Remarks on Asthma
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In old medical literature the word asthma was considered as almost identical with dyspnoea, but after the introduction of auscultation as a means of diagnosis, and when many diseases hitherto regarded as asthma were found to be due to other and distinct conditions, the existence of a pure asthma as defined in Trepner's System of Practical Medicine vol iii. page 184, as "a violent form of paroxysmal dyspnoea, not dependent on structural lesion, characterised by wheezing respiration with great prolongation of the expiration and by the absence of all the symptoms between the attacks." Such a disease as this was denied by many authorities, such as Pestan and after him by Beau, Louis and others who tried to bring asthma into a condition entirely dependent on Empysema and Catarrh. They were however soon opposed by capable observers, who asserted that asthma in its restricted sense was due to a neurosis, and produced by a spasm of the muscles of the small bronchi. This opinion was led up to by
the discovery of muscular fibres in even the smallest bronchi by Russelion and the demonstration of their contractility by Fizet and Williams; and, as I believe, the opinion which now finds most support, and is ably advocated in a paper by Biermer, published in vol. 66 New Sydenham Society, in which, as a result of deduction and indirect experiment it is laid down: 1st. that the muscular fibres of the bronchial tubes are antagonists of the inspiratory muscles, and prevent overdistension during inspiration; 2nd. that they assist in expiration, and have an expulsive force during forced expiration, and in expectoration; 3rd. that spasm of these muscles causes a narrowing of the tubes, increases the resistance to inspiration, and the negative pressure within the chest; 4th. that the inspiratory forces are able to overcome any obstacle that the narrowed tubes may offer; 5th. that the interference with expiration is of greater importance, because the bronchi exist under the usual expiratory pressure, plus the pressure of spastic contraction, and will be
more pressed together than the corresponding alveoli, and
64 that this will be almost equivalent to a valve-like closure
of the alveoli and as a consequence
the air cells become distended with air,
which is unable to find exit through
the narrowed tubes, is not renewed,
and which rapidly becomes useless
for the purpose of purifying the blood,
and thus we have produced the air
hunger, and other symptoms so
characteristic of asthma.

Wintrich and following him
Bamberger and Lehman, rejected the
theory of Bronchial Spasm, laid stress
on the depression of the diaphragm
as, militating against the Bronchial theory
and as pointing to their own theory,
of a spasm of the diaphragm, and
asserted that in Bronchial spasm
the diaphragm should be elevated,
the circumference of the chest diminished
and the intercostal spaces drawn in,
all of which are the opposite to what
we find in asthma, for here the chest
is full of air. The lungs being distended
press the diaphragm downwards, this
same symptom being observed in all
cases in which there is interference with the passage of air from the alveoli; whether this, depends on swelling of the bronchial mucous membrane, or bronchial spasm, or on emphysematous diminution of elasticity.

Moreover, this theory of spasm of the diaphragm cannot be held as true because distinct and regular contractions of the diaphragm, though diminished in amount, have been observed by competent authorities; the upward movement being prevented by the increased volume of the lungs.

The theory of bronchial spasm although it is undoubtedly true, as the direct cause of the asthmatic fit, is not, to my mind, sufficient to account for all the phenomena; e.g. the increased secretion of mucus that takes place towards the termination of a fit; this has been explained, by Dr. Johnson, vide [Sir Thomas Watson Practice of Physic vol II page 398] on the assumption that in the outset at least of an asthmatic attack, the lungs deprived of their needful fresh supplies of air by bronchial
spasm, have their blood supply proportionally diminished by a contraction of the minute pulmonary arteries; gradually this arrest of the blood in the small arteries tells in a backward direction, leads to a general venous congestion, and therefore to congestion of the terminal veins and their capillaries; this he considers to be the cause of the exudation.

Biermer is unable to explain the relationship between bronchial spasm and laryngeal hyperaemia of the air passages, but believes it may be accounted for in two ways. First, the bronchial spasm causes the hyperaemia; that is, there exists between them a causal connection, or Secondly, the spasm and hyperaemia are the joint effect of the same cause that is, are due to reflex action.

Therefore Weber attributes the phenomena of asthma to a sudden swelling of the bronchial mucous membrane produced through the agency of the vaso motor nerves, and considers that the engorgement of the
Arterial mucous membrane is similar to the acute swelling, and stoppage of the nostrils to which some persons are subject. This view is supported by:
(a) the result of physiological experiment, which proves, that irritation of sensory nerves is followed by a reflex engorgement of the territory, in which they are distributed
(b) by the close similarity in structure between the mucous membrane of the nose and of the bronchi
(c) by the result of experiment; Hack having recorded a case in which an attack of asthma was induced, by the application of the galvanic cautery to the nasal mucous membrane in a person previously free from asthma.
(d) by the conditions found to exist in the affection known as hay asthma, and which is undoubtedly analogous to the disease under consideration,
(e) by observations made with the teichroscope, by Störk, who demonstrated that the mucous membrane of the trachea and bronchi was actually, in a state of hyperaemia; and
(f) by the copious exudation and
expectoration of mucus which occurs during the paroxysm.

This expectoration was examined in 1871 by Freyden, and described by him, as being, viscid, greyish-white, very frothy, and containing in a transparent vitreous mass a mixture of fine threads, flakes and plugs, some of these being dry and of a greyish colour. Under the microscope a number of brownish cells undergoing degeneration, with numerous very sharp pointed octahedral crystals can be seen with a power of 300 diam. These crystals are composed of a substance analogous to mucoin, and it was held by their discoverer, that these crystals by acting as a direct irritant to the terminal branches of the pneumogastric would cause asthma; this is however not the case, as similar crystals have been found in other bronchial affections not marked by asthmatic symptoms.

Various other theories as to the nature of asthma have appeared at different periods; as that of Brez who expressed the opinion
That the dyspnoea of asthma was due to an effort of nature to rid the bronchial tubes of a certain undefined substance supposed to have accumulated in them previous to the attack.

Another and more recent theory is contained in a paper by Sir Andrew Clark in which he refers asthma to an arteriolar-like swelling of the bronchial mucous membrane.

Another theory is to be found in a note by M.R.O'Conner M.D. on (page 1158 British Medical Journal 1885) in which he says, "I have for some years taught that asthma was due to a reverse action of the cilia lining the bronchial tract," and in support of this mentions the action of chloroform on cilia, and in asthma; but he omits to mention any cause for this reverse action, and overlooks the fact that chloroform acts in asthma by relieving spasm.

After careful consideration of the conditions found during a paroxysm of asthma, I am inclined
to think that the spastic condition of the bronchial muscles as described by Biermer is but the initial stage, and that it is followed by a stage of hyperemia and engorgement of the mucous membrane due to reflex inhibition of the vaso motor centre.

Asthma being a neurosis the organs involved present no anatomical characters of a special nature, but in cases of long standing evidence of empyema and cataract may be found in the lungs, with dilatation of the right side of the heart, as a result of backward pressure.

No changes have yet, I believe, been discovered in the pneumogastic nerve or in the respiratory centre.

The actual exciting causes of asthma are numerous, and seem in a great measure to depend on the individual predisposition. They may be divided into two classes.

1st those acting directly on the vagus, at its origin, during its
course, or at its termination in the lungs, e.g. fatigue, Physical exhaustion, and Severe mental emotion, which may be supposed to have a centric action, but the effect of the latter, would be more correctly described as hysterical dyspnoea. Enlarged bronchial glands pressing on the nerves during its course, as sometimes seen in children after measles, or whooping cough. Cold air and various forms of dust acting on the nerves ending in the lung. And 2nd into those causes acting in a reflex manner, e.g. Various perfumes acting through the olfactory nerves. Gastric, Rectal or Ovarian irritation.

I will now pass on to relate some cases of interest.

Case 1. A. H. female, aged 27, in good position in life. Father alive aged 66. Had a severe attack of Rheumatic Fever one year before patient was born. Mother aged 52, healthy. Two brothers, and four sisters alive and in good health.
Paternal Grandfather died aged 70 from disease of throat for which several operations had been performed. Paternal Grandmother died aged 68 suddenly from heart disease.
Maternal Grandfather suffered from Gout, died aged 50 of Brights Disease.
Maternal Grandmother aged 76 healthy.
Paternal Aunts & Aunts, but some of their children died of Rheisis.
Maternal uncles and aunts all living.
Patient has suffered from attacks of spasmodic asthma from age of 12 years, the longest period without an attack being about six months.
During childhood had measles followed by pneumonia.
Up to five years ago was a stout well-nourished girl leading a country life, and was a great walker; could never sit in heated rooms without having an attack, about that time (5 years ago) had a severe mental shock, health has not been so good since. Complains a good
deal of pain at back of neck, and attacks of asthma are usually preceded by palpitation. Worry or anxiety always produces an attack. The attacks of late have somewhat altered in character and are less frequent, but the premonitory palpitations are more severe. The attack invariably comes on at night, and is marked by severe dyspnoea; the respiratory difficulty being very prominent. She sits up in bed clutching the knees, and is for some hours unable to change her position. The face becomes cyanosed and is covered by a cold clammy perspiration; after some time the cough is accompanied by a frothy, expectoration, some hours after this relief is obtained. Pulse rapid and small, and there is evidence of general distress. During the interval the general condition is good. The heart is healthy, and the alimentary functions are carried out normally.
The kidneys act freely, the urine, when last examined, R/P 9, 1010
Acid, pale, no deposit, and did not contain albumen or sugar.
The menstrual functions are normal.

The treatment that has been found most useful in this case is a mixture consisting of:

- Potass Sodici: 360
- Tinct Speciae: 3 Fl.
- Tinct Lobeliæ Eeth: 3 Fl.
- Estorí Chlorici: 3 Fl.
- Syrupe Solut: 3 Fl.
- Aqua: 3 Fl.

14 fl. mist

One eighth part to be taken every four hours.

The bedroom being freely sprinkled with sanitas fluid and kept at a
warm temperature.

Case 2. A female aged 27, married one child aged four years, there were no miscarriages.

Family history on both sides
free from any pulmonary taint.

Before marriage patient suffered from
the hysteric, in other respects healthy.

During the prevalence of cold east
winds, she became affected with
General bronchial catarrh, which subsided after about ten days treatment. The patient now noticed that she awoke each morning about five o'clock with difficulty of breathing, lasting till about nine, when the breathing became free; no discomfort being experienced during the remainder of the day. The attacks increased in severity, and continued for nearly three weeks in spite of treatment by Exit Belladonna, Stramonium and Ipecac in the form of pill, and various other remedies, but was immediately relieved by the treatment adopted in case 1.

Case 2. Need not be given in any detail; is that of E. R., female, aged 32, who suffered during two or three years from severe attacks of spasmoid asthma usually induced by exposure to cold winds or damp. The attacks did not present any peculiar feature. The patient married; left the neighbourhood; became pregnant; and during the eighth month had a violent attack of asthma, the
Paroxysms of dyspnoea becoming so severe, that it was considered necessary to induce premature labour; but before the birth of the child, the patient sank from exhaustion.

Case 4. Is also that of a female, aged 30, born in London. Father died aged 63 from cancer of tongue. Mother had gout, died aged 50 of Bright's disease. One sister alive and healthy.

One sister and one brother died in infancy.

Maternal grandparents both died of apoplexy. One maternal aunt died of acute rheumatism. The patient was always more or less liable to cold, was fairly strong up to eleven years ago, when she began to suffer from winter cough, and at that time had pain in upper part of right chest, for which she consulted Sir William Jenner who ordered the application of tincture of iodine and to take Codliver oil, at the same time she began to be subject to attacks of asthma.
which came on suddenly, and went off after sometime leaving the breathing quite clear.

Some years ago had congestion of the lungs, and again last year in Madeira, where she had been ordered to winter, she had congestion of the left lung.

She had been staying in St. Leonards for the last three months; about five weeks ago went out in the east wind, after which bronchial asthma supervened.

The attacks came on every night but the breathing did not become quite clear during the day, though she had much less discomfort.

Irritave cough was a troublesome symptom in this case, but the amount of expectoration was small. When the attacks came on the dyspnoea was extreme; the face becoming cyanosed, and the body covered with perspiration. The dyspnoea was much more marked during expiration than during inspiration. This case proved obstrucive owing to the prevalence of east winds, but
the improvement was very decided on commencing the mixture mentioned in case 1.

These cases are interesting as showing the persistency with which asthma will return when once it has expressed itself (Cases 104), as showing the early age at which the disease may come on (4 years in Case 1), on turning to Dr. Hyde Salters table we learn that out of a total of 225 cases tabulated by him 71 or nearly 3 came on before the age of 10 years; and as showing a connection between Gout, Rheumatism, and Asthma, in Case 1) Grandfather had Gout, the Father had Rheumatism and the Patient had asthma; in Case 2) Mother had Gout, and the Patient asthma; bearing out a dictum of Trousseau that Gout, Rheumatism, and Asthma are expressions of one and the same diathesis. Case 3 is remarkable in the fact that death occurred during late pregnancy, when the interference with respiration was intensified, and the patient was unable to bear the double strain.
of Asthma and pregnancy.
Cases 1, 2, &c. show the efficacy
of Sodium of Potash in relieving
the distress produced by the
conditions culminating in an
attack of Asthma.

Finis.