usually worse at night. Nasal trouble, e.g. Rhinitis occurs with Asthma.

(16) Paralysis of the Bronchial Muscles, has also been suggested. This might account
for the temporary overdistension of the alveoli, but then there would be no rhonchi, and as there would be no obstruction to the free entry of air to and fro in the lungs, so there would be no diaphoresis, and consequently no need for forced respiration; and though this condition might simulate emphysema, yet one would not get the interference with the blood oxygenation, as in emphysema, for none of the blood vessels would be stenosed or obliterated.

17. Spasm of the Respiratory Muscles. This idea has also been proposed, but of itself it could not produce bronchial asthma. We find, however, in medicine, many instances of aberrant action of the Respiratory Muscles of a convulsive, spasmodic nature, allied to Asthma, in Epilepsy for instance, and other affections of the Brain producing the well known Cheyne-Stokes respiration.

18. Dr. Foxwell, in his "Essays in Heart and Lung Disease," 1875 pp. 191-20) is of the opinion, that in Asthma, there is a "sudden peripheral tension (spasm) of the pul-
monary arterioles, and consequent pulmonarystenosis.

Spasm of the smaller arterioles, like pulmonarystenosis (see remarks under heading No. 7 in this thesis) would no doubt give rise to a dyspnoea, but there would be no interference either with the entrance or exit of air into the lungs.

It is none the less true, however, that the drugs mainly used for the relief of Asthma, are concerned with the circulation, for example, the following first excite and then paralyse the Vaso Motor nerves.

Chloral Hydrate, Morphia, Verainin, Nicotin, and Alcohol. The following rapidly paralyse:

Amyl Nitrite, and Atropin.

These have all been used, along with many others, e.g. Cocaine, Potassium Iodide, and have given relief in cases of Asthma.

The effects of fright or terror on the Vaso-Motor Centre are well known.

The passing of a large quantity of urine is often a premonitory symptom of Asthma.
(19) Asthma has been described as "Epilepsy of the Lung," and the symptoms suggest a convulsive attack. That it is a pure "nerve storm," similar to Epilepsy, paroxymal sneezing et. in questionable. It is not unusual, it is true, for Paroxymal sneezing, to alternate with Asthma, but in most instances, according to Sir J. Simon and Watson Williams, it is due to a combination of three factors (1) Neuropathic predisposition (ii) An irritant (iii) Pathological conditions e.g. of the Nasal passages, Rhinitis Phlegm et. Further, as already stated, according to Dr. Theod. Williams 80% of all asthmatics suffer from Bronchial Catarrh. Paroxymal sneezing again, occurs chiefly in women, and chiefly dwellers in cities, whereas the reverse is the case in Asthma. Men are afflicted in the ratio of two to one woman, and city life often relieves the nightly attack is not common or perhaps one should say no the rule in Epilepsy.

The actual attack of Asthma then starts with sudden spasmodic contractions of the smaller bronchioles, whose walls consist of ciliated
mucous membrane, surrounded by a plain muscular layer. The scattered plates of cartilage in the larger tubes have disappeared. These contractions cause blocking of the tubes, and the air is unable to pass to expire freely from the alveoli. The oxygen is soon absorbed, as shown by the fact, that the air which the patient manages to expire, is over-saturated with carbonic acid, and contains no oxygen: there is also cyanosis. Partly by the stimulation of the inspiratory afferent endings of the vagus in the lungs, and the Respiratory Centre in the Medulla, by the non-oxygenated blood, and also in part by the irritation of the Phrenic Nerve, in close relation to the Respiratory Centre, a series of respiratory efforts are made, which are at first mostly inspiratory, apparent in the excessive action of the muscles of forced inspiration, and the over-distension of the chest, which is usually in the position of extreme inspiration. Owing to these violent inspiratory efforts, a certain amount of air passes into the alveoli (which are already
distended, to compensate the loss of space within the rigid chest walls by contraction of the tubes) and they are therefore still more distended, with temporary weakening of their elastic walls: this is shown by the hyper-resonance of the chest, and by the temporary emphysema of the attack passing off, as the elastic fibres recover their tone. The repetition of these attacks is followed by permanent weakening of the elastic tissue, and true emphysema follows—a condition which supervenes earlier in elderly persons, whose elastic tissue is already weakened by age. When the alveoli are distended with, and full of carbonic acid, efforts are made in the direction of expiration, this is caused, both by the extra carbonic acid in the blood directly exciting the expiratory fibres in the respiratory centre, and the normal physiological reflex expiration, which follows inspiration, and which is exaggerated by forced inspiration. These expiratory efforts are shown by the prolonged expiratory screech, but as the contraction of the muscles of the bronchial
still keeps the air pent up in the alveoli, these efforts are of little avail, until the muscles relax. Although inspiration be possible, it is not often much impeded, expiration on the other hand in Bamberger's words "presents the picture of a most laborious and tormenting and at the same time fruitless struggle".

**Etiology of Asthma**

From a study of the foregoing theories, we can only arrive at the conclusion, that Bronchial Asthma is a functional aberration, and although tumefaction of the mucous membrane of the bronchi, or a temporary spasm of the pulmonary arterioles, can to a certain extent be defended, muscular spasm of the bronchioles, as generally accepted, appears to be the most satisfactory explanation of the dyspnoea of Bronchial Asthma.

In considering the causation of Asthma, it is of the greatest importance to bear in mind, what Wilson Fox calls "individual constitution," and I agree with Goodhart, when he says, that he doubts whether this "constitution" is
ever wanting, that is, an idiosyncrasy on the part of the subject. An ordinary variant does not produce Asthma, without this "Constitution" which may even be termed a "Diathesis".

(1) Age. Asthma is common in young children. Hyde Sellars' Table is as follows:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>11</td>
<td>7.8%</td>
</tr>
<tr>
<td>1-10 years</td>
<td>60</td>
<td>31.7%</td>
</tr>
<tr>
<td>10-20</td>
<td>30</td>
<td>12.8%</td>
</tr>
<tr>
<td>20-30</td>
<td>39</td>
<td>17.2%</td>
</tr>
<tr>
<td>30-40</td>
<td>44</td>
<td>19.2%</td>
</tr>
<tr>
<td>40-50</td>
<td>24</td>
<td>9.3%</td>
</tr>
<tr>
<td>50-60</td>
<td>12</td>
<td>5.2%</td>
</tr>
<tr>
<td>60-70</td>
<td>4</td>
<td>1.7%</td>
</tr>
<tr>
<td>70-80</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>125</td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Though it occurs at all periods of life, a larger number take origin during the first ten years, than in any subsequent decade. From the foregoing Table 31% come under this heading. It will be seen that 80% occur below 40 years of age, and 44% below 20 years. Goodhart thinks this a cor-
Asthma, according to these statistics, and from my own personal observation, is a disease of childhood, and early adult life. It is worthy of note too, that it is during this period, that the Exanthemata occur, for instance, Measles, Whooping Cough so accompanied by Cerebral Conditions of the Respiratory passages. Tonsilitis, and Rheumatism, with inflamed throats, are also common at this age. Hyde, Vallet has been a case in an infant of fourteen days old, and another twenty eight days old. Our only child, an infant now, died at the age of ten months of Broncho-Pneumonia, had suffered previously from repeated attacks of,
Asthma. I may add, that his mother has been for twenty-one years a sufferer from this distressing affliction, and I have had opportunities of studying most of its phases. It is an easy matter to confuse the party-small bronchitis of young children, with asthma, and no doubt many cases thus escape notice. Hyde Valle, is probably right, when he gives a percentage of about 5 per cent attacks, during the first year. I have seen several cases in infants, and am of opinion that it is commoner than usually supposed during that period.

II. Sex. It is interesting to note, that asthma occurs about twice as often in males as in females. In Goodhart's table, the ratio is 72 to 47. Between the ages of 20 and 30 years, however, it is reversed, and we find 8 females to 4 males; the number is too small on which to base any conclusions.

III. Locality and Temperature. The effect of locality on asthma is a difficult and peculiar problem. No doubt the state of the atmosphere in these cases, is the real question.
and in all probability, the air of the particular place, or neighbourhood giving rise to the attack, contains irritating particles or odours to the patient. The seaside, for instance, very often has a prejudicial effect. In my wife's case it brings on an attack immediately. It is unnecessary to give many examples, when so many curious instances are on record. Large smoky towns seem, however, to be "favourable resorts" for the asthmatic. To take my wife's case—which is not uncommon—her first visit to London from Edinburgh, when suffering nightly from attacks, was as she describes it "near willows". During five years previously, she had suffered every night, or rather, early morning, from the severest paroxysms of asthma, which disappeared in a most extraordinary manner. Unfortunately, at the end of about three months, owing to grief, the asthma returned, but not to the same degree as formerly. Fifteen years ago Dr. Spooner Bramwell kindly examined my wife's chest at Edinburgh and could detect no disease. As a general rule young subjects are better in high
altitudes, aged patients in the lower, warmer, and Southern (Weber)

IV Heredity. Berkhart states that 16 per cent: at least, of all cases have a parental history of Asthma.

In a series of 123 cases according to Goodhart—
50 had a Neurotic inheritance of one form or another,
25 had a history of Asthma or Hay Fever in parents
8 “ ” “ Acute Rheumatism in parents
Others had family history of Migraine,
Others “ ” “ Diabetes & Endocarditis.

Another series of 217 cases, gives a family history of Asthma in 54, though this probably is too high a percentage.

V Status in Life. It is generally considered, or said, that Asthma is a disease of the “better class” of society, although it is common enough in those not so placed in life. I am not myself so sure on the former point. No doubt, many sufferers from Asthma, more especially males, in the latter station of life, cannot afford to be invalids, so the attack is forgotten until it becomes
so frequent, or complications arise, when the medical man is consulted, or relief sought, perhaps at an hospital. The neurotic tendency of the age may help to explain matters.

**VI. Emaciations**

Hay Asthma, caused by pollen, is I suppose the commonest example under this heading. The violets among flowers in England, is said to especially notice the pollen of the Ragweed is said to be most in evidence in the United States of America. Species: cat, horse, dog, Asthma are well known, and it is perhaps unnecessary to give a detailed list of the various odours etc. Said to be responsible for an attack of Asthma.

**VII. Associated with other diseases.**

Malaria is well known as playing the part of an exciting cause. Potain and others have noticed the association of gout, by producing a bronchial asthma, acts in the same manner.

Influenza is another exciting cause of chronic asthma; dilatation of the stomach and Tetany.
Sudden suppression, or unexpected onset of the menopause, especially about the menopause, nervous shock, or strong emotion. According to Dr. Savage, Asthma may alternate with mental disorder, generally of a melancholic kind (see Allen's System Vol. VIII p. 173).

Nasal affections, for example, hypertrophic rhinitis, polypli, deflected septum, etc., are often associated with asthma. Voltaire's classical case, showed the connection between nasal affections and asthma.

In old age, of course, the rigidity of the chest walls give rise to pulmonary embarrassment, and emphysema, and conduces to asthmatic attacks. Renal and chronic heart disease bring about the same result.

According to Goodhart, there is a variety of Asthma found in "middle-aged" patients, which is very severe and intractable. There is no obvious hysterotic tendency, and no apparent disease, and which can only be explained by some constitutional taint or perhaps a degeneration going on in the lung tissue, or a rapid emphysema.