Thesis

On the Pathology and Diagnosis of Aneurism of the Arch of the Aorta and Innominata, the peculiarities that distinguish them from one another and from other diseases.

By
Thomas Seward Holland
candidate for the degree of M:D
in the
University of Edinburgh

- 1850 -

Contents.

- Preface -

We have chosen Thoracic Aneurisms for the subject of this Thesis, first, because of their importance - This will be best seen by reference to the Registrar-Generals Report for 1840, in which year one hundred and forty seven deaths are returned as caused by Aneurismal disease; - and in 1846, fifty two deaths occurred in London from the same cause* - In this Report, which includes the Mortality of England and Wales, more than 8000 deaths that occur annually are not accounted for, and Apoplexy is assigned as a cause for many of the cases of sudden death. - There can be but little doubt, that many of these so called deaths from Apoplexy, were in reality caused by the rupture of diseased Vessels, Sudden death from the former being a very rare event. -

Secondly - because much obscurity still exists in the diagnosis of these Internal Aneurisms, and though of late years particular attention has been directed to this subject (especially in the Irish School of Medicine) still, the difficulties are far from being all removed - and

Thirdly - That from having paid particular attention to these diseases (in the South & North Infirmaries Cork, under Drs Harvey and Lloyd. and also in Dublin, under Dr Stokes to each of whom we beg to return our best thanks) we hope to be enabled to give more satisfactory and scientific reasons, than has been

* see Preface to Dr Crisps book on diseases of arteries

hitherto done, for some of the facts observed in this (Aneurism) Theology and having made it a subject of special study, we believe we will be enabled to state the diagnostic signs which distinguish Aneurisms of the arch of the Aorta from those of the arteria innominata, with a degree of accuracy, which this part of diagnostic Medicine had not before obtained.

Therefore,

We lay these observations before the Medical Faculty of this University, hoping to obtain at their hands that indulgence, which a junior should ever receive from his Seniors.-

35 Leith Street
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- Thoracic Aneurisms -

Part 1st On the Structure of the Arteries and The Otiology of Aneurism -

We would define an artery as, A vital or organized tube, having no opening, through which flows a fluid called Arterial Blood, and passes through its walls to supply the various parts of the organism - The walls of arterial tubes are composed of different tissues forming the coats or tunics - The number of these coats are stated differently by various authorities - Harrison says "they are composed of Three principal coats" but that "minute anatomists aided by the microscope subdivide these coats, and the arterial tunics may therefore be enumerated as seven in number viz 1st The cellular or fibro = = cellular 2nd a thin yellow elastic one most distinct in the large tubes 3rd a lamina of circular fibres similar to those of the non striated involuntary muscles 4th Longitudinal fibres of the same structure as the last mentioned 5th a layer of cellular tissue 6th Basement membrane 7th Epithelium." Dublin Dissector Vol 4 Page 405

Henlé describes Six coats viz The external or cellular The fibrous. The longitudinal or granular - The penetrated or Striated - The epithelial. — Guthrie says "an artery may be divided by minute dissection and maceration into many layers at the pleasure of the anatomist. but that it separates readily into Three, The Internal, Paget's Retrospect 1844

Guthrie on the arteries Page 1st

Dictionary of Practical Med: article-Arteries
Crisp on Blood-vessels Page 1

Middle and External - Lucain describes the same number. & Copland considers the number of the arterial tunics to be Four and in this opinion he is borne out by & Crisp

The division into Seven coats is quite unnecessary, if not erroneous; as the last three tunics are not distinct coats but are the elements of the Internal, viz. the Condensed areolar tissue, Basement Membrane and Pavement Epithelium which go to form the compound Membrane called Serous - That the Internal coat is in all respects a true Serous Membrane, is proved 1st By its consisting of the elementary structures that constitute Serous Membrane generally.
2nd By the inflammation of this coat ending in the effusion of Lymph, often followed by adhesion of its walls.
3rd By the other products of inflammation or other diseased action (as pus, atheromatous or calcareous deposits, tubercle &c) occuring, not on the free surface of this coat, but in the Subserous tissue connecting the Internal & the Middle Coat.
4th By its forming a Shut Sac, the Membrane being continued from the Ventricles through the arteries & Capillaries to the Veins and thence to the right side of the heart.
& Crisp appears to doubt the existence of Epithelium on the Internal coat for in the first page of his book on the Blood vessels we find him stating that "it is questionable whether the

Epithelial lining, if it exists, can be considered to form a distinct coat" Now the term Arcous Membrane used by Dr Crisp as synonymous with the internal coat necessitates its existence, for the Arcous Membrane lining the blood vessels has the same Essential Structure as that in other parts of the body, differing from them perhaps in its epithelial cells being more frequently thrown off and replaced; though it cannot be considered as forming a distinct coat for the reasons just stated -

We shall adopt the division of the coats as held by Dr Copland and Dr Crisp, and say, that they are Four in number, namely 1st The External - This is a fibrocellular Membrane whose external surface is loosely connected to the "Sheath" which latter is composed of condensed cellular Membrane serving to seperate the Vessel proper from the surrounding Textures. Where the internal coat joins the Second or fibrous Tunic its texture becomes closer, therefore more fibrous & less cellular. The difference in density of the external and internal surfaces of this coat and its fibrocellular Structure, render it capable of great distention, as well as great resistance & on the presence of this coat depends in a great degree the Strength of the Vessel -

2nd The Fibrous often called the Middle or proper Coat. The composition of this Tunic has formed the subject of much debate. Guthrie is of opinion "that no longitudinal fibres can be discovered & it is possible that the folds seen in the inner membrane may have given rise to this opinion"

Dict: Pract: Med: art: arteries 4th Classe

Dr Copland agrees with W Guthrie that "no longitudinal fibres can be detected in arteries". Duncan believes it to consist of pale straw coloured fibres curled obliquely round the circumference of the vessel, but none forming a complete circle Dr Crisp considers it to be "composed of four circular fibres. These may be divided into several layers; they are of a flattened form" and their direction generally transverse. According to Lieberkuhn and Malgaigne they run in a spiral direction, and may be traced two or three times round the vessel, while others describe them as forming perfect circles. He believes it to consist of a layer of yellow elastic tissue ranged longitudinally & of annular fibres resembling very closely the involuntary muscular coat of the intestinal canal - It is to the yellow tissue in this coat that the arteries owe their Elasticity, this property being physical and continuing for some time after death; but the truly vital property of Contractility on the application of a stimulus, belongs to the annular fibres of this coat and this it possesses in common with all true Muscular fibre. The longitudinal fibres are best developed in the great vessels, as in the aorta, particularly at the arch, where they serve to break up as it were the alternating waves of blood sent from the heart & thus to change an intermitting current into a regular and continuous stream. The Elastic tissue of arteries acts the same part as air in the air vessel of a fire engine, for in one case elasticity

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see Carpenters Physiology p564

of compressed air and in this the elasticity of fibres converts the stream which is at first per saltum, into a continued jet. But in the air vessel of an Engine there is a loss of power, as it is necessary, first, to compress the air, this loss being avoided by the naturally elastic arterial coat: arteries also exhibit a property or rather a modification of their contractile power, called Tonicity, which is increased by cold and diminished by warmth -

* 3rd The Subserous coat or the Second cellular tunic of Haller This is interposed between the Fibrous and the most internal coat (which will next be described) according to Krisp, it is a hard opaque membrane of a whitish colour, less distinct in the young than in the middle aged, very dense in the apoplectic and in those affected with Hypertrophy of the left Ventricle. It is in this tissue that the ultimate branches of the capillaries which supply the coats of the Vessel terminate and here also the ultimate distributions of arterial nerves may be supposed to ramify, though they cannot be clearly traced further than the proper fibrous tunic, where Dr Copland "has distinctly followed them".

Arterial Nerves

We may consider this tissue as forming an Internal Sheath which separates the true wall of the vessel, namely its internal coat, from the external supplimentary coats -

As the Subserous tissue is most vascular of all the arterial tunics it is here we would expect to find diseased

* For a detailed account of this tunic we refer to Dr Norman Chevers admirable paper in the 5th Vol of Guys Hospital Reports P40-

action most frequent, and it is in this coat that the products of disease are first deposited, in fact, it bears the same relation (Stokes Membra
to the internal coat of the vessel as the Subserous tissue does
to the Pleura - We may here notice what we believe to be a
general rule, viz That morbid deposits are not formed
at first on the free surfaces of serous membranes, but
rather that they are first laid down in the subserous tissue,
and afterwards extend to the serous surface; of this we have
good examples in Tubercles occuring under the pleura, in
schirrus and atheromatous deposits under the peritoneum,
& in lymphatic and osseous deposits under the pericardium.
The reverse of this appears to be the law that regulates these
depositions when they occur on Mucous membranes,
their free surfaces are most liable to be affected by disease,
for example. Tubercular deposits on the free surfaces of the
mucous membrane of the bronchial tubes and intestinal canal;
this occurs so frequently, as to lead Dr Carswell to believe that
tubercles always occurred first on free mucous surfaces -
polypoid growths are another instance of diseased action
occuring on mucous membranes, and when their inflammation
ends in deposition of lymph it is confined to the surface
of the membrane, from which it is mechanically detached by
an exudation from the membrane on which it rests - as in Croup.
There is however an exception to this latter rule in the case
of Stricture of the Urethra, in which the lymph is beneath the mucous
membrane.

Coopers first Lines of Surgery 7th Edition p 249 -

Mr Cooper observes that Malgaigne gives this coat the name of "Sclerous" & that osseous deposits almost always occur in it -

4th The Serous or Internal Coat.

Is in all particulars a true Serous membrane and therefore does not require any further description than has been already given at Page Two - "It is penetrated by vessels carrying red blood when inflamed" Dr Crisp has never seen this injection of the Serous coat nor have we ever been able to observe it in the pleura when inflamed It would appear more probable that this appearance is owing either to interior injection of the vessels of the subserous coat being seen through the transparent Serous membrane, or that the inner coat becomes acted on and discoloured by blood in contact with it, consequent on

1st Change in the blood itself from a general lesion of that fluid.

2nd Change or loss of vital energy in the membrane by which it was enabled to resist the action that the blood would otherwise have had upon it - as is proved by the internal coat being stained by blood after death -

3rd Some deposit underneath the membrane obstructing in a degree the free passage of the circulating fluid, and thus causing blood to remain longer in contact with that part of the vessel than it would otherwise have done -

4th This adventitious deposit separates the internal from the subserous coat, and in this way cuts off its nervous supply; the blood is then passing over a part of the vessel less organized or vitalized than natural, which tends to make it coagulate and deposit its colouring matter & this readily stains the

inner coat now unable to resist its action.

In cases of Jaundice in which the Inner coat of the arteries has been coloured yellow, we consider it able to have acted directly on the serous coat from contact of the blood in the calibre of the tube, and not by being injected into the minute capillaries that supply the coats.

While we state our belief in the existance of Four distinct coats in the arteries, and although these coats are most distinct in the great vessels with which we have to do. Still, in following out our subject we deem it better to adhere to the old division into Three tunics, an External, Middle and Internal - by doing this we avoid complexity in description & follow the example of most of the authorities on this subject - furthermore, in dealing with disease as Physicians, the less we complicate it with terms, the less we enter into discussions regarding the ultimate structure of the parts, the clearer and more definite will be our Idea of the case before us - The difficulties are quite sufficient in themselves without our superadding to them by over defining.

Our duty is, to glean from the collateral sciences, the established facts, in order that, they may help us through the intricate path that leads to a correct diagnosis, and from thence to a rational, scientific and if possible successful treatment —

The word Aneurism (from the Greek ἀνεύρυσμα) means simply a dilatation, hence any enlargement of a vessel would in this sense constitute an aneurism, but as these dilatations differ both in their size and form, as well as in the number of coats engaged in forming the enlargement, it has been found necessary to classify them and give particular names to each of the different kinds. But this classification has its limits beyond which it becomes not only useless for all practical purposes, but also inadmissible and only tends to render the subject exceeding complex.

Lisfranc defined an aneurism to be "a tumour formed by arterial blood communicating with an artery" and he divided them into two kinds, namely, Traumatic and Spontaneous.

Mr Coopers definition in his elaborate article on Aneurism is only a modification of the one just given, with this addition "That pulsation usually attends it"

Mr Guthrie describes it as "a dilatation or rupture of a part or of the whole of the coats of an artery, but without any external communication which would render it either a wounded artery or a ruptured aneurism" but Mr Cooper has mistaken Mr Guthries meaning for after quoting the above passage Mr C remarks "that according to this opinion Aneurisms are

of two kinds viz true and Spurious or false." now this is not Mr G division for he describes 1st a dilatation of the
Page 47 whole circumference of an artery in which "no blood is deposited by coagulation in concentric layers, the circulation continuing throughit" and he separates this dilatation from what he considers true Aneurism, by remarking "that when the pretmatural
Page 49 dilatation has proceeded to a great extent coagula are formed in it, but these have more the appearance of accidental and irregular formations than of concentric deposits in layers"
2nd True aneurism, to constitute which Mr Guthrie believes the walls of the artery must have dilated at some one spot not including the circumference but on one side of the vessel only & frequently in a small space. the internal and Middle coats being found perfect."
3rd The Sacculated Aneurism of Mr G consists of a true aneurism forming on a previously dilated vessel or in other words it is a true aneurism superadded to a pretmatural dilatation -
4th False Aneurism, caused by the rupture of the Middle and Internal coats & the dilatation of the External.
5th Mixed False aneurism or that in which a false aneurism forms on a true one so as to "give the tumour the appearance of one swelling rising over the other"
6th Mixed Internal aneurism formed by a protrusion

of the Two most internal coats through the External, which latter has been ruptured either by mechanical injury or diseased action - Mr Guthrie doubts the existance of this Kind of Aneurism Boyer also denied it in his book published in 1818 fourteen years after Dubois and Dupuytren exhibited a preperation of this Kind of Aneurism before the Faculty of Medicine. Paris. Brechet has proved the existance of these mixed Aneurisms in other arteries than the aorta - his first example was the protrusion of the inner coat of the popliteal through the fibrous and covered by the external - the next occurred in the left common iliac - There is a fine Specimen of this disease in Mr Listons collection in the London College of Surgeons Museum - We have here a good illustration of confusion resulting from the application of the Same Name to forms of disease altogether different, for we find Dr A. Monro using the term "Mixed Aneurism" to imply the State of a true aneurism when its Sac has burst into the Subjacent cellular tissue. Mr Coopers classification is into 1st True Aneurism which he subdivides into Circumscribed and Diffused 2nd False Aneurism - subdivided into the (a) Circumscribed False, in which the Blood is contained in a defined sac formed by External cellular coat, & (b) Diffused False aneurism, where the vessel has ruptured

Monro's Obs: in Edin: Med: Essays -

Article in the Dictionary of Surgery -

and the blood is diffused into the surrounding tissues - Copland again subdivides diffused false Aneurisms into 1st Primary diffused in which the walls of the vessel are ruptured or perforated at once, blood passing out of the vessel forms no sac but is diffused into neighbouring parts 2nd Secondary diffused aneurism or where we have a false aneurism existing for some time and afterwards rupturing - Perforation & rupture occur most frequently in the internal vessels (for a good example of this we refer to a case of rupture of the pulmonary artery in a sailor occurring without any premonitory symptoms reported by Mr Lyons R: N:).

Edin: Med: & Surg: journal Vol XXXVI P 20

Dr Crisp objects to the term Spontaneous as used by Liesfranc as he considers the greater number of aneurisms whether seated in the cavities or limbs are produced by external injury or great mental and bodily excitement and he proposes that the word "Endogenous be substituted for Spontaneous when speaking of that form of disease which arises from lesions of the inner coat, and that Exogenous instead of Traumatic be applied to those which are produced by external division of the arterial walls" - Breschet divides aneurisms by dilatations into four varieties, which includes both aneurisms by anastomosis and erectile tumours - they are 1st True Sacciform aneurism 2nd The True

Pages 109 & 110

Breschet Sur différentes espèces d'anevrisme: P 12 - 1834 -

Fusiform 3rd True Cylindroid which he subdivides into those that occur on large & on small arteries, the latter forming the aneurism by anastomosis of John Bell and the erectile tumours of Baron Dupuytren 4th The aneurisma Cypsoideum or true varix-like aneurism

Mr Porter on Aneurism Part 1st Page 31.

Mr Porter divides aneurisms into Eight varieties in six of which the blood is withdrawn from the usual channel of the circulation & in the remaining Two it is permitted to enter the circulation - these are - 1st True - 2nd False 3rd Mixed aneurisms formed by the two internal coats of a true aneurism yielding and a sac rising above the vessel formed of the external tunic" in this case the sac at its root and next to the vessel consists of the Three coats - more remotely and where distended of the external coat alone. 4th False dissecting Aneurism in this the blood insinuates itself between the Middle and Internal coat - 5th Diffused aneurism 6th A form of disease only described by Mr Porter in his article on this subject in the Cyclop: of Practical Anatomy "It seems to be formed by a dilatation of the fibrous and cellular coats and the absorption of the internal lining. It appears to be so far a true aneurism as that the artery is uniformly dilated around its entire circumference; and it is so far a false one, that the lining membrane has been removed" 7th Aneurismal Varix which consists in an opening

which remains prominent between an artery and its accompanying vein so that the admixture of the blood is constant In this case there is no Sac. (hence any definition of aneurism which necessitates the presence of a tumour would exclude this form of disease and must therefore be faulty) -

6th Varicose aneurism - Where a tumour intervenes between the artery and a vein through which the communication is kept up between them.

This is the clearest and most concise view of the subject with which we are acquainted -

The Predisposing Causes - or remote causes - Syphilis and the abuse of mercury is considered to act a prominent part in predisposing to aneurism. by Scarpa Richerand Cooper Carl Porter and Hodgson & Dupuytren and Bouillard regard them as predisposing to arthritis, while Guthrie and Mr Crisp doubt the accuracy of this observation. Particular occupations are regarded by some as tending to developper this affection, postilions & coachmen are considered as the class of the community most frequently affected with popliteal aneurism - In France the men who clean out dissecting rooms and procure the subjects are said almost all of them to die of aneurismal disease and Richer and remarks that he never knew any of these men who were not addicted to drinking spirituous liquors - Mr Porter denies that any degree of labour exertion or exposure

Hodgson on the arteries pg 410

Dict: de Med: et Chir practiques Tom iij p 413

Dict of Pract: Surgery p 119 - 1839 -

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predisposes to the occurrence of aneurism; and that if keeping the limbs in a bent position would help to produce this disease then sailors should be peculiarly subject to aneurism, yet no one considers these men as peculiarly liable to be affected with aneurism. Dr Crisp comes to the directly opposite conclusion from his large collection of recorded cases. p 117-

Men are much more liable to all diseased conditions of the vessels than females - In 557 cases of aneurism collected from the British Medical Journals by Dr Crisp, less than an eighth were females - Of these 557 cases, 243 were internal aneurisms and in these the proportion of women affected was about one fifth, while out of the remaining 308 external aneurisms, barely a tenth occurred in females. Dr Crisp believes "that the principle reason (for this difference) will be found in the nature of their occupations, those of the males being much more violent and laborious" p 115 and Mr Porter inquires "whether the too often reckless and dissolute habits of males" would not be in itself sufficient to explain the comparative infrequency of the disease in females"? p 48 There are the only explanations that have as yet been offered for the strange frequency of this disease in the male subject, and they are quite insufficient and unsatisfactory, we therefore hope the following ~~explanation~~ will tend to explain more fully & scientifically this fact in the etiology of aneurism -

We stated in a former part of this Essay our belief, that most if not all the deposits which are found in the coats of the arteries, are laid down originally in the Subserous coat which connects the internal with the Middle or Fibrous tunic and we are borne out in this opinion by Dr Copland, and most of the modern writers on this subject (- also by Hodgson &c) (see foot note *) Now we know that these deposits are the chief exciting causes of aneurism - again, the subserous coat is the most vascular of the arterial tunics and it is here we believe that lymph is first deposited, as it is in this tissue the inflammatory action begins or is most excessive. If the inflammation be acute, it soon extends to the fibrous coat and then we have a second deposition of lymph on the free surface of the internal coat, which may end in adhesion and obliteration of the vessel, this being a much more common result than would be supposed from the small number of cases of this kind on record, as remarked by Mr Lyons. But when the diseased action is slow and unhealthy, then the lymph or other product of this action is effused slowly into the subserous tissue, separating the coats, destroying their Elasticity, and thus laying the first step to the formation of aneurism; or ulceration takes place on the surface of one of these elevations (as Hodgson observes speaking of atheromatous deposits)

Hodgsons book Page 16

Lyons Surgery 3rd Ed Page 122

* Note - "In 300 cases of diseased aorta Dr Chowne could not find a single example in which the bony deposits could be fairly stated to have originated in the middle coat" Dr Chowns paper

and perforating the internal coats gives rise to aneurism.
The same holds good in the case of osseous deposits, which almost
universally take their origin in the Subserous coat -
We have been led from observation & reasoning on this
subject to refer, the rarity of Aneurism in females & young
persons to the diminished quantity of Subserous tissue
in the arteries of women and to its still further diminu=
=tion in the vessels of children - and furthermore -
we would explain the great exemption of the lower
Animals from aneurismal and other arterial
diseases, by reference to the almost total absence of
the Subserous coat even in the aorta & other great
vessels of these animals -
Let us enquire if this explanation obtains support from
what is known of the diseases to which the veins are
liable? The veins have no true Subserous coat, their tunics
being united by fine cellular tissue, hence osseous or
other deposits are exceedingly rare in these vessels, and
we find that Dr Crisp has given the absence of the Subserous
coat in the veins as a reason why they are almost entirely
exempt from ossific deposits; but he nowhere alludes
to it as explanatory of the formation or frequency of
Aneurisms - but our explanation is borne out by the
following description of the Subserous coat given by
Dr Crisp in the second page of his work, where he remarks, that.

Crisps book
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"it (the Subserous Coat) is less perceptible in the arteries of females: and in children I have not been able to detect it"

In an appendix to his book, on the diseases of the blood-vessels of the lower animals, Dr Crisp states that "after a careful examination of the aorta of a great many horses, oxen and sheep he has not been able to detect the Subserous coat" but he does not offer this fact as an explanation of the rarity of Aneurism in these animals; on the contrary, he refers their exemption (as a general rule) from diseases of the vessels 1st To the slowness of their circulation, for in the horse and many of the inferior animals the pulse varies from 40 to 45 in the minute; 2nd To the absence of Mental excitement, & 3rd To the less varied and more natural condition of their food; but if as Dr Crisp believes "the greater number of aneurisms whether seated in the cavities or limbs are produced by external injury, or great Mental and bodily excitement" and if "Aneurism may result from violent muscular effort in an artery perfectly free from disease" ought not Aneurism to be a disease of frequent occurrence in the lower animals & particularly in their extremities; ? Whereas, the few cases of this disease that have been observed in the horse, occurred in the aorta or its immediate branches and what is very remarkable & tends much to establish the truth of our explanation, is, that they are for the most part True Aneurisms.

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Page 116
Richter and was of the same opinion See Dict: Pract: Surg: P 117

Crisp's book. See P 340 for cases of Aneurism in the horse in the region of

These remarks will serve to explain why it is that disease so rarely occurs in the Pulmonary Artery? but have we been anticipated in a measure by Dr Crisp for speaking of this lesions he says "the same reasons I have given for the absence of morbid deposits in the veins will I think apply to this vessel" these being 1st the absence of the Cuberous coat 2nd the thinness of the fibrous coats & 3rd this being less subject to the force of the heart's action. We cannot consider either of the last two as applying to the pulmonary artery the 1st being the true cause

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We would here beg to offer a suggestion viz may not the exemption of the right side of the heart from disease in comparison to the left, be susceptible of explanation (in part) founded on the amount of Cuberous tissue in either side of the heart?—

Let us next enquire if we can offer any explanation of why it is that Aneurism should be most frequent between the ages of 30 and 40 or 45 and comparatively rare after 55 or 60 years of age?

It would be in all probability almost impossible to demonstrate with the scalpel, that there is actually more Cuberous tissue in the vessels between the ages of 30 and 45 than at other periods of adult age - nor is this absolute increase in quantity necessary to our explanation - but when we recollect, that these are the years in which

the tissues suffer greatest loss in any given time & that the process of reparation is most vigorous in its endeavours to keep the body from suffering loss, there we see good reason for inferring, that these are the periods of life in which the Subserous tissue must be increased in quality if not in quantity & hence aneurisms ought to be (according to our hypothesis) & is most frequent at these epochs in life - Then when old age is established at 55 or 60 years the tissues are atrophied or have undergone important changes in structure, the Subserous coat becomes denser, more fibrous or fibro cartilaginous & less vascular, hence, as the vascularity, vitality & even absolute quantity of the membrane decreases, so does the liability to aneurism -

This explanation we hope will be considered more scientific and satisfactory than any as yet proposed, and we put it forward with some confidence believing that it will stand the test of the most careful examination to which it can be submitted, as it is based on facts, from which we have endeavored to draw correct inductions.

Parallèle de la Chir: anglaise avec la Chir: Française p. 249 -1815-

M. Roux considers aneurisms (particularly internal) to be more frequent in England than in France and Despagnet agrees with him in the opinion, that the prevalence of the disease in England over that of all other countries (excepting perhaps America) is to be attributed to the greater

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energy of the people and their constant indulgence in Spirituous drinks.

Dict: Chirg p. 119 -

M. Cooper opposes this opinion of M. Roux -

Exciting or Proximate causes-

Chronic or unhealthy inflammation of the coats of the vessel by weakening its Contractility and Elasticity unless it enable to resist the tendency to dilate caused by the current of blood passing through it, consequently it yields on all sides forming a dilatation or at some one point more than another, (forming a true aneurism) then by rupture or absorption, one or more of the coats may be removed (forming a false aneurism) - It is Mr Porters opinion that - an aneurismal dilatation is proceeded by a general one more or less of the whole vessel and both by that condition of the artery which he denominates an unhealthy inflammation, which acts in the manner just described - Atheromatous deposits between the inner and middle coat or more properly in the Subserous were first noticed by Monro and Haller and are among the predisposing causes of this disease; the formation also of a firm yellowish matter in the same situation has been described by Morgagni & Scarpa under the name of Steatomatous matter, but this appears to be only a modification of the atheromatous deposit differing from it principally in being softer and not containing gritty particles -

The cartilaginous and ossific deposits so often found in the Subserous coat are considered by all the investigators of this subject excepting Dr Crisp & Mr Porter as the most

frequent of. That class of predisposing causes now under consideration, and they may doubtless tend to cause the disease by producing rupture or ulceration and so would aid absorption of the internal coat, while there is much deserving of consideration in the observation of Mr Porters that "its (ossific deposit) extraordinary constancy compared with the infrequency of the disease in subjects advanced beyond a certain age, at once proves how little efficacy it can have as an exciting cause" and Dr Crisp considers "that they may be often looked upon as the result of the wear and tear which the arteries like other parts of the body, are subjected to, & probably it is a wise provision of nature to accommodate the vessels to the lessened supply of blood" We would observe that it is when these ossific deposits occur in the vessels of the middle aged that they would have most tendancy to cause Aneurism. (It is hardly necessary to note that though we speak of ossific deposits, we do not mean that they are true bone, and we now regret that we did not substitute the word calcareous for ossreous in speaking of them)-

Andral has seen the internal coat of an artery raised by small abscesses situated in the cellular tissue (the subserous coat) between the inner & fibrous tunics, and it was probably to the bursting of some of these into the vessel that the ulceration of the inner coat was owing. Dr Townsend has described a form of aneurism caused by the rupture of the vasa vasorum & consequent effusion of blood between the coats of the vessel

Dr Townsend's paper Bost. Med. Journal for 1832

p48-

p12

See Copland's Dictionary art: Arteries 5th edition

3rd The Final or Ultimate causes.

These are dilatation, absorption, ulceration, laceration or rupture of some or all the coats of a vessel.

- Part 2nd -

The position, symptoms, and physical signs, of Thoracic aneurism -

Under the head Thoracic aneurisms, we include those of the aorta and arteria innominata -

Of all vessels the arch of the aorta is most liable to become the seat of disease for two reasons 1st Because it is in this part of the vessel that the subserous coat is best developed & 2nd on account of its being in the most favourable position for receiving the full force of the arterial waves. The latter is the explanation usually given for the frequent occurrence of disease in the arch but the 1st and chief reason has been (as far as we are aware) hitherto overlooked - Mr Porter has observed that "aneurisms of the aorta are in their commencement almost always true aneurisms formed by dilatation & consisting of all the coats" that when they attain a certain size they either burst altogether or become false or mixed aneurisms -

Rep. 64

It makes but little difference either in the diagnosis or treatment to which of the kinds of aneurism the one in the case before us belongs, though no doubt the diagnosis of a small and simple dilatation may be made in opposition

to that of a large aneurismal sac, but further than this we have no means by which we could make the diagnosis of a true from a false aneurism - we may conjecture that the disease is of the True Kind when the tumour is small and the symptoms not urgent; the amount of Pain also is much greater and more intense in False than in True aneurism - as first noticed by Dr Stokes - this can be explained by the larger size of such False aneurisms which causes them to press more on & interfere with the functions of contiguous parts. As to the positions which Aneurisms of the aorta & its arch assume, they are exceedingly variable, but as a general rule, when it occurs in the descending part of the arch or lower down the sac looks downwards and to left side, but whether anteriorly or posteriorly must depend on the part of the vessel from which it springs, on the position it holds to other parts or even perhaps on accidental circumstances, and they generally terminate by rupture into the pericardium - left pleural cavity or left bronchus - We do not remember to have seen any case on record in which aneurism of this part of the vessel ruptured into the right bronchus or right lung - This being capable of easy explanation from the anatomical relations of these parts -

Dr Hamilton has recorded a case in which the sac ruptured into the right pleura - Ed: Words: four Vol XIV p 312

Aneurisms of the transverse portion of the arch have the general direction of upwards and outwards, but the position varies not only in different cases but we believe at different

times in the same case, as if nature was endeavouring to relieve parts which had been long pressed upon, and this will explain what is often seen in watching the progress of our other cases, viz one set of symptoms greatly aggravated, while others which were before most complained of will have almost disappeared - In order to state the parts into which these aneurisms have ruptured we should have to mention all the organs in the thoracic cavity into all or each of which rupture has occurred at one time or other - When the tumour arises from the aorta within the pericardium, the direction of the sac is directly downwards generally encroaching on the cavities of the heart - an example of this form of disease is mentioned by Mr Guthrie, it is a specimen from the Hunterian collection in which the semilunar valves formed part of the walls of the sac whose diameter was four inches and its length five inches, the direction was downwards. A second case is recorded by Dr Hamma, in which the sac arose from one of the sinuses of the aortic valves, and the aneurismal tumour formed in the external wall of the left ventricle - a third case by Dr Smith in which "the sac communicated with the aorta by a round opening about the size of a shilling, placed about an inch above the valves, the sac passed downwards and projected into both ventricles - It is Dr Smiths opinion that all aneurisms spring from the aorta within the pericardium would have this direction because the opening from the artery

Dr Hamma's case Ore 6th Vol Lib: Med: Journal Page 80

Dr Smith's case 4th Vol Dub: Med: Journ: Page 114 -

similar case reported by Dr Henderson in his Lectures on clinical medicine and Edinburgh monthly journal Vol iii Page 450

into the sac being placed within the influence of the retrograde flow of the blood, both the weight and impulse would tend to direct the tumour downwards" and the appearance of the opening into the sac tends to support this opinion" the lower part of the circumference of the opening being thickened, rounded and well defined, while it presented no defined edge above, but gradually sloped from the anterior of the aorta to the front of the tumour.
These cases and several others (to be found in the Journals,) fully prove the fallacy of the opinion held by Bertin and Scarpa, that it was impossible for aneurism to form on the ascending aorta as they believed this part of the vessel was destitute of an external cellular coat.
In 98 cases of aneurism of this part of the vessel 30 ruptured into the pericardium, 6 external, 4 into left pleura, 3 into the superior cava, 3 into the oesophagus, 3 into right lung, 2 into the right, and 2 into the left ventricle & others into the Trachea pulmonary artery &c -

Crisp table p235 & 134

Symptoms - We believe the first complained of is, generally palpitation of the heart - We do not consider that this is caused by or has any relation to a preexisting hypertrophy of the left ventricle on the contrary [redacted] The following order is a general rule - An aneurism occurs near the heart from some cause independent of any action of the heart, its size is too small

to cause symptoms per se that would attract the patients attention , but it disturbs the general circulation, breaks up the proportion that exists in the normal condition between the blood and the vessels in which it circulates, by so doing it disturbs the hearts action, the pulsations become quicker in order to restore the balance of the circulation, however, the patients first complaint is referred to the organ secondarily affected ; we have many other examples of this in the history of disease - When however the sac becomes of sufficient size to produce uneasiness and give origin to symptoms referable to itself, then the heart seems to get rest for a short time and the patient tells us that his heart is much better, but" and here begins a long list of complaints referable to the seat of the aneurism - after a short time the hearts action once more increases and now he complains of two sets of symptoms, one caused by the tumour, the other caused by the excitement or perhaps hypertrophy of the heart - or disease in its lining membrane.

This subject requires further examination (which can be only made by studying the early history of these cases) before our statement can be considered as proved and we now put it forward merely as an original observation we have made and which deserves to be looked for in other cases of aneurismal disease -

2nd Pain — is present in a greater or less degree in all aneurisms and it is D^r Laws opinion that the frequency of pain is in an inverse ratio to the size of the tumour.

D^r Laws papers Lond: Med: Jour Vol xx/ p 433

D^r Stokes remarks, that the intensity of the pain is in proportion to the amount of disturbance of vital functions rather than to the amount of mechanical obstruction. D^r Law regards the pain as being of two kinds 1st a lancinating paroxysmal pain, which appears to be caused by the irritation of nerves in relation to the tumour, & probably as some suppose from tension & irritation of the nerves that supply the arterial tunics. D^r Law does not suppose the pain to be in any degree attributable to this latter cause for he says "the arterial tunics can have no hand in producing or regulating the pain as in the largest aneurisms there has been the least pain" and this is confirmed by the fact that when an aneurism has been long subject to pressure from some neighbouring part as the clavicle sternum &c the pain diminishes greatly, or even ceases for a time, if dislocation (as in the case of the clavicle) or absorption (as in the case of the sternum and vertebræ) should occur. 2nd A dull continuous boring pain, which D^r Law considers to be a pain sui generis, peculiar to aneurismal tumours and caused by the absorption of the vertebræ or other osseous structures in their vicinity

We are in a position which enables us to assert with perfect confidence, that this second description of pain is not a necessary accompaniment of internal aneurisms and that the most extensive destruction of the vertebræ may occur from the pressure and irritation of aneurismal tumours without the patient complaining of or suffering from this dull constant pain - and we rest this opinion on two cases, one of thoracic aneurism & one of abdominal, which occurred in the North Infirmary Cork under the care of Dr Finn (one of the physicians to the hospital) who has the notes of these cases, with the post mortem appearances -

When an aneurismal tumour extends into the mediastinum great relief from pain is the result and an aneurism may exist for a long time and end fatally without having given rise to any inconvenience as in the case of Sir David Barry in the Lancet 1835-36 p. 64 -

But when we remember how great relief from pain is given by the application of a few leeches over the tumour we cannot but consider irritation in the tumour itself as a source of pain. Aneurism of the anterior part of the thoracic aorta are least painful, while on the contrary those situated on the anterior of the abdominal aorta are most painful, at least such is Dr Harrisons opinion.

Aneurisms of the hepatic artery are also painless for the most part which Dr Stokes explains by the fact of their not being bound down by dense and unyielding membrane.

...sion in
...Vol of the
...Med: Journ
...p. 433

...ns on
...neurism
...Med: Journ
...Vol p. 400

If Aneurism be present in one part of the aorta, pain occurring in another part should lead us to suspect the existence of disease there also - The pain sometimes extends down one or even both arms, it is generally a tingling sensation but in some instances as in the case accompanying this paper it is of so acute a character as to resemble that which occurs in cases of Angina pectoris - Though pain is the most constant symptom of these affections still it cannot be considered as pathognomonic; (indeed we may make an axiom of a remark by Dr Stokes viz "that there is no pathognomonic symptom or sign of any disease") for Enlarged Glands Cancerous or other tumours involving the phrenic or pneumogastric will cause pains similar to those just mentioned - Still we should remember that paroxysmal pain occurring without any accompanying febrile excitement is a most important Element in our diagnosis of Aneurisms -

3rd Dyspnoea. Is generally present in all cases when the Aneurism has become of large size & it is generally caused by pressure of the tumour on our bronchus or on the trachea. This is said to be seldom present when the aneurism is of the arch as in this case the sac presses against the most resisting point of the arch formed by the rings of the trachea For example in a case mention by Dr Stokes the posterior part of the sac was absorbed so that the rings of the trachea formed a part of its walls and corresponded to the centre of the

Stokes on the Chest Page - 301

Dyspnoea on thoracic aneurism: Brit: Quarterly Journal Vol ij p1

Stokes on the diseases of the Chest-p300

Instances of these was little or no tracheal distress nor was the form of the tube altered - Still we find that in the twelve cases of aneurism of the transverse portion of the arch recorded by the late Dr Greene dyspnoea to a greater or less extent occurred in all - Dyspnoea may be caused in other ways than that by pressure of the sac on the trachea or main bronchial tubes viz By pressure on the pulmonary artery or its divisions, on the pulmonary veins - on the left auricle - By admixture of the arterial and venous blood in either a varicose aneurism or an arteriovenal varix - By pressure or irritation of the pneumogastric nerve or of its branches most frequently the left pulmonary plexus By mechanical compression of the substance of the lung and by oedema glottidis - If intercurrent bronchitis or other pulmonary affection should be superadded the dyspnoea will of course become greater and may amount to orthopnoea The stridulous breathing which sometimes accompanies this disease resembles in some respects the stridor caused by laryngeal disease, from which it can be distinguished by the stridor caused by aneurism pressing on the trachea having this peculiar character, namely, that it occurs "from below" 4th Cough - is generally at first slight but afterwards becoming more distinct until it acquires its peculiar paroxysmal short ringing character, & characteristic as to obtain for it the name of the Aneurismal cough. -

As it is caused by irritation of the trachea and nerves any other tumour as well as an aneurism may excite it.

5th Aphonia, more or less complete is a frequent accompaniment of aneurism, being caused by pressure on the trachea, recurrent nerve, or by edema of the chords. It is questionable whether pressure on a bronchial tube would be sufficient to cause any perceptible change in the voice - Its tone varies greatly at different times in the same case being lower one hour than at the next, and Scholes has stated a case in which the voice was changed from bass to treble the trachea being contorted by an aneurism of the innominata. Todd has reported a dissection made by himself in a case of aneurism of the arch where the recurrent nerve was compressed and atrophied of the muscles on the left side of the larynx had occurred which fully accounted for the change in the voice in his case - Lancet 1840-

Scholes in the 15th vol Lond. Med. Journ 1803

mentioned in Dr Greene's paper

6th Dysphagia - is a frequent symptom in thoracic aneurism it was present in nine of Dr Greene's cases and it is very changeable in its intensity being extreme one day and perhaps totally absent the next as if it was caused in a great measure by a spasmodic state of the oesophagus no doubt the direct pressure of the sac will cause permanent stricture in some cases, but we are inclined to refer the paroxysmal attack of intense dysphagia (& also of dyspnea)

With same class of diseases as the dysphagia occurring during other diseases of the Thoracic viscera chiefly those of a very inflammatory kind, as that form of dysphagia noticed by Testa as forming a prominent Symptom in Pericarditis - in these cases there was low fever, dyspnœa, pain in the back & Stimulation of the neck; it also occurred in cases of violent Carditis & Endocarditis and Dr Stokes has observed it in two cases of intense Pneumonic inflammation of the left lung ushered in by a remarkable aphonia which subsided as the pneumonia extended - In these cases the dysphagia was a vital phenomena as there was nothing to cause it by pressure, but the fact of their being preceded and attended by fever would be sufficient by itself to distinguish them from aneurism - In some cases the attempt to swallow food produces intense pain and brings on an attack of dyspnœa.

Testa reviewed by Dr Stokes Dub: Med: Journ P 133

Morgagni relates the case of a woman aged 60 years who refused to take any food and died of starvation rather than suffer the agonizing pain which accompanied each attempt at deglutition.

Mentioned by Dr Green

7th Edema - of the upper extremity sometimes occurs, it may extend up the neck and engage both sides of the face as occurred in a case brought before the Pathological Society of Dublin during the session 1847-48 generally greatest if confined to the side which the aneurismal tumour occupies - Anasarca of the entire body may

exist along with aneurismal disease as in our & Greenís cases but in this and all other cases where the Edema is general it has been caused by the coexistence of Valvular and aneurismal disease

5th Emaciation - we can scarcely consider this in the true sense of a symptom as it occurs but seldom & then at the last period of the disease and appears to be the result of long continued sickness pain, anxiety & to we may add of the treatment, if the patient has undergone the Valsalvian method - Morgagni supposed it was caused by obliteration of the Thoracic duct from the pressure of the sac, but this must be exceedingly rare -

6th Paralysis - The only case in which thoracic aneurism caused paralysis is recorded by & Stokes the carotid and Subclavian arteries with the vena innominata and the jugular vein obliterated by the pressure of the sac of an enormous aneurism of the Innominata and the patient died Hemiplegic - Effusion into the Ventricles causing death by coma occurred in our cases also.

Stethoscopic

- Non Stethoscopic Signs or those observable without the

1st Pulsation or abnormal motion -

We have borrowed the latter term from & Greenís paper, as he considered that in many there was an abnormal motion, yet not of the character implied by the term pulsation.

Sub: Med: Chir: Trans Vol x P400 Note When this was written we had not seen the case of Dr Hudson in which paralysis occurred in a patient laboring under Subclavian Aneurism - Edin: Med Journ Vol XIII P 269 also Dr Bennetts case of Hemiplegia with Hypertrophy of the Heart - communicating with rupture of the Aorta producing dissecting Aneurism - Medico Chir: Trans Vol XXXIV P 157 -

A defined point of pulsation is by no means an universal phenomena in thoracic aneurisms, there is more generally a "diffused expansive motion" which can be felt by the application of one hand over the tumour, while the other is placed against the opposing point on the back - as recommended by Dr O'Beyen and even by making the patient walk about for a short time then looking over the shoulder or across the chest while he holds his breath as recommended by Dr Greene - Yet this sign is not peculiar to aneurisms, for cancerous or other intra thoracic tumours pressing on the great vessels will have their pulsations communicated to them; diastolic pulsation has been recorded as being present in pneumonia by Dr Graves - it has been observed in Chronic diseases as in Cancer before noticed, in displacements of the heart in Empyema,* in Phthisis, and in† cirrhosis, and also in a form of disease described as Pulsating Empyema of necessity - Hence, the occurrence of an abnormal or a second point of pulsation in the chest is not peculiar to and consequently not pathognomonic of aneurism. The force of the pulsation of aneurismal tumours is not less than of the heart, but oftentimes much more violent and this too in cases where the heart is not hypertrophied - This at first sight strange phenomenon is explained by the Hydrostatic law, that a given pressure exercised on a fluid contained

Dub: Med: Jour Vol xxiv Page 167

Graves Clin: Med: 1st edition P 740

* Stokes on the Chest P 499

† Corrigan Dub: Med: Jour Vol xiij P 266

Φ Dr Bonnal Dub: Med: Jour Vol xxv P 1-

in a vessel is communicated to every portion of the surface of that fluid and thence to the parietes of the vessel and thus multiplied" It is very doubtful whether or not the fibrous coat of even a true aneurism becomes hypertrophied if it be so this would tend to make the sac contract with great force but we believe that we shall find a more satisfactory explanation of the great contractile power of aneurismal sacs (on which so many of the peculiar aneurismal phenomena depend) by reference to the experiments of M: Poiseuille by which he proved that "the power with which the arterial coats contract upon themselves (or their contents) after being dilated exceeds that which is expended in dilating them" *

Stokes in the Dub: Hosp: Journ Vol v p 432

Edin Med & Surg: Journ Vol xxxvi Page 221-

2nd Tumour - Well defined tumour is a very rare occurrence in aortic aneurisms more generally there is a slight prominence observable in some part of the chest, or the upper part of the sternum may be slightly pushed out and tumour sometimes presents itself above the clavicle but in many cases even up to the time of death from rupture no tumour appears externally - in Dr Greens cases only one presented any external elevation & in this our instance, the upper third of the sternum was protruded Laennec and Hope considered a pulsating tumour as the only pathognomonic sign of Thoracic aneurism, we have only to mention Pulsating cancerous and Pulsating Empyema, to nullify this statement -

* On applying the hand over the seat of the tumour the aneurismal thrill can often be very distinctly perceived

There is another form of tumour that presents itself to our notice first described by Dr Stokes under the name of Tippet-like swelling of the neck, it is very circumscribed and appears to be produced by a general distension of the veins of the neck and not by aderma of the tissues -

Stokes' cases Dub: Med Journ Vol V Case IV p4

3rd Enlargement of the superficial veins

This was first described as a sign of internal obstruction by M: Reynard - It is a sign often present in Aneurisms generally confined to the immediate situation of the sac or to that side of the neck, in a few cases it has extended part of the way down the arm - The cause of this in these cases is most frequently pressure on the Superior Cava or on the Brnd innominata & we find distension of the external jugular vein a frequent sign in such cases

The following important practical rule is worthy of being remembered that "if in a case of supposed subclavian Aneurism of the right side, a varicose state of the jugulars of both sides should occur a strong argument against surgical interference would exist as there would be almost a certainty, either that the subclavian Aneurism was of great size so as to compress both Brnd innominata, or that the disease was more deeply seated engaging either the aorta or innominata"

Stokes Dub: Med Journ Vol V p424

This distension of the veins also occurs in Cancerous and other tumours within the chest and it forms a very important element in their diagnosis, and we may state as a general rule, that when the presence of the veins is caused

by Cardiac affections, it is more a general phenomena than when caused by aneurismal disease, it being local in the latter case - Mr Key has recorded a case of thoracic aneurism in which motion & turgescence of the inferior thyroid vein lead to the examination for and discovery of the disease (Medical Gazette Vol 11 P617 alluded to in Dr Greenes paper) Pulsation or motion in the veins has been remarked in cases of heart disease, a remarkable case of this kind is reported by Dr Benson in which the enlargement and pulsation was confined to the veins of the upper extremity caused by patency of the right auricle ventricular opening & regurgitation into the auricle as a result - Dr Graves also records its occurrence in the veins on the back of the hand in a case of pneumonia and in another case of peritonitis in both of which no signs of cardiac disease could be discovered. (Dub: Med: Jour Vol viij P324) (Graves Clinical Medicine 1st edition P470-) It is remarkable that when caused by aneurism there is often the most marked variation in this as in other signs the veins being one day as large as twice their usual size and on the next they will have resumed their natural dimensions (Stokes Dub: Med: Jour Vol v P424)

4th Arterial Signs - The most important is a difference in the volume of the radial pulses; this was noticed in Five of Dr Greene's cases. The left pulse being the weaker in Three which leads one to observation that the left is generally the weaker of the Two - But there is no such difference observed in many cases even of very large aneurism and we must object to the following statement made by Dr Greene; viz:

"If weakness of the pulse of one wrist necessarily accompanied aneurisms of the thoracic aorta it would in fact be pathognomonic" - Now to constitute the pathognomonic sign of any disease it must not only be invariably present in one affection but it should occur in none other - But we know that the presence of any tumour or the obliteration of the vessel, would cause the pulse to be absent or weaker than that in the opposite wrist, hence though it were constantly present in aneurism it would not necessarily be a pathognomonic sign. We consider this difference to be always caused by the pressure of the tumour, and not as Magendie believed from the force of the hearts action being expended on the sac hence the stream of blood being weaker - Magendie's explanation would apply if the pulses all over the body were weaker than natural, but it in no way explains the comparative weakness of the two radial pulses (see footnote *)

Magendies Lectures in the Lancet 1834-35

It were well worth observing whether aneurisms ever produce that visible pulsation of the arteries which forms a marked feature in Patent aortic valve disease & we would suppose a priori that aneurism of the ascending portion of the arch would be the most likely to cause it some of 5th displacements - The heart may be pressed downwards or to either side by a thoracic aneurism, the trachea and larynx have also been dislocated far to one side as occurred in a case of innominata aneurism already alluded to -

Dr Greenhow's case presented this pulsation save one in which the pulse were decreased

Stokes Irish Hosp: Journ Vol v

* note. Great retardation of the arterial wave passing from the Heart to the radial artery has been noticed as a sign of aneurismal tumour by Dr Green & Dr Henderson in the 45th Vol Edin: Med: Journal

Dislocation of the clavicle has been observed in these tumours as well as in Phthisis and the upper part of the sternum with the cartilages of the ribs have been protuded beyond the level of the side -

Stethoscopic Signs - It is on these that the diagnosis of internal aneurism chiefly depends and it is by their aid almost entirely (though not exclusively) that we are enabled to distinguish such aneurismal from other diseases -

1st Dulness on Percussion. This is one of the most constant physical signs of aneurismal tumour, & by carefully percussing the chest we will generally be enabled to map out the region occupied by the sac, though there be no external tumour. When localised dulness occurs at the upper third of the sternum it is most valuable, as it is in all probability caused by some tumour. But if a portion of lung be between the tumour and the thoracic walls, if the lung be emphysematous or if tubercular or other diseases of the lung exist, then we may lose this valuable sign or we may refer its existance to a wrong cause -

Illustration We may mention a case of Dr Henderson's in which there was "impaired percussion" and diffused impulse resulting from the condensation of the anterior margin of the lung, it having been pushed under the sternum by an effusion into the right pleural cavity; but by paying proper attention to the symptoms & other physical signs we shall

Clubbes on the chest

Henderson 43 Vol Edinb: Med & Surg: Jour

be enabled to discover the true cause of these phenomena.
Dr Green noticed that percussion invariably gave pain even when there was no internal tumour, we have never heard a patient complain of its causing pain - It is scarcely necessary to observe that dulness will be caused by cancerous and other accumulative diseases as well as by aneurism -
2nd Respiratory Signs - On looking attentively at the motions of the chest, we will be able to detect a more or less immobility either of one side in comparison with the other or of the upper part of one side (usually the left) as compared to the lower - But the most important sign is a difference in the intensity of the respiratory murmur in the lung of opposite sides (or in different parts of the same lung) as first pointed out by Dr Stokes - For as an aneurism invariably enlarges more to one side than the other, it must of necessity come to press on the bronchi, or substance of one lung, first, or on one side of the trachea more than on the other, hence, the respiratory murmur will be weakest in the lung of the side to which the compressed tube belongs and this difference will be better marked if the other lung takes on a supplementary action - This sign is best marked and most valuable in the early stages of the disease, for as the tumour enlarges it comes to press on other tubes in the opposite lung or by compressing the trachea equally on either side or in the middle, renders the difference less apparent.

This difference in the respiratory murmur of the lungs forms the great diagnostic sign between aneurismal or other tumours compressing the tubes and Foreign body in the trachea or tubes, as in the case of foreign body (and also in Laryngitis) the air is excluded equally from both lungs or entirely from one lung: but this diagnostic applies much better to the distinguishing of laryngeal obstruction from aneurismal, rather than of Foreign body from the latter. It is Andral (as well as we remember) who states that a localized Pulse can be heard over where a bronchus (or the trachea) is compressed and that in one case the patient referred the cause of his dyspnoea to a point over where this single pulse was heard - Dr Law also has observed this phenomenon.

Law on the diagnosis of aneurism Pub: Med: Journ Vol 21st p 433

3rd The aneurismal sound, sometimes called the sound of Pulsation. This may be either single or double - The occurrence of double sound in aneurismal tumours is quite independent of the position which the sac holds to the heart: this has been by Stokes, Law, Greene, and several others and it fully proves that the diastole and systole of a single cavity can produce a double sound - Bruce Latimer's explanation of the first and second sound of the heart depending on the division into auricles and ventricles is erroneous - Dr Crisp does not attach much importance to this phenomena as a sign of Thoracic Aneurism, but we have learned to regard it as a very valuable

Stokes's 5th Vol Pub Med Journ

sign in these diseases - The character of the sounds produced by aneurisms is much softer and less valvular, (if we may be allowed the expression) than the sounds of the heart; the first sound of the sac is synchronous with the contraction of the ventricles and is accompanied by a distinct impulse - May not the occurrence of double sound indicate the class to which the aneurism belongs for as the second sound is caused by the contraction of the sac (as will be hereafter shown) is it not a just inference that when this second sound is present the fibrous coat is not ruptured, it being to the continuity of this coat that the sac owes its contractile power.

Bruits - In a dozen cases of Thoracic aneurism some modification of Bruits may be heard in Five and no such sound in the other dozen - Dr Law says "he never found a Bruit in thoracic aneurisms of the heart was healthy, that is permanent bruit, for it may be present occasionally; this variation he considers to depend on some modification of innervation or on a more or less fluid state of the contents of the sac" - He have heard Bruit de Soufflet called "the aneurismal sound" but nothing can be more incorrect than such an appellation for neither Bruit de soufflet nor any of its modifications can be considered as characteristic of aneurism - Such is the recorded opinion of Stokes, Law, Corrigan, & such will be found to be the case by every one who studies this disease

Law in the 2/ct Vol Lab: Med Journal.

The different kinds of Bruits are much more frequently heard in Abdominal than in thoracic aneurisms, and their tone is generally soft and low - The presence of a Bruit cannot depend on pressure, as in Dr Stokes case of aneurism of the innominata the pressure on the sac must have been extreme, as the clavicle was not dislocated though the tumour rose far above it and displaced the larynx and trachea, yet in this case no Bruit existed - It is probable that the absence or presence of Bruit de soufflet or its modifications depends more on the state of the distal or cardiac side of the vessel near the aneurism, than on the mere presence of the tumour itself, as suggested by Dr Stokes -

Stokes on the 5th Vol of the Dub: Med: Jour:

The Bruit, like the aneurismal sound, may be double, in which case each sound is accompanied by a bruit - In order that two Bruits should occur we believe it to be essential that the distal side of the vessel should be made rough by dilated action, and we consider the order of the phenomena to be as follows - The ventricles contract - the rush of blood into the sac causes a Bruit and the consequent dilatation of the tumour produces the first sound (if there is any interval between this and the next action it is not perceptible) - When the diastole of the sac is completed, its Elasticity causes it to contract, this produces the second sound and the Blood entering the narrow & roughened vessel is thrown into irregular

vibrations which produces the second Bruit - This is the first attempt that has been made at the explanation of the latter phenomena - Bruits exist in Cancerous tumours as recorded by Dr Stokes and in pneumonia as reported by Dr Hyacinth - Bruit also occurs in the subclavian artery in cases of Phthisis and any tumour will cause this sign if it compresses one of the great vessels - The existance of a pulsating tumour even when accompanied by Bruit de soufflet cannot be regarded as conclusive proof of the existance of aneurism - for in a case by Dr Houston all these signs existed yet on post mortem examination no aneurism could be found and the heart and its vessels were perfectly healthy - What all these phenomena must have arisen from nervous excitement for which there was good cause - Cancerous tumours also present pulsation & Bruit - It may be considered strange that in speaking of the sounds caused by aneurismal tumours we have said nothing of the Bruit de rapé, Bruit de scie &c these names we have purposely avoided using, as different observers apply these terms very promiscuously and by speaking of Hard and Soft Bruits we make our perception of the sound heard, much more intelligible to others -

Stokes on Cancer of the Lung Dub: Med Jour vol xxj p 266

Graves on Diseases of the Heart vol ij Dub: Med: Jour:

Houston Dub: Hosp: Gaz: Vol j p 157

Friction Sound - These are by no means of frequent occurrence in aneurism, though they may occasionally be heard under the clavicle & at the scapula posteriorly - These sounds would

be much oftener present, if the irritation caused by the aneurismal sac tended to produce inflammation and adhesion between the walls of the vessel cavity with which they come in contact. And aneurism would be a much less frequently fatal disease if such adhesions were common - Neither would ruptures into the pericardium and pleura be then as they now are the most frequent and most rapidly fatal form of rupture -

We have now described all the symptoms and signs of thoracic aneurism, each sign will have a peculiar value in one case more than another, it is from the connexion those present have to each other and from their occurring along with the symptoms of those diseased conditions that we are enabled to make the diagnosis correctly -

Terminations - These consist in Spontaneous cure or successful operation (the latter not having yet succeeded in aneurism of the aorta or innominata) or death, from rupture of the sac and the escape of its contents, or from the result of pressure on and interruption in the functions of organs whose unimpaired actions are essential to life.

The only case of spontaneous cure in aneurism of the aorta is that by Dr. Monro and in this case the disease was low down in the abdominal aorta, we are not aware of any case of spontaneous cure in thoracic aneurism

Patients have lived for 7 years while laboring under this

disease they may even suffer no inconvenience upto the days of the fatal rupture as in the case of Sir David Barry before mentioned. Hodgson lays down this great difference between the manner in which these diseases rupture into serous cavities and when they open on mucous surfaces;- in the former, the rupture is from direct yielding of the coats, but when they open on a mucous membrane it is by ulceration - this action we believe to begin generally on the free surface of the mucous membrane and to extend inwards.

Crisp on the Arteries P133

Dr Crisp first proved statistically that rupture into the pericardium was the most frequent termination of these aneurisms and it is strange that Hodgson should have only mentioned Two cases in which this form of rupture took place - Lawrence never saw an example of it & Dr Hope says it is very rare - Ruptures into mucous canals would appear to be the least dangerous form for example in a case by Mr Cooper the rupture occurred into the oesophagus the patient vomited about three pints of blood and a still larger quantity passed by the bowels, yet in eleven days he was again at his work as a coalporter and lived for nearly two months after - Mr Mondfoot records a case in which from eleven to fourteen pounds of blood were at different times expelled by the mouth the oesophagus being perforated, and Mr Mondfoot conjectures that an attempt at cure had taken place as the patient lived for some time after. But it should be remembered "that the occurrence of sudden

Med: Chir: Trans Vol xxij

Edin: Med & Surg: Journ Vol xxij

death from the rupture of an aneurism depends more on the mode than on the quantity of the effusion" Thus in two cases of Dr Stokes extensive effusion of blood occurred behind the peritoneum which it seperated from the adjacent tissues, yet both these patients lived for a length of time after. and one of them died from rupture of the sac into the pleura - Then again a very small amount of effusion into the pericardium will cause death in an exceeding short space of time. This being explained by the interruption to the heart's action.

A singular exception to this rule is recorded by Dr Stroud XXV Vol London Med Gazette The right auricle ruptured into the pericardium - Dr Clymer bled the patient largely & she lived for 10 hours after

The mode of the diagnosis of rupture on the same general principles as apply to all other internal solutions of continuity, namely the occurrence of, new, sudden, and extraordinary symptoms. Aneurismal tumours cause death in one other way viz by producing gangrene of the lung caused by the pressure of the sac on the nutrient vessels and nerves at the root of the lung, this occurred in one of Dr Green's cases

Treatment - The old treatment of Bleeding and Semi-starvation usually known as Valsalvas treatment has given place (in the Irish school at least) to a more rational and successful mode of attempting cure, namely to small bleedings or leeching over the tumour, a nourishing or even directly stimulating diet, occasional opiates and rest of both mind and body - Under this treatment a patient will live for years while enjoying the regular habits & calm of an hospital life, who if allowed to return to his

usual daily occupations would not long outlive the change — after having repeatedly seen the most distressing paroxysms of Dyspnoea, Dysphagia and pain obtain the most marked relief by the application of a few leeches over the region of the sternum, while at the same time the patient was taking eight ounces of wine daily and living on a full animal diet, we must own at the risk of appearing presumptuous state our belief, that a highly stimulating treatment would be less injurious than that of Valsalva, though this latter plan is recommended by a very high authority in modern Surgery - We have a good example of the relief afforded by stimulating treatment in the case reported by Dr Bratty in the 5th Vol of the Dublin Hosp: Reports.

Opium will often fail to produce either relief from the pain or sleep, but let a few leeches be applied and then the Opium which has been given before the leeches were used will begin to act, sleep will be produced, and a long intermission from pain will thus be obtained - As regards Digitalis, the safest rule would probably be to abstain from its use altogether - The state of the lungs and bowels require close watching, as intercurrent attacks of bronchitis are apt to occur and the bowels are generally most obstinately constipated, both of which greatly aggravate the patients sufferings - The state of the heart will greatly modify the treatment, if it be healthy, treatment will be more beneficial and when it is diseased we must vary our remedies accordingly - but this like all the other details of practice can only be learned at the bed side of the sick.

Mrs Surgery 2nd Edition page 117

Part 3rd.

Diagnosis of Aneurism of the arch of the Aorta from those of the Arteria Innominata –

If in answer to the question "What are the signs and symptoms of aneurism of the Innominata?" we stated them to be similar to those of aneurism of the arch of the aorta, few persons would undertake to say that our definition was incorrect – If these three affections present the same set of phenomena, all attempts at their differential diagnosis will be failures – but if the mode of succession of these signs be different? then we have only to multiply accurate observations in order to arrive at the knowledge of their characteristic differences.

We are not aware that any attempt has hitherto been made to state the signs proper to aneurisms of the innominate in contradistinction to those of the arch of the aorta – and in order to do this, we have collected the cases of this disease reported in the British Medical Journals – They are arranged in a tabular view, in which their signs and symptoms are drawn up under the same heads as the twelve cases of aneurisms of the arch of the aorta recorded by Dr Greene in the 2nd Vol of the Dublin Quarterly Journal. – These cases of Dr Greene's are the most accurately recorded which we know of, & the arrangement of his table is admirably suited for contrasting them with aneurisms of the adjoining vessels –

Tabular View of 18 cases of Aneurism of the Aorta Innominata (collected from the British Medical Journals)

No	Name of Journal	Reported by	Sex & Age	Tumour and Impulse	Dyspnœa	Cough	Dysphagia	Pains	Heart & Pulse	Percussion	Auscultation	Operation	Post mortem appearances and Obs
1	Lancet 1826	Dr Wardrop	F 45	Tumour at the inner side of the right Sterno Mastoid Muscle	Paroxysms of Dyspnœa			Severe pain in the neck	Pulse full		Bruit de Soufflet over the Tumour	Subclavian tied on 26th July 1826	Died Sept 13th 1826
2	1829	Dr Evans	M 30	Tumour appeared after a paroxysm of coughing above Sterno clavicular articulation pulsated	Dyspnœa	Cough			Pulses of Equal Volume	No dulness	No Bruit	Carotid tied - no pulsation in right Subclavian or in the Brachial 8 days after	Well 9 years after operation, partial paralysis Dyspnœa & Cough became less severe after the
3	1836	Mr Ray	M 52			Cough		Dull gnawing Pain					Sternum partly absorbed - Descending Aorta
4	1837	Mr Hearn	F 28	Tumour on right side between the Sterno cleido mastoid and the trachea	Dyspnœa	Cough			Right Pulse very indistinct		Loud tracheal wheezing - Bruit over the tumour in right carotid and Subclavian - Tumour emitted sound similar to and synchronous with the Heart"	Carotid tied. Subclavian tied two years after the operation but patient would not submit to operation	4 months after operation the tumour pulsated dyspnœa had disappeared - Died Four months after last op
5	1841	Dr Maxwell	M 41	Small Tumour above Sternum Pulsating	no Dyspnœa	no cough			no palpitation				Disease confined to the innominata -
6	Edinburgh med & Surg Journal vol XXVI	Dr Whiting	M 40		Dyspnœa	Crowing Cough	Dysphagia				occasional Bronchitis		Cartilages of the Larynx partly absorbed and ulc Larynx from the pressure of the sac - Produc
7	vol XXV	Dr Stuchinclose	M 64	Pulsating Tumour above the Sterno clavicular articulation & extending along the course of the Carotid	Dyspnœa so urgent as to prevent sleeping	Dry Cough. Voice hoarse		Intense pain over right side of Head and face			"The pulsations of the Tumour corresponded with the action of the Heart"		Tumour occupied the entire of right side of neck breaches over Two inches to left side - no internal c together with innominata all aneurismal - C from the blood passing back into the aorta - Death
8	London Med: Gazette Vol 17	Dr Mott (New York)	M 50	Pulsating Tumour under right Sterno clavicular articulation	Dyspnœa			pain over tumour on applying pressure - Œdema of Hand & Members of right arm	No right radial pulse right Carotid pulsation weaker than the left		Bruit de Soufflet over the Tumour		Clavicle partly dislocated and absorbed displaced Subclavian and roots of the corre the innominata -
9	vol XXIV	Dr Hughes	M 40	Pulsating Tumour under right Sterno Mastoid Muscle Tumour disappeared without any apparent cause	Dyspnœa which ever much increased on the disappearance of the Tumour		Dysphagia		Right Subclavian artery appeared larger than the left. Heart's action Feeble		Signs of Consolidation in the upper part of right lung		Three aneurismal swellings one of the innominata & the 3rd Subclavian - Left Subclavian arteries closed - Heart La Aneurism had perforated the trachea - the perin
10	vol XXV	Dr Reid	M 50			Cough Hoarse Voice		Violent pain in right side of the Back - Numbness & pain in right arm - Veins of neck large finally Œdema & loss of power in right arm - which ultimately extended to the other arm	No right pulse				Sternal end of clavicle and first rib absor
11	vol XXV	Dr Watson	M 33	Swelling above right clavicle caused by compression of Lymphatics no external Tumour				Jugular veins turgid - Veins of Chest & abdomen enlarged	Right Pulse much smaller than the left		Point of Pulsation at the upper part of the Sternum - no Bruit de Soufflet		Coats of the Brachio Cave, Internal Jugular &
12	vol XXV	Dr Wickham	M 55		Dyspnœa	Cough						Carotid & Subclavian tied	Death from rupture of the Sac
13	vol XXV	Dr Wilson	M 44		Dyspnœa	Voice as low as a whisper	Dysphagia	Veins of neck turgid. Œdema of upper extremities					Tumour overlapped the Thyroid gland - Cla Reached as far as Sphenoid bone & obliterated
14	Edin Monthly Journal of Medical Science Vol IV	Dr Henderson	F 57	Tumour pulsating at the sternal end of the clavicle					Right Pulse smallest Long interval between the contraction of the ventricle and the pulse at the wrist	Dulness of the Clavicle and Sternum from above its articulation with the 2nd rib	A single obscure murmur, above the clavicle with the aneurismal diastole - A feeble cooing sound with the pulsations of the Heart below the clavicle & becoming louder towards the 4th cartilage of left rib - Becoming still fainter towards the apex of the Heart - Murmur with both Sounds of the Heart but marked with the 2nd & becoming less distinct towards the apex - 1st sound of the Heart often pure -		Aneurism of the aorta partial dilata Heart dilated, not Hypertrophied - A of regurgitation
15	Dublin Med Journal Vol V	Dr Stokes	M 34	Pulsating Tumour at first under Sternal end of clavicle, after wards Articulation - Tumour far above the clavicle	Dyspnœa	Laryngeal Cough Larynx & trachea pushed far left side	Dysphagia towards the close of life	Pain of right side of Head & neck - Hemiplegia of left side of the body Veins of right side of the neck turgid	right Pulse very indistinct	Sternal half of clavicle dull	Feeble respiratory murmur in right lung - Bruit in the left - Double pulsation heard over the tumour becoming weaker towards the Heart No Bruit de Soufflet		Aneurism of the Innominata -
16	vol XXV	Dr Hutton	M 47	Tumour at first under the clavicular articulation finally extended across the neck	Dyspnœa	Cough		Pain in right shoulder extending up right side of neck face & head	right pulse smalled			Carotid tied - Death from ulceration of the vessel where the ligature was applied (35 days after)	Tumour had projected into the Trachea Minute Opening
17	Med & Phys Journ: vol XXXIV	Dr Robinson	M 53	Tumour the size of an orange above right Sterno clavicular articulation	Dyspnœa	Dry Cough			"oppressed Pulse"		Bruit de soufflet -		Aneurism of Innominata - Ascending ao patches on this vessel - Clavicle thicke upper end of Sternum & part of clavic the left side of the body occurred a Tumour M this paralysis was referred to an injury of the tra paralysis appeared - The corpora striata and the plate occupied by fibrous t
18	Caspers Archives Bye 206	Mr Key	F 46	Pulsating Tumour above right Clavicle					Left Pulse rached & feebler than right	Slight dulness on right side	No Bruit de soufflet	Innominata attempted to be tied and found impracticable	Died asphyxiated - Descending aorta

Tabular View of 18 cases of Aneurism of the Aorta Innominata (collected from the British Medical Journals)

Dysphagia	Pains	Heart & Pulse	Percussion	Auscultation	Operation	Post mortem appearances and observations
	Severe Pain in the neck	Pulse Full		Bruit de soufflet over the Tumour	Subclavian tied on 26th July 1826	Died Sept 13th 1828
		Pulses of Equal Volume	No Dulness	No Bruit	Carotid tied - no pulsation in right Subclavian or in the Brachial 8 days after	Well 9 years after operation, partial paralysis of the right side of the body - Dyspnoea & Cough became less severe after the Tumour appeared externally
	Dull gnawing Pain					Sternum partly absorbed - Descending aorta also aneurismal
		Right pulse over indistinct		Loud tracheal wheezing - Bruit over the Tumour in right carotid and Subclavian - "Tumour emitted sounds similar to and synchronous with the heart"	Carotid tied. Subclavian tied Two Years after the operation	A month after operation the Tumour pulsated less violently and the dyspnoea had disappeared - Died Four months after last operation -
		No palpitation			patient would not submit to operation	Disease confined to the innominata -
Dysphagia				Occasional Bronchitis		Cartilages of the Larynx partly absorbed and a tumour formed within the Larynx from the pressure of the sac - No diagnosis made -
	Intense pain over right side of Head and face			"The pulsations of the Tumour corresponded with the action of the heart"		Tumour occupied the entire of right side of neck & had displaced the Larynx and trachea over two inches to left side - No internal rupture - carotid & subclavian together with innominata all aneurismal - Tumour disappeared after death from the blood passing back into the aorta - Death probably caused by Asphyxia from the blood passing back into the aorta
	Pain over tumour on applying pressure - Oedema & Tremulousness of right Arm	No right radial pulse right Carotid pulsation weaker than the left		Bruit de Soufflet over the Tumour		Clavicle partly dislocated and absorbed - trachea flattened and displaced Subclavian and root of the carotid aneurismal as well as the innominata -
Dysphagia		Right Subclavian artery appeared larger than the left. Heart's action Feeble		Signs of consolidation in the upper part of right lung		Three aneurismal swellings one of the neck a second of the innominata & the 3rd Subclavian - Mouths of left carotid and left Subclavian arteries closed - Heart large & fatty - The aortic aneurism had perforated the trachea - the opening was found closed by a clot.
	Violent pain in right side of the Back - Numbness & pain in right Arm Veins of neck turgid finally Oedema - Loss of power in right Arm - which ultimately extended to the other Arm	No right pulse				Sternal end of clavicle and first rib absorbed -
	Regular veins turgid - Veins of Chest & abdomen enlarged	Right Pulse much smaller than the left		Point of Pulsation at the upper part of the Sternum - no Bruit de soufflet		Coats of the Vena Cava, Internal Jugular & other great Veins Thickened
					Carotid & Subclavian tied	Death from rupture of the Sac
Dysphagia	Veins of neck turgid. Oedema Upper extremities					Tumour was seated the Thyroid gland - Clavicle & Sternum partly absorbed Brachial and Cephalic Veins obliterated - Ascending aorta dilated & Aneurismal
		Right pulse smallest Constant interval between the contraction of the Ventricle and the pulse at the wrist	Dulness of the Clavicle and Sternum from above its articulation with the 2nd rib	A single obscure murmur, above the clavicle with the Aneurismal diastole - A feeble cooing Sound with the Sacs systole heard below the clavicle & becoming louder towards the 4th Cartilage of left Rib - Becoming still fainter towards the apex of the Heart - Murmur with both Sounds of the Heart but marked with the 2nd & becoming less distinct towards the apex - 1st Sound of the Heart often pure -		Aneurism of the aorta partial dilatation of the aorta Heart dilated, not Hypertrophied - Aortic valves admitting of regurgitation
Dysphagia towards the close of life	Pain of right side of Head & neck - Hemiplegia of left side of the body Veins of right side of the neck turgid	Right Pulse very indistinct	Sternal half of clavicle dull	Feeble respiratory murmur in right Lung - Rales in the left - Double pulsation heard over the tumour becoming weaker towards the Heart No Bruit de Soufflet		Aneurism of the Innominata -
	Pain in right shoulder - Extending up right side of neck & face & Head	Right pulse Small			Carotid tied - Death from ulceration of the vessel where the ligature was applied (65 days after)	Tumour had projected into the Trachea and perforated it by a minute opening -
		"Oppressed Pulse"		Bruit de soufflet -		Aneurism of innominata - Ascending aorta dilated & Osseous patches on this vessel - Clavicle dislocated from the Sternum - upper end of Sternum & part of clavicle absorbed - Paralysis of the left side of the body occurred a Twelve month before the tumour appeared this paralysis was referred to an injury of the head received Nine years before paralysis appeared - "the corpora Striata was found to have disappeared and its place occupied by fibrous lymph"
		Left Pulse reached the fingers later than right	Slight dulness on right side	No Bruit de soufflet	Innominata attempted to be tied and found	Died asphyxiated - Ascending aorta also aneurismal

This table is intended for comparison with Dr Greenes tabular view of
Twelve cases of Aneurism of the arch of the aorta
in the 2nd vol: Dublin Quarterly journal.

In this table we have endavoured to give as far as possible the words of the physician by whom they are published in order to avoid any errors - If any have occurred they are those of omission rather than of commission, which we shall endavour to correct at some future period -

Many of these cases are very imperfectly reported for example No 3 - 6 & 12, but they will not affect our object of comparison.

A Summary of the phenomena observed in Dr Greenes cases and in this table will render the differences more perceptible

In Dr. Greenes table of 12 cases	In the accompanying table of 18 cases
No defined tumour of aortic aneurism occurred in any of the cases.	Tumour above right Sterno clavicular articulation in 12 cases.
Dyspnoea in 10 cases.	Dyspnoea in 12 cases.
Cough paroxysmal in 12 cases.	Cough in 10 cases.
Dysphagia in 9 cases.	Dysphagia in 4 cases.
Pain over entire chest in 7 -.	Pain over right side of neck & face in 6 cases.
Pain at left side with numbness of left hand in 3 cases.	Loss of power over right arm in 2 cases.
Veins of neck turgid in 4 cases.	Hemiplegia of left side in 1 case.
Veins of chest in 4 cases.	Veins of the neck turgid in 4 cases.
Veins of left arm in 1 case.	
— both arms 2 cases.	
Right Pulse weakest in 2 cases.	Right Pulse smallest or absent in 7 cases.
Left pulse weakest in 3 cases	Left pulse smallest in 1 case.
	Carotid pulse of right side weaker in 1 case.
	Subclavian pulse of left side weaker in 1 case.

Dr Greene's cases of aortic aneurism	In the table of Innominate aneurism
Tulness over the upper part of chest sternum or the inner third of right clavicle in 7 cases.	Tulness over sternum and clavicle or right side in four cases.
Some modification of murmur in 7 cases	A morbid murmur in 4 cases
Double sound & double impulse in 6 cases.	Double Sound & impulse in 4 cases
Bruit heard down the left side of spine in 2 cases (in which the heart was healthy)	No mention of Bruit down the Spinal column.
Voice Feeble & whispering in 3 cases.	Voice hoarse in 2 cases feeble in 1 case.
Respiratory Murmur feeblest in left lung in 7 cases.	Feeble resp. Murmur in the right Lung in one case.
Some morbid respiratory phenomena in 11 cases	The above the only respiratory phenomena mentioned, excepting a loud tracheal wheezing in one case
Two of the patients were females	Four cases in Females. -

It would appear from these statements that there are some well marked differences between these two affections, and there is good reason to entertain the hope that their diagnosis will be placed on some more firm basis than has been done up to the present time; and yet we hear of operations for the cure of aneurism of the innominata; we would ask ought not the existence of a disease be well ascertained before the Surgeon attempts its cure by operation? we ourselves know of one case in which the Subclavian and Carotid were tied

to cure an innominata aneurism; the surgeon gained great applause for his skill in the use of the knife; the patient died of hemorrhage from the carotid (on the 12th day) and on examination after death the disease was found to be a vast aneurism of the arch of the aorta - (the preparation is in the possession of Doctor Hobart Cork) and this is not a solitary case, many such are to found in the annals of Surgery it were perhaps a startling question to the operators in such cases if they were asked "how long the patient might have lived had not Science interfered?

The following conclusions may be drawn from the Comparison of the table with Dr Green's cases

1st That a pulsating Tumour above the right Sterno-clavicular articulation is of more frequent occurrence in Aneurisms of the innominata, than in those of the arch of the aorta and this by a very large proportion.

2nd That Dysphagia is of much more frequent occurrence in Aneurism of the arch of the aorta. (see foot note *

3rd In Innominata aneurisms the pain is generally referred to the right side of neck face and head - in those of the arch, the pain is over and across the upper part of the entire chest.

Note* Dr Stokes observes in his paper on the diagnosis of Aneurism 5th Vol Dublin Medical Journal "That it seems probable that in Aneurism of the innominata Stridulous breathing coexisting with Dysphagia would be more constant than in aortic aneurism" - this is not borne out by the cases before us -

4th The right arm affected with pain and partial loss of motion or sensation in Aneurism of the Innominata.
The left arm suffering in the same manner in aortic aneurism
5th The State of the Venous system does not appear to present much to guide us - But from the position of the left Vena innominata we would conclude that the veins of the left side of the body ought to be rendered more turged than those on the right - Though no general rule could be made from three cases.
6th The right radial pulse weaker than the left in Aneurism of the innominata - (in only one case was left pulse weakest) (See foot note *)
7th Double sound would appear to be a more frequent sign of aneurisms of the innominata than of the arch.
8th. Bruit heard down along the spinal column is a frequent occurrence in aortic aneurism - being heard in two of Dr Greenes cases - it is not mentioned as existing in any of the cases of innominata aneurism -
(Further attention to this phenomena would in all likelihood establish an important general rule regarding this sign)
9th The voice more frequently affected in proportion to the number of cases in aortic aneurisms.
10th Some morbid respiratory phenomena present (as a general rule) in aortic aneurism - their occurrence in Aneurisms of the innominata the exception & not the usual occurrence -
11th Large proportion of females affected with innominata

* "Conversant observers that the left radial pulse is more frequently the weaker in aortic aneurism" - as states in Dr Greenes paper page 22nd

Aneurism from wounds of the Aorta -

In order to show that these observations have been attempted to be made practically useful, we shall conclude this part of the subject by recording the following case, in which the importance of accurate & careful examination previous to operation is well illustrated -

Ellen Shea aged 27 admitted into South Infirmary Cork in May 1849 - Under treatment of Dr Hobart one of the Surgeons to the Institution -

After undergoing repeated examinations the patient was considered as affected with aneurism of the innominata - and Dr Hobart had proposed to tie the carotid and subclavian arteries - but previous to the performance of the operation Dr H requested me to examine the case and I obtained the following account

She suffered from palpitation of the heart for the last Eight months - For months past, she noticed for the first time a pulsating tumour at the upper part of the chest & about the same time the veins of her neck became turged (particularly on the right side) and her face edematous - A short time before admission into hospital her ankles were swollen - Suffers from dull constant pain between the scapulæ with occasional stitches down right arm. Complains of a hoarseness and loss of her voice" which comes and goes from day to day" -

Never had Dysphagia or Dyspnoea & enjoys good health
her chief distress being caused by the beating of the tumour
& a constant dry cough -
Larynx &c - respiration Easy and without Stridor.
The veins on right side of the neck very turgid -
A pulsating tumour larger than a walnut is seen above
right Sternoclavicular articulation - Sternal end of
right clavicle dull on percussion - respiratory murmur
scarcely audible over the upper part of right lung - loud
in the lower part of same lung & over the entire of left side.
No râle in any part of the chest -
Heart's action quick - A soft murmur with both sounds
of the heart - loudest at the left side of the lower third of
Sternum, above this point it becomes weaker and
is soon replaced by another sound -
Well marked thrill can be felt over the tumour, &
on applying the Stethoscope in this situation a loud
double sound is heard accompanied by a harsh rasping
double murmur - These phenomena have their
maximum of intensity just below the right Sterno=
clavicular articulation - When the Stethoscope was
moved across the chest in the direction of a line drawn
from the tumour to the apex of the heart, we found, that
the aneurismal Bruits became gradually less distinct
until we reached a point about midway between the

tumour and the heart's apex, where it was replaced by a double murmur of much softer tone which became more intense as we approached the heart - This latter sound being the double murmur before mentioned as accompanying the heart's action -

We have then in this case two points of pulsation within the chest, each accompanied by a distinct systolic and diastolic sound & each giving origin to a double murmur; one set of murmurs (the aneurismal), harsh; the other set (the cardiac) soft - We next examined the arteries - Radial pulses of equal volume: Thrill can be felt & a murmur heard in the carotid and subclavian arteries on both sides of the neck, rather better marked on the right than on left side - Double sound & double murmur heard down the spinal column as low as 5th dorsal vertebra, equally loud on both sides of the spine - Below the 5th dorsal spinous process the sound and murmur lose their double character; below this point a single pulsation and single Bruit is audible.

On the 5th of June she complained for the first time of a violent pulsation in the abdomen accompanied by a feeling of faintness, & she remarked that "the beating in the neck was less strong" - A hot well defined tumour can be felt in the epigastric region, pulsating & accompanied by a loud Bruit - Both murmur and

pulsation are single. Pressure of the hand in the epigastric region causes pain in the back, and a feeling of nausea, with a sensation of fluid passing from the abdomen up into the chest.

In the latter end of the month of June she had a slight attack of dysphagia and on the day following she spat up without effort over an ounce of semicoagulated dark coloured blood. Leeches were applied over the tumour which relieved the dysphagia & since then up to her leaving the hospital in the month of September she had no return of either the hemoptysis or dysphagia - and no new sign or symptom developed save the occurrence of pain & occasional lividity of right arm and fingers of right hand - Pain in right arm at times very severe

These observations were afterwards confirmed by the physicians of the Hospital,* and as the existance of regurgitant disease of the aortic valves was put beyond the possibility of doubt, all idea of operating was lain aside -

As to the exact position of the aneurysmal tumour we considered it, to engage the anterior & superior part of the transverse portion of the arch - and that there also existed a dilatation or aneurism of the abdominal aorta a little below the diaphragm -

In this case the correctness of the diagnosis must

* We are allowed to refer to the physicians of the South Infirmary Cork in confirmation of the accuracy of these notes, but would request they [illegible]

remain for the present a matter of doubt, as the patient is still enjoying a moderate share of good health; had she been operated upon, an opportunity would most probably have been afforded of testing the accuracy of the diagnosis by post mortem examination

If aortic valve disease had not been present, then the existance of a Bruit in both carotids would have been a valuable guide ; inasmuch as, we could not conceive it possible for disease in the innominata to cause a murmur in the left carotid, and it would be perfectly possible for an aneurism of the arch of the aorta to cause murmurs in all the great vessels, as they all take their origin from it.

The case just mentioned fully confirms the observation of Dr Stokes Greene & Corbal & others viz that a single cavity is capable of producing Two Sounds & originating Two Murmurs - but as observed at P44 we would consider the second Murmur as indicating and caused by roughening of the distal side of the opening leading out of the Sac -

Dr Stokes's case in the 5 Vol of the Dublin Medical Journal together with the case before us, would appear to disprove one of Dr Hendersons conclusions in his paper on "The Sounds afforded by Substernal aneurisms" Edinburgh Medical Journal P324 - he remarks "That, when two pure sounds, i.e. sounds free from morbid murmurs or

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pasings, are heard in the situation of an aneurism,
the one only originates at the Sinuses the other being
communicated from the sigmoid valves"
Dr Henderson has arrived at one very important observation

Henderson
Edin Med Jour
Vol XLV
P324

viz "That the second sound of the heart is susceptible
of increase and probably of diminution from disease
of the aorta capable of modifying the energy with which
the blood recoils upon the valves" -
There are no doubt many remarks in this 3rd part of
our Essay, which will not stand the test of more extended
observation and others which will require modifying
before they can be classed among the list of facts;
It could not be otherwise considering the imperfect
state of our knowledge of these affections, and if each
of our conclusions were ultimately proved incorrect, still
our time would not have been misspent, for in order
to disprove these observations much attention should
have been paid to this Subject and this would end in
the establishment of sure ground on which to erect
the differential Diagnosis of Aneurisms of the
Innominata from those of the arch of the Aorta.

Part 4th

Differential diagnosis of Thoracic Aneurism from Laryngitis, Intrathoracic Cancer and from Pulsating Empyema -

We have but one original observation to offer on this part of the subject, it must therefore suffice to collect the symptoms and signs of these diseases and by placing them opposite one another, to show at a glance the differences that exist between them.

By such tables as the following, we learn, the symptoms and signs of each affection, can estimate their value singly and collectively and see their relation one to the other, which enables us to take a logical and comprehensive view of the case before us.

Were this method more fully carried out (than it has been hitherto done), both in the mind of the physician and in his notes, there would in all probability be much less "jumping at a diagnosis" (if we may use the expression) far more certainty [redacted] and success in treatment

Diagnosis of Thoracic aneurism from Laryngitis

In aneurism we have,	In Laryngitis we have
1st Evidence of Internial pressure.	
as. feebleness of respiratory murmur	1st Respiratory murmur Equally
(a) in one lung or part of a lung,	(a) feeble over both lungs.
without the signs of inflammation	
solidification or effusion -.	
(b) Dislocation of clavicle &c..	(b) No dislocations or displacements.
(c) External tumour or gpment.	(c) No tumour or other enlargment.
Enlargment or protusion of parts.	
2nd Evidence of Solidity within thr chest.	2nd No Evidence of Solidity
(a) dulness of thr clavicle or chest.	within the chest - pneumonia
(b) Bronchial or tracheal respiration or	or bronchitis is often superadded &
great resonance of the voice in some situation.	they present their proper signs -
3 Existance of Signs of Aneurism	3 Absence of these signs.
as Pulsation, Bruit, &c.	
4 difference in the Radial pulses.	4th Pulses Equal.
5 Pain lancenating, intermitting	5th Cause of suffocation high up
and low down within the chest.	in the neck as if from constriction.
6th Disease begun without any	6th Traceable to cold Sphyxes
assignable cause.	or some other cause.
7th Dysphagia always disparate.	7th Dysphagia not a common symptom & high up
8th Local venous turgescence.	8th General venous congestion during & after
9th Edema of the arms, neck or face	9th If any Edema occur it will
on the side of the aneurism.	Engage the Upper part of the body generally &
10th Tympanitic swelling of the neck.	10th - None -
11th "Stridor from below".	11th Stridulous breathing beginning
	from above.

Diagnosis of Intra Thoracic Cancer from Thoracic Aneurism

The diagnosis of pulsating cancerous tumours within the chest from aneurism, is a problem requiring much attention to the succession & mode of occurrence of both Signs and Symptoms before we can attempt its solution. The two diseases have much in common, both may cause dulness on percussion, tracheal breathing, pulsation, dyspnœa dysphagia, difference in the radial pulses & Bruit de Soufflet. Dislocation of the viscera occur in both affections (as an example of this we may mention Mr Lynn's case in which the diaphragm was pushed down and the heart displaced far to the left side and much lower than natural) in fact the diagnosis from physical Signs depends chiefly, on the great extent of the dulness and feebleness of pulsation in cancer, when compared with aneurism.

Lynn Med Chir: Trans Vol xxiij

It is to Dr William Stokes that the profession is indebted for most of what is known on this subject, and his diagnosis of cancerous degeneration of the lung was indeed an illustration of what can be done by long continued observation, opening a new and heretofore considered impassable path in diagnostic Medicine. Cancerous tumours derive their pulsation from the vessels with which they are in contact, and the Bruit which occurs in these tumours is caused by the pressure exercised on them. If the explanation we have offered of the cause of Double Bruit be correct (see p 44) it would be impossible for it to be caused by the pressure of Cancerous or other tumour, as we consider it to have its origin in the roughened coats of the artery.

Stokes on the diagnosis of Cancer of the lung Lib: Med: Chir: Vol xxi p 266

Up to the present time double Bruit has only been heard in aneurismal tumours, hence we must (at least for the present) regard its presence as conclusive proof that the disease is not cancerous. This difference has not been before noticed, and it may have weight in forming our opinion as to the nature of the case we are examining

In Intrathoracic Cancer	In Thoracic aneurisms
1st The expression of the countenance is peculiar & very characteristic of Malignant disease.	1st The countenance is anxious & often expressive of suffering.
2nd The Vesicular murmur diminishes gradually, until it is entirely absent.	2nd The murmur diminishes much more rapidly & is never entirely lost.
3rd occasional pain of a pleuritic kind	3rd Lancinating & dull pains.
4th Tumours often occur on other parts of the body which do not present aneurismal characters	4th If external tumours appear they have all the signs of aneurisms.
5th Expectoration of matter called from its colour "black jelly coloured Sputa".	5th Expectoration small in quantity and consisting of mucous.
6th Haemoptysis frequent.	6th This is a very rare symptom in aneurism.
7th Enlargement of the superficial Veins very well marked.	7th Veins not so much competed. And the congestion extends over a smaller space
8th Frequent Coudyperton Empyema.	8th Not related in any way to Empyema.
9th Complete dulness on percussion over a large portion of the chest.	9th Dulness confined to a small space.
10th Pulsation feeble & diffused.	10th Pulsation strong often violent in one point

In Intra Thoracic Cancer

11th Bruit is Single in all cases.
12 Signs of Internal pressure increase very slowly.
13th No absorption of the bones.
14th The Symptoms and Signs do not vary in intensity at different times.
15th Symptoms resist all attempts at alleviation by treatment & are not aggravated by Muscular effort.

In Intra Thoracic Aneurism

11th Double Bruit may be present.
12 often exceedingly rapid & formidable increase in Signs of Internal pressure
13th Absorption of the bones caused by the pressure
14th Greatest variation in the intensity of all the phenomena.
15th Great relief afforded by bleeding leeching and rendered more beneficial by Emetics.

Diagnosis of Pulsating Empyema from Thoracic Aneurism

"Pulsating Empyema of Necessity" is the name applied to a form of Circumscribed Empyema (described by Dr McDonell in the 25th Volume of the Dublin Medical Journal) which receives its pulsations from the heart. We have never seen a case of this kind: Dr McDonell says "they resemble aneurisms in the long continued pain, dyspnea, cough, & liability to occur at our Side, (namely the left) pain in a certain point where after a time a small tumour appears, which increases in size is devoid of pain and presents a diastolic pulsation & finally ruptures giving rise in cases of Pulsating Empyema to Pneumothorax by internal fistula. We believe Dr McDonell is mistaken when he asserts that aneurisms are more liable to occur on the left side, and we would be less likely to confound this disease with Aneurism on account of its occurring low down at the left side of the chest.

Pulsating Empyema

1st Begins with symptoms and signs of Pleuritis with effusion.
2nd No Dyspnagia, Bruit de Souffet or thrill
3rd The Pulsation is not strongest at the point where the dulness is greatest
4th occur only on the Left Side

The absence of many of the signs of aneurism will prevent these diseases being mistaken one for the other

Thoracic Aneurism

1st None of these signs precede the formation of aneurism.
2nd The signs usually present -
3rd Pulsation always loudest at the point of extreme dulness
4th May appear on either side most frequently the right.

To conclude - our endeavour has been, to make this Essay as practical as possible; to avoid making use of the observations of others without acknowledging from whence we derived our information, and to render the entire as complete [redacted] and concise as lay in our power.

Thos S. Holland March 1850
