Thesis on

Vesicular Emphysema

March 1854

Short, but distinct, and correct.

Emphysema is Asthma not dangerous? Emphysema not dangerous in itself, by from superadded disease? Emphysema cureble.
The diseases of the lungs, from their great frequency of occurrence, especially tuberculosis, from the great mortality arising from them, in this country claim a large share of the attention of the medical practitioners. They have been investigated with great care and diligence, more especially, since the art of auscultation, Auscultation, were introduced into medical practice. Before the assistance that is derived from auscultation, Auscultation, in the diagnosis of pulmonary affections, was known, the diseases of the lungs were very little understood, almost during the life of the patient, and comparatively little attention was paid to them partly, from their obscurity, and partly from the limited means of diagnosis succeeded by the other practitioners.
Now, however, that these arts have been studied and applied, diseases, which formerly were confounded with one another, have been separated, and a great change has consequently taken place in their diagnosis and treatment.

Relics of Empyema, before its true nature was understood, were included, along with other affections, under the name of Asthma. Some of the old authors mention it as a disease analogous to 'broken wind' in horses, but they do not seem to have been able to diagnose it with certainty, even after the death of the patient. Some have the first to operate relucial empyema from the diseases with which it had been confounded, and to point out its characteristic symptoms. And his views on the subject have been adopted by most subsequent authors, with some exceptions, modifications.

In the following remarks on Relucial Empyema, the only
proposed to consider intercellular, its Anatomy, its Mechanism and Cause, its General Symptoms, Physical Signs, its Complications, and its Treatment.

I. Anatomy of Vesicular Emphysema. Vesicular Emphysema is essentially a distention of the air-cells of the lung, together with a certain amount of atrophy of the pulmonary tissue. The whole lung may be affected, or only a part of it; and in the latter case the Emphysema may be confined to separate vesicles, or it may affect all the vesicles of alveole. Every part of the lungs is liable to become emphysematous, but the borders and apices seem most obnoxious to the disease, probably from their not being so able to reach pressure, as the inner solid parts. Emphysema differs from some other diseases of the chest in occupying, with equal frequency in both lungs, and in one part of a lung as often as another. It seldom happens that one
When the thorax is opened the lung does not collapse, but may even protrude through the opening. The appearance of the lung, when taken out of the body, does not generally exhibit very marked pathological appearances. The more voluminous its surface is frequently covered with irregular groups of enlarged vessels, and its colour is paler than natural so much so that in some places the lung may appear almost white. The enlarged vessels may have been to occur either singly or in irregular groups, it can be distinguished from those of interlobular, subpleural emphysema by their immobility. If the entire lung be affected, the pleural surface may be actinized as natural, but more convex. Occasionally single vessels occur like stings of bees on the margins of the lung. On handling the lung, it has upon its soft, springy, feeling as if full like
a dawn pillory, it capitulates left. Whisk to lids easily forced out of their sockets hardly with a slight, hissing sound.

The structures of Emphysema may be demonstrated, by inflating the lungs and urging it rapidly. If the experiment be successful, the cells will remain in their enlarged condition, as will be seen on section. In this way, it may also be seen, that, the cells do not always remain separate from each other, but that several are united to form one general cavity, in which, the remnants of the original cell walls can been perfectly in the form of rings round its wall by passing across its finer threads. The interior of the cavity is lined with a smooth lining with mucous membranes. They contain serum, pers, mucus, and other fluid.

The extent to which the cells are dilated varies in different instances, in different parts of the same lung. They may be no longer than a needle, or they may acquire the shape of a
Within infection, or border of the lung, when held between the eye & the light, appears almost translucent. When thrown into water it floats high, from the large quantity of air contained within it. There is usually, dilatation of the bronchial tubes, except for any short distance from the cells.

III Mechanism and Causes.

Although, many theories have been advanced upon this subject, two only have been recognised, as capable of producing often diseases. Both these theories take upon Respiration as the principle agent in causing the dilatation of the air-erubescent. By one it is maintained, that the lesion is produced during the expiration; while by the other inspiration is said to be the active agent; they have been called respectively the Expiration and inspiration theories. Lennec, who first accurately described the disease, gave
out the inspiration theory, the explanation afforded by it, appeared satisfactory.

In cases of chronic cough, the small bronchial ramifications become obstructed by the swelling of their membranes or by the secretion of mucus. Hence, that the air cannot be forced through them into the arteries only by our effort. The stronger act of inspiration is able to force air through these tubes, which the fainter act of inspiration, is unable wholly to expel. In this way, each act of inspiration adds a fresh portion of air to that already imprisoned within the cells, which aids by possible inspiratory acts, (as coughing) gradually dilates the cells.

The inspiration theory accounts for the production of the chills by holding, it to be the result of previous increase of part of the lung by which...
air is prevented from traversing that part; that, by inspiration, a vacuum is formed, & the healthy part has, accordingly, its own function to perform, but also, that of the diseased part, & that the escape of air, which is thus forced into the sound part, produces the dilatation.

Against the inspiration theory it is argued, that the respiratory act is mechanically incapable of producing dilatation of the lungs, or of any part of it. That the act of inspiration tends, entirely, towards expelling the air vessels, by the uniform pressure of the external pressures of the thorax, upon the whole pulmonary surface, and that even when the vessels are maintained at their maximum or normal state of filling by a closed glottis, any further dilatation of them, by the expiratory force, is as much contradictory as the further dilatation of a bladder, blown up and laid at the bottom of a vessel by hydraulic,
or equalized pressure, applied to its entire, external, surface. The respirationists answer this argument by saying that the comparison made here, between a deflated bladder and the air cells, is inapplicable, as it is not proved that such an extent can be produced, either between the air in the air cells and the external parts of them. They contend, that, although a forcible inspiratory effort, with a closed glottis, or (what is the same) with obstructed bronchial tubes, cannot alone produce dilation of the cells, the continued pressure produces an atrophy of the pulmonary tissue, that the vessels thus losing their support, easily become obstructed. Another objection brought forward by the respirationists, is, that the inspiratory current press with the usual force which beyond the obstructions to which they are subject in the bronchial tubes or cells, but that it will press with increased force, into the adjoining tubes and cells, into
which its access is free, their latter may thus become thickened, and in time, permanently dilated. But, the heart, we should expect to find from this would be, an hypertrophic, not an emphysematous, enlargement of the cells, unless the diseased part of the lung has been suddenly rendered impervious. The inspirationists say that this indicates

our lung has free access to the emphysematous portion of lung, or this in the cases, there must be the free equivalent. Alto! how, then, does an unusual quantity of air become imprisoned within the cells? And, further, if the emphysema is produced by a part of alveoli becoming breakable of performing its function, that function, revolving upon the second part, how is it that the whole lung may become emphysematous? To this it may be answered, that the lung, which is found wholly emphysematous, has previously healthy parts that, the other lung was
discussed, and that the former had to act for the latter. But both lungs have been found emphysematous throughout their whole extent.

It thus appears, that neither of these theories, are sufficient to account for all cases of emphysema. It is probable, that both inspiration, expiration, are concerned in the production of the disease, when it is rapidly produced, expiration, may be the chief agent; and when its interference becomes gradually that both inspiration, expiration, operate together in producing it.

The other theories that have been brought forward, it is only necessary to notice briefly. Andrelin conceives, that the disease arises from an atrophy of some of the walls of the air-cells, with subsequent emphysema, so that several cells are enlarged to a few of larger dimensions. This may occur at certain intervals in old age, when there is a general abstraction
of all the tissues of the body; but such attacks are not likely to produce a great deviation from the natural condition of the lung, as is found to be the case in well marked cases of Vesicular Emphysema. Dr. O. W. Stokes of Dublin support paralysis of the bronchial muscles (by branchioli). But the eparmonic contractions of the branchi, which are admitted to exist during the attacks of Apopnea, seems to be against the notion of any such paralysis. Dr. Budd supposed an unnatural weakness of the tissues of the lung, which is nearly the same as Arand's theory, it is open to the same objections.

III. General Symptoms & Physical Signs.

Vesicular Emphysema is one of those diseases, which appear lost themselves by some general symptoms, appreciable by the sense of touch, sight. When the disease is first manifest, there is an almost habitual
Shortness of breath, with occasional attacks of syncope dyspnoea. The com- 
pliance of the patient has meant a 
more expiration, the lips are congested, 
the vessels dilated, vascular. The 
whole face appears swollen, partly from 
venous congestion, partly perhaps 
from an hyperemia of the respira- 
tory muscles. The patient acquired 
adolescent youth, which, in some cases 
has been accused of such a manner, that 
the face have become almost hori- 
zontal. The shape of the chest is 
altered; it is now cylindrical; the 
ribs being depoligne than natural. 
The clavicles is generally ill defined; the 
emphysematous lungs pressing upwards 
and forwards, at first, at first, at 
depressed it to the concavity, 
which gradually stiff, both above and 
below it. The sternum loses its flatness, and 
appears arched forwards, both into the 
gitudinal, horizontal, directions. The 
intercostal spaces are wider, but not 
smooth, if at all, protruding. The ribs
does not collapse during inspiration as in health, but remain fixed in nearly the same position as they assumed during inspiration. The act of inspiration is arrested, incomplete laughter is a general, but not an essential, concomitant of emphysema, when present, is almost characteristic of the disease.

The chest on percussion yields an abnormally clear resonant sound, from the lung being overdistended with air; and in this way, particular emphysema may be distinguished from pneumonia, which closely resembles it in some of its general symptoms, but gives out a hypersonic sound on percussion. The abnormal resonance may be general, or partial, according to the extent of the emphysema. The evidence of the existence of the disease, afforded by auscultation, is to a certain extent, negative. The
Ventricular murmurs are very indirect from the imperfect expansion of the chest; the diminished quantity of air admitted, and from the large quantity of air stagnant within the lungs, and along with vesicular emphysema, there is always more or less bronchitis, the physical signs of which are mixed up with those of emphysema; so that the patient may have all the varieties of hoarseness, bibulous, sonorous, various, or expiratory rales, according to the extent of the bronchial affection. Sennert, or some others say that, "Any expiratory rales" may be heard in the emphysematous parts, but more recent writers say that they have been able to satisfy themselves of this expedience. "Sound on expiration, say Dr. Watson, "but that which proceeds from the formation of fine, thin, foamy bubbles as air passes through liquids. In the
bronchial tubes." It has been already stated, that the patient is subject to occasional attacks of hyposthenium. During these paroxysms, the patient cannot lie down, but sits up in bed, with his head and arms thrown forward, crossed in front of him, in order to relieve the tension of the abdominal muscles. These attacks become more frequent, as the pleurisy advanced. They are attended with scant bleeding in expiration is generally audible in the lower posterior part of the lung. They occur most frequently during the night, the reason of which appears to be, that the respiration, being principally abdominal, is apt to be embarrassed by the recumbent position, which throws part of the weight of the viscera of the abdomen upon the diaphragm. The pleurisy is essentially chronic and unequalled with
fever. Usually the appetite remains good, so that the patient does not lose flesh.

IV. Complications.

Vascular emphysema is generally admitted, to be the result of pre-existing diseases. There are a few, however, who contend that it is a congenital, and idiopathic, affection, and likewise, that it is hereditary from the being able to trace it from one generation of family to another. But there are not sufficient grounds for considering it a hereditary disease, that is held by most pathologists, that it is not "twin of the original bodily formation," but that a participation to the disease merely in homologous and from parent to offspring. And that under these circumstances the disease is liable to be easily excited.
by looking closely to the diseases of childhood.

The complications of vesicular emphysema are numerous, but there are some of much more frequent occurrence than others. Some of them are looked upon as the cause of other effects of the disease.

The following table, made up by Dr. Gurney, from the reports of post-mortem examinations, conducted by him at the Royal Infirmary, published by him in the Monthly Medical Journal, shows in an accurate, the relative frequency of most of the complications of emphysema.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuberculosis</td>
<td>20.0</td>
</tr>
<tr>
<td>Condensation (Collapse)</td>
<td>67.6</td>
</tr>
<tr>
<td>Bronchial Abscesses</td>
<td>17.5</td>
</tr>
<tr>
<td>Induration and Ulcezyse</td>
<td>25.0</td>
</tr>
<tr>
<td>Constrictions</td>
<td>20.0</td>
</tr>
</tbody>
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Depatization & Tuberculosis, though occurring with considerable frequency, cannot be regarded otherwise, than as merely accidental affections. Neither the causes, nor effects, of Pulmonary Empysemata. In many cases of Tuberculosis, part of the lung is found emphysematous, both to every limited extent, and as to secondary affection. It has been stated by a Continental writer, that Tuberculosis, and Empysemata cannot exist together, but the two grow for one or the other the one of the former, by producing the latter.

The other complications, mentioned in the table, are looked upon as closely connected with the progression of Empysemata, if not indeed its real pathological cause. In the table, Bronchitic collapse, is stated to occur in the proportions of 69.6 percent, but this is an approximation.
as bronchitis, is an almost invariable concomitant of emphysema; and indeed, that bronchitis has been said to be related to emphysema, as Cowper to Effect. The sense may be due to Atrophy which is one of the essential parts of the disease.

Enlargement of the heart is a very common consequence of emphysema, & it is easy to see how this is effected when the disease has lasted for a considerable period. The capillaries of the lung are subjected to pressure, which greatly reduces the quantity of blood they are capable of transmitting, or it may obliterate them entirely, and the blood being thus impeded,ブルル漏れ in the right cavities of the heart, venæ cavae, and gradually accumulates in them. Thus there will be a single dilatation of the right side of the heart, sometimes, though rarely, then.
is frequent hypertrophy, with dilated
sides of the
enlarged, but
the enlargement of the left side of
the heart, can clearly be said to ap-
send on the left in case of.
Records a case of ventricular emphy-
mem, in which "the heart was double
its natural size, both ventricles
being dilated and thickened", but
in this case, the enlargement of the
left side, most likely did not depend
on the emphysema, but, on incompleting
of the atrial, postemiac lumen, valves.
He does not state whether he found
these values healthy or not. As a
Consequence of this obstruction to
the venous circulation, there is severe
congestion, and aneurism. From the
lumen, the lumen also is
frequently found. The causes of
Emphysema is a very frequent cause.
of asthma is the asthma involving the air of all others, that affords the best hope of along life to the patient. During the fit of asphyxia, symptoms, indication of pneumatic inflammation are frequently revealed, but it must be very slight and transient. Lanneau mentions a case in which he found emphysema of the lungs, with suffocation cough, and slight perforation of the lower pad of the right lung.

Vesicular emphysema of itself is seldom attended with much danger. When it proves fatal, it is in consequence of the superaddition of some other disease.

V Treatment

A question has arisen as to the abnormality of vesicular emphysema, and many high authorities maintain opposite views on the subject. Though the discussion is of old standing, all of them...
admit that it is incredible, but when it is of more recent occurrence, it would seem to be susceptible, first of all, of great amelioration, as is shown in a case related by Stokes. The case came under his own case, and after describing symptoms of spotty extension emphysema, and the treatment adopted, he goes on saying, "Coincident with great relief to the symptoms, the following change in the physical signs took place: first, the mortified cleanliness of the affected side, though not removed, was diminished, and terminated at the mucous line, in place of the ulcer, and, secondly, the ulcers became more humid and longer, and the ocular derision was manifestly increased. And finally, the diaphoretic phenomena, like those of percussion, ceased to
In heart, beyond the middle line of the sternum where they had been before visible; and in this situation, they were replaced by the healthy muscles of the opposite lung. Though a complete cure cannot be said to have been effected in this case, it is evident that a great change took place in the morbid condition of the lung. The treatment is principally preventive, care being taken to avoid the injuring causes. Violent exercise, every thing which tends to increase the acceleration of the respiration, obviously favor the onward progress of the disease. Violent mental emotions, the exposure to the influence of cold and humidity, and other causes of asthma, cough, the inhalation of noxious vapours, particles of dust, all occasions of the disease are to be shunned. Attention should be
directed to the state of the digestive organs, the secretions, &c., being preserved in a regular condition, and flatulent distension of the stomach and bowels, being prevented. It is well to keep these objects in view, as respects those whose parents have been affected by the disease; even although they may not themselves have become affected, for it appears from the statements of M. Louis, that the parents of more than one half of those whom he had treated, had been similarly attacked.

Warm clothing, together with the use of the Chinese bath, are strongly recommended.

In adopting any scheme of treatment, we should be careful to distinguish between those cases which are simply in consequence upon organic or other affections. When there is no sign...
influence complications, it is often quite sufficient to administer, with the bronchial irritation. The medicinal agents used in the treatment of emphysema, are numerous. The principal ones are, camphor, myrrh, as well as the hallucines, d'ossian, or extract of poppy, or opium; the decoctions of senna, with an aromatic water; the liquors potassiques, and tincture of the cistula of poisson; the mixture fori compa-

ka, with the alkaline carbonates, and crenolypes, and mercuries; the sulphate of zinc, with the compound uraccharica paste; the compound tincture paste with soap, and the compound galbanum paste. Rub the patient's limbs, or blisters, applied to the chest, or stimulating liniments, rubbed along the superior parts of the lungs, will also materially contribute to the relief of the patient. Inhalation
of various salves or ointments of linseed, "\[illegible\], linseed, or salve, which should include the essence of
"\[illegible\]. Sals, have been made
mentioned by some. Smearing the
"\[illegible\] is often serviceable, but
loose its effect by frequent use.
"\[illegible\] given with caution for
more abuse of it are dangerous.
Lavender, says, that frictions with oil
are very useful, in lessening the
susceptibility to be affected with
"\[illegible\]. Some patients experienced great
relief from drinking an infusion
of coffee, some even during the day.
"\[illegible\], but often with attack at its very commencement. But without
drinking spirit and other in the two
most efficient remedies for the
"\[illegible\]. As the disease is the
result of bronchitis, chronic pneu-
"\[illegible\] to much of the treatment,
which is appropriate to these maladies,
is also suited to it. When symp-
toms of congestion of the lungs state-
continues, and when the complaint
has recently followed these or other
afflictions of the lungs, local applica-
tion, by means of Cupping, or Eau-
dry Cupping, may prove useful. If
local application be adopted, it should
be, before the approaches of the
means just mentioned, are prescribed.
It has been suggested by Dr. Martin,
and St. Hilaire, to try the effects of Epsil-
Onia in this disease, but the contractile
property of the sinuses and tubers, can hardly
the rectitude by other means, than by
those which will promote the general
vasoconstrictor, and health of the frame, and of
vasoconstrictor, in a warm, dry, and more
usually, warmer atmosphere; and attention
at all the digestive and eliminative func-
tions, are the most influential,


Cardiac Hypertrophy.

William B. Gregory.

Just left a good dinner, but might have been
enjoyed with advantage.
Cardiac Hypertrophy.

Hypertrophy of the heart is a disease, the true nature of which has only been recognized since the beginning of the present century. Previous to the researches of Berzin in 1811, it was considered an aneurism or dilatation of that organ, such as to use the comparison of an early writer (Lancisi) "the obstruction or stagnation of fluids might cause in the other viscera." Since the period however, to which I have referred, this as well as other diseases of the heart, has been made the subject of repeated and careful investigation. And it will be my object in the following thesis, to give the results of these observations, in a very concise manner, and the present state of our knowledge of the Causes, Effects, and Treatment of Hypertrophy of the Muscular Tissue of the Heart.

Hypertrophy, according to the general acceptance of the term, and indeed its strict meaning, signifies an excess of nutrition, an increase in the size and
Healthy structure of an organ, usually attended by an increase of its normal powers. It may be considered, in many cases in which it occurs, not so much a disease in itself, as an effort of nature to overcome the results of disease elsewhere. This is always true when it is the result of obstructed function, as in the case of the heart, for example, when the flow of blood from it is retarded by vascular or other diseases, causing, according to a well-known physiological law, an increased supply of nutritive material to the muscular tissue of the heart, and thus enabling it, by an increase of its normal texture, better to meet the demands which are made upon its powers. But increase of action even when attended by no unusual obstacle to the circulation, may produce hypertrophy, as is seen in the instances of many nervous affections, causing continued and violent "palpitations" of the heart, leading ultimately to organic disease.
The classification of this disease usually followed is founded upon the capacity of the chamber affected, as compared with its normal condition, as 1st Simple Hypertrophy, in which there is neither diminution nor increase in the size of the chamber. 2nd Hypertrophy with Dilatation. 3rd Hypertrophy with Contraction. But it will be more convenient for me, at least in treating of the causes of hypertrophy, to speak of them...simply, as they can be referred to obstructed circulation, or not.

1st. The heart may be compressed and the circulation thus obstructed, by diminution of the capacity or alteration of the form of the thorax. Its capacity may be diminished by a variety of circumstances: as by curvature of the spine, crowding the thoracic viscera upon each other; by pressure of abdominal tumours upon the diaphragm; by effusions into the pleuritic or pericardiac cavities; by aneurism of the arch of the aorta. Many of these certainly do not always produce hypertrophy.
The poison exerted may be sufficient to cause death, before there has been time for the "vis medicae in Nature" to produce an increase in the size and power of the organ. And in other instances the poison may have been but temporary, and consequently not adequate to the production of organic disease of the heart, but undoubtedly the tendency is such, according to the physiological law before referred to.

2. The capacity of the chambers of the heart may be diminished by growths in their interior, the only one to be referred to in this place, is that of polypi. That these may constitute an important obstacle to the circulation, is evinced by their size, which in some cases, according to Dr. Hope, is equal to that of a pigeon egg. The effects of their formation, as sometimes rapidly occurs in indurated endocarditis, are those of obstructed circulation; and when recovery from these symptoms takes place, Dr. Gralhe is inclined to believe, their they
have undergone disintegration and solution.

They are generally found in the right cavity of the heart, and are usually it is supposed formed but a short time before death.

3. Valvular Diseases — Diseases of the valves play a very important part in the production of hypertrophy of the heart, for they are among the most frequent causes of obstructed circulation. They depend for their origin chiefly upon endocarditis and are much oftener found on the left than the right side of the heart.

In order properly to explain the affections to which the valves are most liable, a short description of their structure will be necessary.

The valves are formed by a reduplication of the lining membrane of the heart, enclosing fibrous tissue on the margins of their segments, and are attached to fibrous rings which encircle the different orifices of the heart. The fibrous tissue is the part generally affected by opious and cartilaginous degenerations. The serous mem-

Bone is but seldom affected, except by extension of the disease from the fibrous margins.

When the mitral valve is the subject of fibro-cartilaginous degeneration, it contracts, forming a funnel-shaped groove into the ventricle, and leaving an opening between its segments, which permits regurgitation. Or there may be depositions calcareous in their nature, and varying in size, beneath the lining membrane of the valve, should its margins be affected by these, regurgitation may ensue from want of accurate coaptation, or contraction may be produced, the valves remaining quite unimpaired in function.

When these depositions affect the fibrous ring at the base of the valve, a frequent cause of impaired function is shortening and thickening of the chordae tendineae or adhesion of one segment of the valve to the ventricular wall as the result of inflammation. - The valve, however, may be completely unaffected by disease.
and yet closure. By it, if the orifice be rendered impossible, from dilatation of the latter following dilatation of the ventricle, Atrophy of the valve, which is sometimes attended by perforation of its segments, may produce the same effect. The effect of all these lesions, as it is obvious, is to cause regurgitation followed by hypertrophy, and in most cases dilatation.

The aortic valve is also subject to cartilaginous and stenomatosus, as well as opacific degeneration. When the latter takes place, the segments of the valve may lie against the walls of the aorta, permitting free regurgitation, or they may remain fixed in the shut position, contracting the orifice, and at the same time permitting reflux of the blood. Or the valve may be affected by warty vegetations, principally upon its base and free margins, these then incumber its movements, prevent its closure, and contract its aperture according to their size and number. They are usually considered the result of
inflammation.

The manner in which contraction of the orifices of the heart produces hypertrophy, is easily referable to the general law before mentioned, that increased action of a muscle, within certain limits, causes an increase of its normal texture. This is well illustrated in the instances of those, whose employments compel them to use a certain set of muscles constantly, as for example, the muscles of the arm of the smith, or the carpenter, or those of the leg of the cleaner. This law, while applicable to the voluntary, is particularly so to the involuntary muscles. The existence of a stone in the bladder, or of stricture of the urethra, or indeed any obstacle to the free escape of the urine, may produce hypertrophy of the muscular coat of the bladder, or hypertrophy of the muscular coat of the intestines may result from a stricture or obstacle below it.

Failing incompetency of the auricules as an illustration of what occurs
as the other orifices of the heart as well. When valvular incompetency is uncomplicated with contraction of the orifice, we have the following series of phenomena. The left ventricle, when completely filled with blood from the auricle, contracts propelling its contents into the aorta. This, when thus distended, owing to the elasticity of its walls, contracts upon the contained blood, which compelled either to advance or flow back into the ventricle. In the normal state of the parts propelled through the vessel first attempts at regurgitation having the effect of closing the valve, but when this is insufficient for the closure of the orifice, a portion of the blood is forced back into the ventricle, which already partially filled by what has flowed from the auricle, during the part of the period which has elapsed. Upon the contraction of the latter receives a superabundance and hence in the first place, a gradual yielding or tendency to yield in the sides
of the affected chamber, from the continual
and unceasing pressure of the accumula-
ted blood against them, and an attempt
upon the part of the muscle to overcome
this pressure, and consequently an increase
in the bulk of the muscle, the function
of which is so much increased, in other
words causing in most instances hyper-
trophy with dilatation, for the exciting
causes of the one are often the same as those
which produce the other. Constancy pressure
and distention by blood, as in engorgement,
causing constant engorgement of a
cavity, is said to be a far more prolific
cause of hypertrophy with dilatation, than
simple contraction of the orifice by which
the blood leaves the chamber; for in the
latter case, the ventricle is almost or
perhaps completely emptied for a time,
and is free from any distending cause.
— Valvular disease, however, is not
always productive of hypertrophy.

Stokes/Diseases of Heart and Aorta page
285 remarks, that although dilatation
and hypertrophy so frequently coexist with alterations of the valves, yet there they occur either as independent affections, or with an amount of valvular disease so insignificant as to constitute an unnecessary and accidental complication, and that it is still to be determined whether the cavities of the heart are liable to change from mechanical causes alone. And speaking of valvular insufficiency he remarks, they are cannot deny why in one case, the cavities become hypertrophied and dilated, while in another an indisposition to this change appears to exist, and suggests that when there is dilatation and hypertrophy, there must be some vital alteration or organic change in the muscular structure. The patients mode of life would probably go far to explain the occurrence of valvular obstruction without hypertrophy and dilatation, for when exposed to but few of the causes mental and bodily, which tend to excite the circulation, the heart might still
be able, without a marked increase of function, to supply the demands of the system. The right ventricle may become hypertrophied, owing to pulmonary venous congestion, dependent on their upon a contracted mitral orifice, or upon such diseases as emphysema, asthma, by which the circulation of the blood through the lungs is continually obstructed.

What has been said of the left chambers of the heart, applies with but little difference to the right. The affections of the valves are the same, they may be thickened, contracted, orifice, and the result of obstructions. As regards hypertrophy, is essentially the same, although deeper perhaps in degree, as on the left side of the heart.

Hypertrophy of the heart may be sometimes caused by adhesions of the pericardium, this being a serious mem-
brane, is liable as a result of inflammation to be affected by adhesions of its opposing surfaces, when these as is some
times the case, are not prevented from coming into contact by effusion of fluid. When the adhesions are universal, death is very likely to be the result, but when partial and the consequence especially of chronic pericarditis, hypertrophy is often produced. This, however, is not an invariable result, for it has been ascertained, that the formation of false membranes is sometimes followed by an atrophicd state of the muscle, although it may be a question in these cases whether the atrophy did not precede the formation of the adhesions.

Dr. Sinclair (Monthly Journal 1857) remarks upon this subject that "as adherent pericardium may in certain cases result in extreme hypertrophy, yet that in other cases it may not only fail to produce this effect, but, appear altogether powerless in opposing the atrophy of the heart, resulting from chronic disease." Thus this is a frequent cause of hypertrophy, appears
however, very evident from the observation of Dr Hope (Diseases of Heart, page 192), that he had never examined after death, a case of complete adhesion, without finding enlargement of the heart, generally hypertrophy with dilatation.

The tendency of puricardial adhesions to produce hypertrophy, is doubtless much increased by its coexistence with endocarditis, resulting in valvular disease, as well as with other affecting morbid causes, such as fever, despair.

It doubtless exercise some influence in producing cardiac hypertrophy. In some instances, in which nervous "precipitations" are frequently caused or long continued as for instance in prolonged anxiety, the manner in which increase in size and functional power is produced is obvious, for the heart is excited by mental emotion, to increased rapidity of contraction, and hypertrophy may follow as explained in a previous paragraph. — M. Beece, a writer in the
Archives Séniales de Médecine for Jan. 1853, explains the effect of depriving moral causes, by their debilitating influence upon the heart, resulting in dilatation, their organ not being able to empty itself completely at each contraction, and that then the conserving tendency of nature is shown in producing hypertrophy, in a manner similar to what occurs in the stomach and bladder, on which organs we sometimes see the muscular fibres manifestly hypertrophied, when their functions have been for a long time disturbed and their contractile power diminished. At present, however, it seems to be the opinion, that the instances in which, mental emotions are the sole exciting causes of Coroiic Disease, are not many.

Dethorne, too, although perhaps not often an exciting cause of this disease, may certainly act as a greatly aggravating one. The blood is richer and more stimulating th•...
acting under this increased stimulus is increased in the force and power of its actions.

Anemia also is a most untoward complication of hypertrophy, and if not remedied hastens the disease on to a fatal termination.

Violent exertion is doubtless a frequent exciting cause of hypertrophy of the heart, and the mode in which it is so, can be explained. I think in the following manner. The effect of the contraction of the muscles is to hasten the circulation. 1st. By the undoubted sympathy which exists between them when in exercise, and the heart. 2nd. By the pressure they exert when in action upon the veins and arteries in their vicinity. In the instance of the veins, the blood is forced either onwards towards the heart, or backwards, but its first attempt in the latter direction is prevented by closure of the valves which occur at frequent intervals in the veins, and it is thus propelled either
through its original channel, or more often perhaps, by means of anastomosing veins, with increased force towards the right side of the heart. The blood when thus returned in greater than its normal quantity to the heart, produces increased and violent action of that organ, which thus propels an increased quantity through the lungs to the left auricle and ventricle, which in their turn become likewise overburdened. Greater force is also doubtless required to propel the blood through the arteries, although the circulation is less obstructed in them by active muscular exertion than in the veins, indeed, in the latter. It is, as shown above, hastened owing to the valvular arrangement, which does not exist in the arteries. The heart, called on by the above circumstances, for increased functional performances may become hypertrophied. And it is in protracted efforts, as one would naturally suppose, that this effect is most apt to be pro-


Units among the causes of the state of the E15 in the British Empire
duced. But violent exertion, even when of short duration, may have a similar result, often indirectly, by producing insipid and inflammation of the valves and aorta, resulting in incurable organic disease.

Mental emotion and excitement are doubly often conjoined with bodily exertion in thus stimulating the heart's action.

Dr. Hope is of opinion that inflammation may also be a cause of hypertrophy, independent of any valvular defect or adhesion of the pericardium, for he believes he has seen a certain number of cases of hypertrophy, in which it was evidently elicited from attacks of acute rheumatism attended with inflammation of the heart, and in which the valves and pericardium were unaffected.

**Effects of Cardiac Hypertrophy.**

Hypertrophy of the heart may be either general or partial, as affecting the whole organ, or only one or more of its cavities. The partial form is the more common. When general, it may be in-
increased to three or four times its normal
weight, and in some rare instances, far
more. When premature, the left ventricle is
the heart generally affected, and when
this exists to any great degree, the interior
arrangement of the heart may be greatly
altered, especially if the interventricular
septum be included in the disease, for a
flattening and diminution of the capacity
of the right ventricle may ensue, its base
pushed, as it were, upwards and to one side.

When the right ventricle however, is only
affected, it may constitute the sole apex of
the organ, the course of which is true in the
normal state of the parts.

No considerable change, of course, can
take place in the size of the heart, without
a corresponding alteration of its form and
position, and the following are the appear-
cances it generally presents. Its apex is
almost obliterated and lies external to
the nipple, corresponding to the sixth-
seventh or eighth intercostal spaces.

Its base approaches more or less near to
the claricle, for the position of the heart, in some instances in which its hypertrophy has been the result of pericarditis, is higher owing to pericardial adhesions, than its gravity would otherwise dispose it to assume. In most instances, however, if its unusually horizontal, and shows a tendency to assume the globular or spherical form. In all marked cases of hypertrophy, the heart can be felt or even seen, beating to a much greater extent than normal, over the left side of the chest, and even the pit of the stomach. The increase both in the force and the space over which these shocks extend, can be easily distinguished by placing the hand over their part of the chest. The action of the heart is not, however, usually more frequent, then in the state of health, unless it be excited, which is easily is, by slight exertion, emotion etc. The sounds of the heart are modified in hypertrophy. They become dull and stifled, for as the muscular
substance is increased in quantity. It becomes less fit for the transmission of sound, rendering it probable that the sound emitted by the superficial fibres alone during contraction, is heard distinctly. In health, too, the first sound of the heart is supposed to be rendered clearer and more distinct, by the vibrations of the auricular-ventricular valves, made tense during the ventricular contraction, and increased, perhaps, by the suddenness with which these valves are put upon the stretch. How a hypertrophied heart "from being thick and unyieldy, contracts slowly and with a gradual progression" and consequently the closure of the auriculo-ventricular valves is sluggish, and is attended with a jerk just of extension both of the valves and the chordae tendineae as well as the ventricular walls. (Hope).

The second sound is diminished for a similar reason, for the diastole as well as the systole being more sluggishly performed than in health, the "acme of the
blood on the sigmoid valve is felt sharply.

The first sound, however, in hypertrophy with dilatation, is increased in some cases to a very great extent. The second sound in the same complication, is also sometimes increased, by the quick diastole of the heart, and by the increased tension of the arteries, from the more than ordinary quantity of blood injected into them, producing a short, vigorous recoil, when the diastole takes place. The sounds of the heart may be altered also, by diseases of the valves, and other morbid conditions connected with hypertrophy.

Hypertrophy of the heart has a tendency to produce a fullness or congestion of the vascular system. This tendency may be counteracted, it is true, by other diseases diminishing the orifices by which the blood leaves the heart. The evil effects, for instance, which might result to the brain, from hypertrophy of the left ventricle, may be prevented by a narrowing of the aortic orifice. And indeed, these
diseases, as in a case mentioned by Dr. Hope, may so counterebalance each other, as to permit
the person affected to reach even an advanced age without symptoms of heart affection.

An appearance of plethoric or robust health
may be imparted by the fullness or tinge
ence of the vascular system produced by
this disease.

When the hypertrophy has proceeded
to such an extent as may suffice to
keep the capillary vessels in a highly
distended or congested state, or when
the same is produced by valvular
disease or other obstruction to the return
of the venous blood, the complexion may
become purple or even livid, the respira-
tion hurried and difficult; serous
infiltration of the cellular tissue or
purpura hemorrhages may result. The
ability, however, of simple hypertrophy
to produce these latter conditions is
 doubted by Dr. Maleine, who asserts that
the opinion is maintained upon purely
speculative grounds, and seems incli
med to think, that increased tonicity of the smaller vessels often accompanies, and
prevents the evil effects which might otherwise ensue from simple hypertrophy.

Boziclause seems also to hold the same opinion, and thinks that simple hyper-
trophy rather lends new energy to the
course of the blood, and asserts that one
might as well maintain that the "broad
shoulders of the porter, the muscular
arms of the mallet, and the well developed
legs of the dancer would unfit them,
respectively, for the proper performance
of their duties, and refers to a case recor-
ded by himself (No 113) in which there was
great and uncomplicated hypertrophy.

so great as apparently to have been the
exciting cause of the attack of apoplexy
which terminated the patient's life, and
in which there was no lividity of the face,
venous engorgement or infiltration (page 321).

- The uncomplicated form of hypertrophy
- unless it be developed in a remarkable
degree, generally interferes but little with
the health. The complication of hypertrophy with contraction of an orifice, valvular disease permitting regurgitation, or other disease obstructing the circulation is much more formidable, producing attacks of urging dyspnoea and palpitation. The efforts of the heart to overcome the obstacle but aggravating the evil—Dilatation is also a most untoward and one of the most frequent complications of hypertrophy. The manner in which it may be caused in connection with hypertrophy has been explained in a preceding paragraph. — But to examine more in detail the effects of cardiac hypertrophy especially upon the organs which are chiefly affected by it, namely, the brain and lungs. — The vessels of the brain may become congested, giving rise to headache vertigo with a liability to terminate, according to some, as a more advanced period of the disease in apoplexy or acute encephalitis. For hope who supports this opinion accedes in its favour, thirty.
nine cases of fatal apoplexy, occurring in St. Marylebone Infirmary during two years.
In twenty-seven of these cases of nearly three fourths, there was accompanying disease of the heart. And as those periods of life at which heart disease is most common from forty to fifty, and from seventy to eighty, there were eighteen out of twenty who had concomitant disease of the heart. This view of the question certainly appears most reasonable, and is the one which most writers on the subject advocate. For the propelling power of the heart increased slowly there would be a greater tendency to rupture of the vessels at those parts where they are diseased; or but feebly supported, as in the cerebral substance, then when the heart exerts but its normal power. Dr. Latham seems also to hold the above view, for he asserts that fatal affection of the brain may be entirely the work of the heart. Once again, the heart by the simple scheme of its action, has the power to kill and to kill.
through the medium of the brain," and refers to a case in support of this statement. Dr. Malleshe, however, adopts the other side of the question, and thinks it is controverted by the evidence we at present propose upon the subject. It appears certain, however, that cardiac hypertrophy being pleurs but a part in the production of cerebral hemorrhage in most if these cases, a predisposition created by calcareous and other degenerations of the cerebral arteries coexisting. The congested state of the cerebral vessels, caused by hypertrophy of the heart, may obviously predispose to inflammation of the brain, and may thus be fairly enrolled among the causes of encephalitis.

2° The lungs are not affected to any great degree by simple uncomplicated hypertrophy. But when it is combined with some obstructive disease, as for example— at the Mitral Valve, congestion of the lungs and even pulmonary
appropriately measured, dyspnoea, upon slight exertion, is often present early in the disease, and is very rarely absent in the more advanced stages. Unless, however, there exists some very serious obstacle to the circulation, these attacks are usually transient, the engorgement being soon relieved by the pulmonary veins. The dyspnoea, in some instances, continued and most urgent, the patient being unable to assume the recumbent position, from a feeling of impending suffocation, since this may continue even for days, or until death takes place. According to Dr. Hope, serious infiltration may also occur, even in cases of simple hypertrophy, but generally there exists some obstruction to the circulation.

Hemoptysis may also ensue, usually as the result of Venereal Diseases with hypertrophy.

It is nearly impossible to diagnose hypertrophy of the arteries, when it
exists alone, but it is usually found in connection with the same affection of the ventricles. — The right ventricle is sometimes, though rarely, hypertrophied alone. It is then recognised by increased impulse and dullness on percussion under the lower part of the sternum, by the absence of the pulse characteristic of hypertrophy of the left ventricle, and by the pulsation or dilatation of the jugular veins. It is also said by Boileau, that it is liable to be accompanied by expectoration of pure arteriæ blood, from time to time, but this Mr. Hope considers doubtful, and should it occur. It would probably be only when the hypertrophy depended upon an obstructed Mitral Orifice. — In hypertrophy of the left ventricle especially when combined with dilatation, the dullness is greatly increased, extending in some very well marked cases, from the second intercostal space to the eighth rib, and from an
...ich and a half to three inches and even more outside of the outline line of the nipple. There is a widening and fullness of the left intercostal spaces, the pulse is strong, tense, vibrating. The complexion florid, and glandules, headache, bleeding at the nose to frequently occur.

Treatment. Physicians differ as to whether this disease is curable or not. Two of the most eminent authorities upon the subject, Laennec and Hope, maintain that it is, although they differ widely as to the means by which this desirable object is to be attained. Others, however, and men of almost equal note, as Latham, Raleigh, and Stokes after their publication is the utmost limit of our art in this disease. The plan of treatment recommended by Laennec, and by which he stated he had effected many cures, was their first proposed by Valsalva and Albertini, namely, by means of frequent venesections and cow dries
reducing the patients to the constant
of strength, consistent with life, and
continuing this condition for many
months, this practice, even when sub-
mitted to by the patients, had usually
the effect of aggravating the disease,
although some of the symptoms might
be benefitted at first, "in short time
then exists the state of anemia which
is invariably attended with a quick
jerkings of the bones of the heart and arteries,
precipitation and breathlessness on
excitation or excitement, and a disposi-
tion to serous infiltration.

The treatment Dr. Hope has found
most effectual is to diminish the
quantity, without materially detei-
nating the quality of the blood, and
to diminish the force and energy of
the heart's action. The mode in which
he accomplishes this is by small
bleedings to the extent of four or
eight ounces, repeated generally
at an interval of some weeks, but
frequently enough, to keep down dyspepsia, and other symptoms of a violent action of the heart. The circulation of properties should never be hindered by exercise or excitement of any kind.

The diet should be sufficiently severe to secure the principles of treatment mentioned above. This, as indeed the whole treatment must very much according to the nature of the case, plethora and anemia evidently requiring almost opposite modes of treatment. A dry diet, especially when plethora exists, and the gentle use of purgatives have been found of great use. Diuretics have been used with great advantage, even when they have not been rendered necessary by the presence of pathological effusions.

When there has been much irritability of the nervous system, as evidenced by palpitations and especially when not conjoined with anemia, the use of sedatives seems especially to be in-
The sedatives which have been principally used in this disease, are 
digitalis, hyoscyamus, comum, morphia, either alone or variously combined. 
Digitalis, Boerhaave speaks of it as "the 
true opium of the heart." He has used it 
chiefly as an endemic application 
in the following manner. A blister is 
applied over the precordial region, 
and from six to fifteen grains of powdered 
digitalis, sprinkled on the vesicated 
surface. This, he says, diminishes as 
by enchantment the number and force 
of the heart's actions. The local abstraction of blood by blisters or cupping, from 
the precordial region, exerts often a 
surprising effect in checking the violence 
of the heart's action, especially when the 
internal administration of digitalis 
or hydrocyanic acid is combined 
with it. Opium, chloroform, Indian hemp, 
have all been used with advantage, as 
well as the remedies mentioned above. 
as narcotics in this disease, especially
When the excited action of the heart is attended with pain, stimulating treatments are sometimes found necessary. Generally, when the hypertrophy is dependent upon a permanently patent state of the aortic valves, and it is in this class of cases especially that repeated and excessive venesection is most obviously contraindicated, for as previously shown, the hypertrophy when owing to valvular disease, is in fact a conservative effort upon the part of nature, and the object of treatment should be to restrain this effort within proper bounds, or else to cure the disease upon which it depends. The latter unfortunately can be but seldom accomplished, thus confining our attempts too often, merely to the palliation of the patient's sufferings. Not that medicine is entirely powerless in this disease, doublet much may be done, in many instances, by a proper regulation of the patient's mode of life, and the judicious use of remedies.
towards the prolongation of his existence. And in some rare instances, in which the hypertrophy is uncomplicated and the health in other respects good, there may even be a reasonable hope of permanent cure, but this unfortunately, is but seldom the result of even the most judicious treatment.