THE HISTORY OF ANEURYSM.

Being a contribution to the study of the origin, growth and progress of ideas in Medicine.

By

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"In some converse with letters my tastes, if not my talents have attracted me to the development and propagation of ideas through the long and broken ways of history."

Clifford Allbutt.
"Fitzpatrick Lectures."
1909-10.

The above words lend an encouragement to those, who, searching from inclination in the shadowy realms of the past are constrained to advance an apologia against futility. Like Paracelsus before the assembled multitude of students at Basel, flinging into the fire of St. John the "decadent" works of the past, some would have us fix our eyes forever on the future. But the history of medicine is "more than the raw material for pieties, regrets, and picturesque instances", more even than the epic of those who laboured to cut the steps by which medicine mounts towards Truth: it is a well of inspiration and a source of ideals out of which, whatever the limits of the subject, may be drawn a stimulus for future endeavour.

When the heavy mists of obscurity which veil the beginnings of man are rolled aside there emerge dimly from the oblivion of a million years and more Egyptian, Babylonian, Hebrew and Chinese civilizations where the

physician was sunk in the priest and the healing art was wrapped in magic.

Much might be written about the medicine of these phantom empires which loom behind the tangible beginnings of the Genius that was Greece. But there is nothing concerning the subject of aneurysm in the charms, prayers and prescriptions of early Egypt, the sacrifices, divinations and demonology of Babylon, the soothsaying and incantations of the T'ang Dynasty or even in the more rational hygienic laws of the Pentateuch Code. Its beginning is in Greek medicine.

In order to postulate the recognition of the lesion known as aneurysm, it is necessary to premise the existence of some knowledge, however slight, of the arteries and their contents. Alcmaeon of Croton, the monumental figure of ancient medicine and the first Greek medical author known to us, had not this knowledge.[1.] There is but a meagre description of the blood vessels in the Hippocratic books and that attributed to Polybus, so that it is probable that Hippocrates, like Aristotle, did not appreciate the difference between arteries and veins[2.], both being called φλεβες (Littré)* while the term artery, (arteria - ἀρτηρία)[3.] was used to indicate the trachea as an air-containing tube.

Praxagoras the Coan (C.340 B.C.) first actually distinguished arteries from veins, and from his dissections,

* Galen: "quod autem arterias antiqui venas appellabant."

thinking of the collapsed and empty arterioles as air-containing tubes, it was natural for him to deduce that pneuma, which Alcmaeon and later Aristotle had regarded as nerve-borne, was responsible for their pulsation and thus to apply also to them the name arteriae.

Herophilus, pupil of Praxagoras, admitted blood to the arteries but assumed its admixture with pneuma, as also did Erasistratus from whom it passed to Asclepiades in Rome, and Galen, too, believed in this admixture of blood and air.

After the advent of this knowledge, descriptions of a vascular lesion distinct from the varix noted by Hippocrates appeared somewhat tardily in the literature. The passage of the early Greek writings down the centuries has been a troubled one, and the additions, annotations, abbreviations, corruptions and deletions to which they were at different times subjected make it difficult to define them in their original purity and thus to attribute priority definitely.

Further it is not improbable that the term Ἀνεύρυσμα, aneurysma, of which the various possible sources of derivation are εὐρηνεῖν[4], exilire or effluere: εὐρύνω[5], dilato: a (privative) and τὸ νεῦρον[6] (A nerve): or ἀνὰ, retro and εὐρύνω, dilato, arose from a confused conception of the lesion, had in the beginning a loose or false application, and was used to denote also a

wounded artery, thrombosis, or even such swellings as goitre.[8.]

Many authors from their own researches, or from those of others, attribute the earliest knowledge or aneurysm to Galen: thus Freind[9.], Lancisi[10.], Weltinus[11.], Trew[12.], D Munro[13.], Scarpa[14.], Osler[15.], and Garrison[16.], hold this view, The priority of authorship, however, I do not attribute to Galen but to Rufus of Ephesus. This anatomist, philosopher and physician of the Hippocratic spirit and tradition, called by Oribasius "Rufus the Great" (Τέγραπται δὲ καὶ Ῥούφῳ τῷ μεγάλῳ κτλ : and it has also been written by Rufus the Great[17.]) journeyed widely like most of the ancient physicians, but probably resided mainly at Rome[18.] in the time of Trajan (53 to 117 A.D.). He was thus before Galen - born Pergamos A.D. 129 - who knew him as a previous author and spoke appreciatively of his works.[19] Rufus's works have been greatly fragmented, but Aëtius preserved in Tetra bibloS iv. Sermo ii. Cap Li. a chapter in which Rufus said,-

"It makes a tumour they call aneurysm, that is to say a dilatation of the artery" - (Efficitur tumor, quem aneurysma, hoc est, arteriae dilatationem graeci appellant). Whilst mentioning aneurysm, then, Rufus did not attribute the discovery to himself; from his wording the lesion was obviously previously known.

Later, Galen[20.] did write of aneurysm and applied the

term to a swelling containing "thin bright blood mixed with much subtile spirit" (sanguinem esse tenui multog ---- spiritui comistu alibi monstravimus) resulting from the wounding of an artery. He also observed clinically the pulsation, the disappearance of swelling upon pressure, the spouting of blood should the aneurysm be opened, and he finally differentiated it from oedema. Upon this evidence it has been assumed[21] that Galen knew only false, traumatic aneurysm, or "aneurysm by effusion". But although his references generally were to the spurious form he elsewhere stated that aneurysm was "a dilatation of a vessel" (dilatatio vasorum).

To realise that Galen's physiology was impregnated with pneuma-lore, his pathology based on the Pythagorean critical days and the Hippocratic doctrine of humours, and his anatomy confined through prejudice to apes and pigs makes it astonishing, not that he may have missed internal aneurysm, but that he should have so clearly described the signs of the external lesion. He had a treatment too, and in a case of brachial traumatic aneurysm he cured the patient by applying compression with a sponge, "ac spongiam mollissimam extrinsicus super hoc deligavi."[23]

Other treatment of this time was exclusively surgical. Antyllus, a distinguished physician who was also a surgeon, introduced an operation of ligation above and below the lesion thereafter incising and emptying the sac,[24] whilst

a little later (c 360 - 375) Philagrius, more famous for his operation for stone, described a somewhat similar treatment.[25.] Such methods were mainly employed in the traumatic brachial aneurysms which resulted from unskilled venesection, or from the rare performance of arteriotomy; indeed it is probable that despite the violence of the times,more of these cases resulted from the misdirected puncture of the lancet rather than the well-directed thrust of the sword.

Oribasius, who lived towards the end of the fourth century, was not a plagiarist but a professed and honest compiler. Chapter XX of his XLV th. book is entitled "On aneurysm, taken from Antyllus, 1st. book of surgery." From this it is clear that Antyllus at least, knew true aneurysm for he said "There are two kinds of aneurysm. The one produced by a local dilatation of an artery: it is from this that the disease bears its name of aneurysm; the other results from the wounding of an artery and from the passage of blood into the surrounding flesh."

According to Oribasius, Antyllus must also have recognised the aneurysmal vibratory thrill.

Little of advance was made in the literature of the subject until the sixth century when the condition was described by Aëtius of Amida, a high physician of Byzantium

whose works have come down to us very fully. He was not free from the taint of magic and from the prevailing looseness of terminology, whilst he undoubtedly plagiarized Galen, yet there is evidence that he too recognised that aneurysm might arise apart from those "preceded by a wound of the artery", and he wrote thus of the true lesion,-

"Notae aneurysmatis sunt, tumor parvus aut magnus, cocolor, citra dolore, ad tactu mollis, spongiosam laxitate prae se feres: Et ita ad digitoru compressione cedens, ut prope modu evanescere videatur, veru amotis digitis citissime revertes, id quod in meti aneurysmate et reliquis quae sine vulnere fiunt, praecipue videre datur."[26]

Further he emphatically differentiated the above condition from false aneurysm - "But when it has been preceded by a wound of the artery the tumour does not present the same softness,"*

It has been my endeavour by reproducing these little-known passages from the text of Oribasius and Aëtius to controvert the belief which has descended from Silvaticus,[27] Severinus[28] and Scarpa[29] that the Greeks knew only false aneurysm. i.e. that formed "by the extravasation of blood under the skin." (Scarpa.)

Aëtius moreover stated that "this dilitation of vessels (which the Greeks call aneurysm)" was common in

* "At ubi arteriae vulnus praecessit -------- tumor non similiter mollis occurrit.

women after difficult labours and was most frequently met with in the throat. However it is more than doubtful if this reference was to aortic aneurysm, apart from the sex incidence mentioned, for Aëtius went on to say that the tumour was known by the name of bronchocele[30.] (tumora Branchocela appellatum) which in the early days was loosely confounded with struma or goitre.[31.]

Aëtius, without the eclectic mind of Galen, was more fully dominated by the belief that blood and spirits (spiritus animalis) might escape from the vessel by anastomosis, diapoedesis or diacroesis, and this inevitably clouded his pathology, but he too had an anatomically sound surgical treatment for external aneurysm.

This he described fully, showing that he used powdered myrrh to pack the wound in order to favour the formation of pus[32.] - an early indication of the doctrine of laudable pus. "Aneurysms of the head and neck" he considered past the remedy of the surgeon but regarded as advantageous the discutient application of a plaster of cypress.

In the seventh century the knowledge of aneurysm, if not increased, was at least consolidated by Paul of Aegina, another product of the famous Alexandrian School which in this same century (c 640) was ravished by Arab hands and came to its end. Although he is best known by the fifth of his seven books, a volume devoted to toxicology which became a very favourite textbook during

mediaeval times and which overshadowed to a certain extent his other works, he wrote of aneurysm and its treatment.[33] His words bear a close resemblance to those of Aetius, and Broca strongly remarks that "il a pillé sans scruple."

He recognised external aneurysm, and the operation he advanced had a combination of the technique of Antyllus and of Aëtius.

But Paul was the last of the Alexandrians as Aëtius was the last of the Greeks, and the knowledge of aneurysm up to this time may be epitomised. External aneurysms were well known both from trauma (false) and from true dilatation, and despite the obscurity of circulatory physiology their clinical signs were recorded. Treatment was by compression, local applications and by surgical means. References occur in the literature to aneurysms of the neck regarded as incurable but there is no definite allusion to the internal lesion.

Dark days lay ahead. When the barbarian hordes, grown increasingly aggressive, swept into and sacked Rome in 410 under Alaric the Goth, the shock of the calamity had shaken the civilised world. Greek physicians had long flourished in Rome after a period of initial hostility when Cato and Tertullian* had winged against them

* Tertullian asserted that Greek anatomists practiced dissection upon the living human subject.

shafts of malignity, and the destruction of their well-ordered garden was a blow to medicine. But the significance was greater far than this. The fate of the whole Roman Empire was sealed, and when it fell there ensued a stifling of culture and learning which persisted through the Middle Ages; for in few of the invaders did contact with the Graeco-Roman civilization arouse a spirit of research and a love of science.

We enter then upon the period of the Middle Ages. This is regarded as a desert in the history of learning which must be traversed in the journey from the classic ruins of a conquered Rome and a decadent Greece, to the reconstruction which had its beginning in the Renaissance. But even in this desert there were well defined oases through which the caravan routes of medicine passed and may be traced.

The Byzantine offshoot of Greek medicine which had been honourably upheld by Oribasius, Aëtius and Alexander of Tralles was still maintained, but gradually dwindled, although the name of Actuarius stands out towards the beginning of the fourteenth century in the gathering gloom which was enveloping it. He wrote thus of aneurysm: "porro arteriam secare plurimum negotii exhibet siquidem sanguinis fluxus, qui aegerrime sisti possit, et arteriae dilatationes, quas aneurysmata Graeci nominant, hinc oboriri solent."[34.]

With the fall of Constantinople this branch was finally destroyed in 1453, the year which, it may be remarked in passing, marked the foundation of Glasgow University as a "studium generale".

In Italy the school of Salernum was another centre of medical studies in the Middle Ages but, if perhaps the Regimen Sanitas be excluded, it maintained ideas but did not itself produce original thought. The authorities were mainly Hippocrates and Galen coupled with translations from the concurrent Arabian school, and there was no fresh contribution to the subject of aneurysm which I can trace.

The main transition of medicine was Arabian, for the victorious Arabs set themselves to acquire the culture which they saw lacking in themselves. Thus Arabian medicine was also chiefly derived from translations of the leading Greek authors. As dissection was forbidden anatomy and pathology were not advanced, whilst their physiology was simply that of Galen modified by transmission. By the Arabians the term aneurysma was corrupted to aburisma, amphorisma, aporisma, emborisma, emburisis, or even merely mater sanguinis.[35.]

Rhazes, who emanated from the great Bagdad hospital, towards the end of the ninth century wrote: de ruptura arterie, que vocatur aburisma.[36.] He knew the operation of Antyllus but made no mention of himself using it.

Haly Abbas[37.] and in the Spanish province, Albucasis[38.] knew aneurysm well. Albucasis in particular recognised the danger of opening this lesion in mistake for other forms of tumour, for he had seen this done. He several times spoke of the risk, and recommended that as a safeguard a cautery should be kept ready in doubtful cases.

Ibn Sina, better known as Avicenna, at the beginning of the eleventh century under the title of "De fluxu sanguinis" dealt with aneurysm, which he named emborism. He advocated the therapeutic use of compression; quod possibile est quiescere cum compressione.[39.]

It is undoubted from the literature that the main type of the disorder known to the Arabian school was false aneurysm, and the conception of the true lesion languished. The chief remedial measure was compression, and Bertapaglia[40.] one of the last of the Arabian authors, in the fourteenth century emphasised the efficacy of this treatment in what was clearly traumatic aneurysm (De Vulneribus.)

Meanwhile the rise of the University of Montpellier (founded by papal bull in 1287) had been favoured by the comparative proximity of the Spanish-arabian schools at Seville, Toledo, and Cordova. Guy de Chauliac,[41.] famous in the history of Montpellier, was acquainted with true aneurysm and advised astringent plasters and compression, whilst Henri de Mondeville had not the antipathy of the Arabs towards operating upon the external lesion.

Lanfranc too, who,driven out of Milan by the Visconti as he had become involved in the squabbles of the Guelphs and Ghibellines,had migrated to Paris, there devoted his attention to the cure of aneurysm and applied a special method which will be referred to later.

Thus in the Middle Ages there was little originality, and such additions as coloured the more lucid work of earlier times in its passage through this chromatic medium were neither emendations nor improvements. Although the corrupt nomenclature did not persist, by an orthographic or etymological error due "aux barbiers illettrés qui mirent pour la première fois la chirurgie dans langue vulgaire" the classic "aneurysm" of Rufus and Galen emerged from this period as "aneurism", in which spurious form it was frequently used through succeeding ages and is indeed commonly used to-day.

The coming of the Renaissance relit the torch of medical science and a new light was shed upon the subject of aneurysm.

Although the old order changed slowly, yet in 1542 Jean Fernel in France described the occurence of aneurysmal dilatation of the great vessels, noting those of the aorta, spleen and mesenteric arteries. 42. Fernelius also drew an analogy between the pathological distension of veins and of arteries but differentiated between them clinically. His theory of essential dilatation was, however, based

upon a false hypothesis, or as has been somewhat maliciously suggested by Scarpa, "was the result of his own imagination", for he considered that if the lesion were not formed by the coats of the dilated artery, but were due to blood effused from the vessel, "it would soon putrefy and give rise to a tumour of a different kind."[43.]

Whilst Fernelius practised in Paris, Vesalius at Padua was laying the foundations of modern anatomy, and it was a sound knowledge of this subject which enabled him in 1555 to point out the existence of internal aneurysm of the descending aorta in the person of a nobleman, Leonard Velserus, who developed a pulsating tumour close to the spine consequent upon a fall from his horse.

Vesalius said that he had found "in these swellings sometimes a humour concreted like Ice, or Crystal, sometimes like suet, and sometimes blood grumous like a Mola," and he gave a most unfavourable prognosis. When the patient died two years later, "upon dissection, the cavity of the aorta was found vastly dilated, and much clotted blood in it, as Vesalius had foretold, which gained him a great reputation."[44.]

This case has become classic and by that peculiar evolution which leads to the stressing of one event and the slurring over of another now stands as a landmark in the history of aneurysm, but it is undoubted that Vesalius knew other cases and was familiar clinically and

pathologically with aneurysm of the thoracic and abdominal aorta.[45.]

About this time, of almost equal interest, too, there was observed by Vidus Vidius a case, which he knew to be exceedingly rare, of a "prodigious intumescency ..... spreading itself equally through so many arterial branches so as to resemble large varices."[46.]

Fallopius had undertaken to open the swelling but as he was going to attempt the operation, fortunately "became discouraged" and would not proceed, This was almost certainly a case of cirsoid aneurysm and is the sole example I can find in the early literature of a lesion which thereafter lapsed into comparative obscurity until revived in 1833 by Breschet[47.] as "anévrysm cylindroïde" and by Dupuytren under the name of "varices artérielles."

That the dawn of learning did not immediately transfigure the writings of this century is well evidenced in the account of aneurysm given by Gorraeus.[48.] Although he too recognised the lesion as occuring "in the chest" his pathology is a bastard pneumatism and his words almost literally those of Aëtius, so that he served to maintain the fallacy of bronchocele and the fiction of detention of spirits, Even the illustrious Paré who had that humility of wisdom which crystallised in the famous phrase "Je le pansay Dieu le guèrit", least likely, as Sir Thomas

Browne says "to plume himself in other's feathers" did not hesitate to illuminate his works with the light of others.* Nevertheless he noted much independently, and the signs of aneurysm which he gave betoken the keenness of his observation, for in addition to tumour, character of pulsation, and disappearance of swelling upon compression he recorded[49.] (the first I can find to do so) that a hissing bruit might be heard without applying the fingers to the swelling.†

Paré's account of the disease is epitomised thus: "Aneurysms may be occasioned by anastomosis, diapedesis, rupture, erosion and wound (playe)" With Aëtius and Gorraeus he was convinced that it occured "principally in the throats of women who have difficult (or perhaps complicated -i.e, mauvais) labours", due again to escape or detention of spirits.[50.]

In his pathology he recognised thrombosis and ossification of the arterial wall, whilst his ingenious explanation of the beneficial nature of arterio-sclerosis exactly anticipated - even if more fancifully worded - the theory of Thoma three hundred years later - "for the earthy matter of the blood being dried and thickened by the

* Paré on being accused of plagiarizing De Héry simply answered that one candle must always be lit from another candle.

† Galen had recognised thethrill and noise on palpation. Broca attributes priority to Sennertus but I find Paré's observation considerably before this.

unusual heat, adheres to the coats of the artery and the parts which it occupies, thus becoming hard and bony (s'endurcist et deuient osseuse); and this by a great foresight of Nature (the handmaiden of the Almighty) constitutes a rampart or strong barrier, lest the hot and boiling blood full of spirit should escape and pass out of the coats of the aneurysmal or dilated artery,"

He preserved in his museum one of the first pathological specimens of aneurysm of the pulmonary artery, "a monstrous thing", from one Belanger, a master-tailor of the Pont St. Michael.

As was natural from so distinguished a surgeon, treatment was chiefly directed towards operation upon these aneurysms which could thus be dealt with. Indeed much surgical technique was devoted towards aneurysm, and his pupil and son-in-law, Jacques Guillemeau, who was later physician to Charles IX, indicated[51.] what was almost the Hunterian operation.

As a medical application Paré himself advocated "l'unguent de bolo et des compresses trempées en jus de morelle et semperuiue, meslés auec fromage frais"; moreover, with a courtesy towards his colleagues unreciprocated and indeed unusual in that age, he commented favourably upon the effect of the treatment of internal aneurysm advocated by Sylvius, Lecturer of Medicine at Paris. This was to discontinue wine, to drink water and

barley water, and to use occasionally clysters and poppy seeds.

Paré is generally credited[52.] as being the first to recognise the relation between aneurysm and syphilis, thus anticipating Lancisi by a century and a half. Initial conjectures freely quoted from book to book gain in certainty and grow in importance, until they assume the significance of dogmas. From a close consideration of the text it is my opinion that this statement conveys a definiteness, and implies an accuracy more than is warranted by the germinant or even accidental mist of truth in Paré's words. His actual words were "Les anévrismes aduiennent souvent a ceux qui out eu la vérolle et sué plusiers fois a cause que leur sang a esté grandement eschauffé et subtilé, qui est cause que celuy qui est contenu aux artères cherche á sortie hors et fait dilatation du ccrps de l'artère".[53.]

Paré's pathology was built largely upon a conception of harmful conditions of the body fluids and it is not impossible that his reference applied to the results of the sweating treatment which produced, as was extensively believed at that time, a heating and thinning of the blood, rather than to syphilis itself. This view is borne out by the fact that he elsewhere mentioned that the mercurial treatment (for syphilis) often occasioned aneurysm, while in his prolific description[54] of the lesions due to

"La grosse verolle" he made no reference to aneurysm.

The commencement of the seventeenth century (the division of centuries is arbitary but convenient) saw the dawn of a more intimate pathology. Hitherto it had been an achievement to recognise such a gross deviation from the normal as a large internal aneurysm. Now, although invention of the compound microscope in 1590 was not to affect morbid anatomy for many years to come, post-mortems became more common, and using only brain, eye and hand physicians tried to solve the enigma of the structure of living tissue.

Sennertus,[55.] was, I think, the first to attribute the proximate cause of "spontaneous internal aneurysm" to the rupture of the inner arterial coat, and a dilatation of the external one (he believed there to be two coats, although Julliet contended there was one only). Thus he stated: "Atque ita proxima causa Aneurysmatis est arteriae tunicae internae aperitis, exterioris vero dilatatio". Yet it is highly probable that he was partly guided towards this conclusion by Hildanus[56.], who had, four years previously, advanced this theory with regard to external aneurysm, saying,"in aneurysmate itaque interiorem tunicam rumpi; exteriorem vero dilatari verosimile est."

Although these etiological views had a great vogue and were accepted by Silvaticus and Severinus in Italy, Gouey in France, Murray at Stockholm and Barbette at Amsterdam, all were not convinced. Robert Wiseman, Serjeant-Chyrugeon to King Charles ii nd. could not

conceive that a force "big enough to burst the inward coat, which is so tough and firm, should leave the exterior whole and go out so leisurely into it as to give it time for dilatation."[57.] Nicholls' experiments[58.] had not yet been carried out and there was a world of stubborn Saxon scepticism behind these words. Wiseman divided the etiology into external causes, which were wounding by lancet or weapon, and internal. These latter, apart from a reference, which is undubitably derived from Paré, to that quality of the blood which being too sharp or thin erodes the vessel, are excellent. He was the first I can discover to give as an important determining cause, the influence of high blood pressure, for he spoke of the force or impetuosity of the blood moving in its channels with greater violence than the artery could sustain. He also regarded as important the effect of strain which was at this time being emphasised strongly by l'Abbé Bourdelot in Paris; so that Wiseman although little known to posterity really suggested two most significant determining factors in the production of aneurysm.

In his surgical treatment of external aneurysm he must be stigmatised as the first to use caustics, but his medical treatment was more rational and he recommended internal "emulsions", cooling juleps, anodynes and opiates,

while he was before Valsalva by one, and Tufnell by two centuries in advocating for aneurysm "such diet as might incrassate the blood."

But these methods of treatment are siftings of the good from the bad, for the therapeutic measures of this century were more numerous than efficacious.

Favourite local applications were oxycrate, pulv. sine pari Jo. Arden, bol Armen, sang, dracon, fac. volat. gypsum, pulv. galeni and ol. roses, At the hospital of La Charité of Paris, the actual cautery, introduced first in this connection by Severin* in 1641, "the button of vitriol" suppuratives, or more humanely, compresses were commonly employed in external aneurysm;[59] with greater simplicity and better results Bourdelot[60] advocated, appropriately enough for a churchman, a fish diet and powerful local compression, and indeed he claimed thus to have cured himself of brachial aneurysm.

The eighteenth century is particularly noteworthy for the richness of its literature on aneurysm, and foremost amongst these writings stands Lancisi's monograph, posthumously published in 1728. This work, although in part reflecting the false credences of the time, constitutes a milestone in the history or aneurysm and deserves special analysis even amongst the many highly meritorious productions

* Not by Lanfranc as Sprengel and Garrison state, although the cautery was long used (since Galen) as a haemostatic. (See Albucasis.)

of the crowded age. Lancisi, who was chief papal physician during several hierarchies at Rome, classified aneurysms correctly by modern standards as "true"and "false". To him a common cause was a fall, contusion, or blow, particularly "two blows in opposite directions", and he developed an abstruse and bewilderingly complex elaboration or this latter theory, In addition, as an ardent humoralist, he believed in the well-worn cliché of "depraved humours, saline, corroding, ichorous" and these acrid or poisonous fluids might be arrested in the contused part, and stagnating, occasion aneurysm. Hypochondriacal, scorbutic or hysterical subjects and those of melancholic (bilious) temperament were particularly liable to the disease from this humoral cause. From his acknowledged master, Hippocrates, he took the view of hereditary predisposition and applied it to aneurysm, being thus the first to record an aneurysmal diathesis. He soundly appreciated the frequency of internal aneurysm amongst "those addicted to gluttony and drinking" and in those subject to strain, as porters, singers, trumpeters; and in this respect he recognised the liability of the aorta to the lesion from its receiving the full force of the blood from the heart.

But whilst he noted aneurysm of the heart itself, to my mind his greatest achievement was that he definitely described "venereal aneurysms"* and found that these could be cured by specific antisyphilitic treatment. It must be stated, however, that Lancisi admitted the priority of Severinus[61.] (but not of Paré) in noting that aneurysm might arise from a syphilitic cachexy. Further, although he believed syphilitic aneurysm curable by specific measures, he adhered to the preexisting opinion that mercurial inunctions commonly caused the disease; thus he held this drug to be contraindicated even in syphilitic aneurysm, preferring sarsaparilla and other non-mercurial antisyphilitic remedies, and he cited in support of this view Paré and Ballonius.

The general treatment of internal aneurysm Lancisi wisely admitted to be chiefly palliative. He advised prohibition of bodily exercise, of excitement and of stimulants, spare diet,† repeated bleeding, and even change of air. Here ended his sound therapy and he was in harmony with his age in advocating vulnerary herbs such as infusion of nettles, ground ivy, saniele. scabious, plantain or periwinkle, after a bolus of two scruples of

* "Cognoscitur autem Aneurysma gallicum non solum ex impuro, quod praecessit contagio, atque ex indiciis luis venereae in alias quoque partes jam propagatae, sed potissimum ex modo quo determinatus locus Aneurysmate afficitur" Prop xxxii. De.------- Aneur. Gallicum,"

† He strongly suggested the avoidance of salads.

oxide of antimony and four grains of white Peruvian balsam. For correcting the salt and acrid humours he specially recommended nitrium stibiatum with crab's eyes and fuller's earth - the vehicle of administration with which he reported a cure, being viper's broth.

He greatly advanced the diagnosis of internal aneurysms, for it must be admitted that hitherto this aspect of the disorder had been almost completely neglected. Symptoms which he variously noted were pain, dyspynoea, oedema of the feet, recurrent "salutary" haemoptysis (possibly "weeping"), a troublesome cough and giddiness; to the gross signs already in the literature he added irregularity of the pulse and difference in the radial pulse forces. He even ventured a reference, albeit conservative, to prognosis. The outlook he considered good with a small and superficial lesion and a bodily constitution abounding in healthy fluids, and bad under other conditions.

Lancisi's pathology was that of a close observer, and he had noted "concretions" and ossification of the sac; but the mania of the age for philosophical hypotheses led him to attach long and fanciful discursions totally unfounded on facts, to the data hardly won by careful investigation.*

* This detracts so much from Lancisi's work that only a mild illustrative passage is appended. "The whole influence of mercury in giving rise to aneurysms consists in the strength of the impulse by which the weakened lymph and blood are forced and tossed about on all sides; which fluids as they become erodent by the admixture of acid salts within the diseased body, are easily enabled to enact upon and to distend the vessels like a wedge, as is very apparent by the swelling and distension that takes place in the salivary glands of the mouth and intestines after mercurial inunctions.

Lancisi's great monograph was followed by a press of puling efforts which in many instances served only to choke the growth of genuine research and to render the historian's task of weeding and selecting laborious and difficult. It became fashionable for each surgeon having a case of external aneurysm to report in detail his treatment, and, sometimes more succinctly, its result, and there is much of this in the literature. Nevertheless work of considerable value was accomplished.

In 1733 Alexander Munro, Professor of Anatomy at Edinburgh University, stressed, if he did not originate the conception of three arterial coats.[62.] On the other hand he confused the existing nomenclature by contending that true aneurysm arose from a general dilatation of all three coats; but that in false aneurysm the primary cause of the lesion was more commonly disease of the inner coat which bursting, led to loss of continuity of the muscular layer and dilatation of the external; whilst in mixed aneurysm a true dilatation subsequently ruptured.

Three years later Petit,[63.] in an interesting paper to l'Academie Royal des Sciences at Paris, defined better the difference between aneurysm by effusion and by dilatation, the latter being primarily due to loss of elasticity of the arterial wall. He gave in addition the symptoms of aneurysm and, (L'auscultation médiate was not to

revolutionise Hippocratic methods for another hundred years) described the "murmur like water in the pipes of a fountain" which was audible on directly applying the ear to the sac; he also observed the disappearance of the thrill and noise with the obliteration of the sac by a favourable coagulation.

It is clear from the literature of this century that the symptomatology of aneurysm received much attention despite D. Munro,[64.] who pessimistically stated that internal aneurysm could not be recognised by any symptoms until very far advanced and that the causes likewise were "too subtle to come under the observation of our senses." The clinical findings were further often laudably confirmed or confuted by a subsequent autopsy.

Other than the more general signs and symptoms already in the literature the peculiar "teazing" cough[65.] hitherto inevitably associated with respiratory disorder, and the anginoid or darting nature of the pain were remarked; whilst hiccup, "often persisting for days" was correlated to the pressure of the aortic swelling upon "the nerve of the diaphragm."[66.]

It may be said here that this general independent recognition of symptoms and the prominence given to the subject of internal aneurysm induces the view that the disorder was now common (this was commented on by Haller[67] in 1749 at Gottingen,[68.] and by de Haen at the Hague in 1761, whilst D. Munro[69.] stated that aneurysms of the aorta were

more frequent than those of all other sites together) or else that the condition was more commonly recognised.

Without undue speculation it is almost certain that both of these factors militated; the lusty growth of medicine must of necessity have facilitated the diagnosis of the lesion whilst the growth of cities and of civilization with their concomitant evils of prostitution and syphilis must inevitably have favoured its increased incidence. Lancisi,[70.] Morgagni[71.] and Guattani[72.] particularly emphasised this latter view. Guattani often noted the scars which his patients had sustained in the conflict with Venus, and speaking of the prevalence of aneurysm remarked that as a cause syphilis "did not occupy the lowest rank."

In 1757 Wm. Hunter published a treatise upon aneurysm in which he adopted the classification already laid down by the senior Munro, but in which, much more significantly, he described "a particular species of aneurysm." Later, in 1761, he read a further paper upon this subject,[73.] which was that of varicose aneurysm. This marked another great advance, and it is clear from the text that Hunter did not merely recognise the communication between artery and vein but that he differentiated aneurysmal varix from varicose aneurysm. His masterly study was interpolated with anatomical observations, and created much interest; certain of his students - notably

White and Armiger[74.] - sent him reports of cases they had observed in their own practices.

Hunter is due all credit, yet it should be mentioned that at the same time Guattani, working independently in Italy and before any report of Hunter's work could have reached him, published reports of cases describing the condition.[75.]

In addition Hunter fully demonstrated the eroding effects of aortic aneurysm, already alluded to by Ruysch and Du Vernoy, upon the tissues, especially the vertebrae, but not upon "gristle" (e.g. the intervertebral discs). This was later[76.] correctly attributed to pressure and not to the solvent action of the blood as had been previously supposed.

In the third quarter of this century the appearance of Jo. Baptista Morgagni's "De Sedibus et Causis Morborum" at Venice had a crystallising effect upon certain too fluid notions of the time; his section on aneurysm has been rightly classed by a modern Morgagni as "one of the finest ever written." He was the first to differentiate between the pulsatile abdominal aorta and abdominal aneurysm, and his combination of clinical and anatomical records dispersed many specious theories still surrounding the disease and placed it upon a sounder basis than ever it had been before.

The names of Home, Wilmer, Baillie of [Britain] Matani

and Masotti of (Italy) de Haen at the Hague and Deschamps at Paris fall towards the end of the eighteenth century, and although the ground which they covered had in the main already been trodden, their works contain evidence or clear perception. Thus the ulcerated and indurated arterial wall with the "osseus concretious" on the sac were noted:[77.] aneurysmal nomenclature was discussed and the sites or the lesion well recognised:[78.] much attention was given to arterial anastomoses and the maintenance of collateral circulation[79.] while the frequency of popliteal aneurysm in coachmen and postillions was commented on, and attributed to concussion and agitation.[80.]

In this eighteenth century too, contributions to the therapeutics of aneurysm had been the reverse of meagre. Unfortunately much of this bears out the words of Wm. Hunter that the treatment of aneurysm from the earliest times has given the ignorant and hardy empiric frequent opportunities of exulting over science. Thus there is found a quack recommending "his pill which he said was so admirably adapted to inward swellings that none of them could withstand its operation," whilst "an old woman would engage to cure with her herb poultice (of 32 ingredients) which though she was turned of three score and seven years, had never once failed her."[81.]

Notwithstanding, there were some which stood above

the welter of mediocrity and worthlessness.

In the early part of the century Valsava and Albertini[82] together devised a treatment to "diminish the tendency of solids to liquefy and to increase the disposition of fluids to solidify" which represented an attempt to induce spontaneous coagulation in the sac. The patient remained about forty days in bed, during which time he was bled at least once, but not too frequently, and clysters were administered together with vulnerary herbs to correct the impurity of the blood. Wine was withheld and only sufficient food and drink to support life given, and that at regular intervals. A milk diet was thought specially suitable for those who could bear it. In the hands of Valsava and Albertini (who insisted upon the necessity for early and correct diagnosis) and later of Morgagni, Benvoli, Guattani and De Haen this method had excellent results and many cases which had not yet become chronic were, it is recorded, entirely or in great measure restored to health, whilst cases of long standing were benefited.

A peculiar form of the treatment, viz. refrigerant, was practised in France by Guérin[83.] later in the century. Guérin assumed, or perhaps presumed, himself, the originator of this method, but the main principle had been applied by Lanfranc[84.] (13th. century), had been noted by Bartholin (1661) thus "saepe nivem supra tumorem imponeret, unde sanus factus est"[85]; and was previously used by the Portuguese.[86.]

It consisted of the local application of lead lotion containing one tenth part vinegar, with the administration of acidulated drinks -i.e. eau de rabel one drachm to the pint - and occasional bleedings. The saturnine compresses were moistened every seven minutes and were varied by the application of ice. The object of this treatment, so far as I can deduce from Matani,[87.] was to restore by these cooling medicaments the loss of tonicity of the dilated arterial wall, and also to promote coagulation. It was apparently so successful as to seem from a modern standpoint almost incredible, for Guérin reported cures which were vouched for by a large number of practitioners and borne out by the results of Sabatier, Pelletan, Ribes and Larrey.[88.] At the Hospital of St. André he had a case of a huge subclavian aneurysm extending from between the second and third ribs to the jawbone which was cured, being reduced to a firm and insensible tumour the size of a small egg.

Italy and France thus contributed a specialised treatment for aneurysm during the eighteenth century, but in Britain, medical treatment was on general lines. Venesection, which Morgagni was championing in Padua was generally advised,[89.] with aperients,[90.] pectorals for the cough and opiates for the pain[91.] while if the lesion were due to venereal or scorbutic disorders these were to be removed.[92.]

Postural treatment was practised in external aneurysm and in this type of the disease D.Munro emphasised the necessity of not handling the sac, and was definitely opposed to the therapeutic use of pressure which he believed to hasten the progress of the distemper.

On the other hand Heister[94.] in Germany strongly advocated compression by "a plate with proper straps and bandages."* Even if no cure resulted it was to be worn permanently, as a truss for hernia, and thus a dangerous operation would be avoided. Foubert[95.] also recognised the successful results by compression and he devised an instrument very similar to the ponton of l'Abbé Bourdelot for purposes of aneurysmal compression, and about this time Guattani[96] introduced a treatment of compresses of charpie with graduated bandaging with which he had restored to health several cases, amongst the number being the coachman of his eminence Cardinal Herba.

A few words fall to be said on the surgical treatment of external aneurysm, mainly because of John Hunter's achievement, for most operations were crude, often unsuccessful and always of necessity painful, although the sombre reading of many failures is relieved by some brilliant successes. It was not an infrequent occurrence even at this time, for an aneurysm to be opened in mistake for an abscess, generally at the hands of a quack or of a peregrinator of

* In modern times Osler remarked on a colleague who derived benefit in like manner.

the short robe.[97] Some surgeons thought it beneficial to practice ligation of the accompanying nerve, which they tied with the artery. The vessel was ligatured above or below the lesion, or both above and below, while the sac was incised, excised or left untouched. The dread of secondary haemorrhage was often fulfilled despite the ligature of reserve, and innumerable styptics were used, some stated to be specific in aneurysm, such as charpie, hare's down, tree-moss, agaric or even chewed paper. Much depended upon the individual skill of the operator and the dangers may be fully gathered from the fact that Pott[98] in London and Penchrienati[99] in Turin independently declared that in most cases of popliteal and thigh aneurysms the operation of choice was amputation.

Amongst the surgical advances of the century. however, was John Hunter's operation for the popliteal lesion, first performed on a coachman at St. George's Hospital in December 1785. Although ligation of the artery some distance proximal to the sac had been practised through the ages by Aëtius, Paul of Aegina, Guillemeau and most recently Anel,[100] Hunter was the first to discern that the anatomical accesibility of the artery in the adductor canal would particularly favour a successful result. This operation was immediately adopted, and performed shortly afterwards by Home at St. George's Hospital,[101] Cline at

St. Thomas'[102], Lynn at the Westminister Hospital[103], Deschamps at the Hospital de la Charité, Paris[104], Vernat at Caen[105], and Fischer at Jena.[106]

Reference has been made, and will again be made, to the experimental work of Nicholls. It may here be noted however that Nicholls in his account[107] of the post-mortem appearances in the body of King George 11. had described what was clearly a dissecting aneurysm of the aorta. However he did not recognise it as such. He considered it to be the true state of an incipient aortic aneurysm.

But about this time, in his work published at the commencement of the nineteenth century, it fell to Maunoir[108] to indicate clearly the true nature and pathology of this lesion, whilst a little later Laennec applied to it the name of "dissecting aneurysm."

The dawn of the nineteenth century was also signalised by the publication of a notable treatise on aneurysm by Antonio Scarpa, professor of anatomy and surgery at Pavia. This had originally been intended as a thesis for the prize offered by the Société de Médicine de Paris in 1797, but as it was then uncompleted Scarpa thereafter amplified the work which eventually appeared in 1804.

The dominant and often repeated note of the book is Scarpa's insistence that true aneurysm is due to a rupture consequent upon degeneration of the proper internal coats of the artery. That aneurysm might arise as a dilatation

of all the arterial coats, although he had actually observed that "the aorta immediately above the heart appeared sometimes beyond its natural diameter"[109.] he very strongly denied, and he opposed acrimoniously the Munro-Hunterian view that true aneurysm was essentially a dilatation.

General scepticism was expressed then, as formerly, as to how the internal coat of an artery might give way without at the same time rupturing the external one. Scarpa however, brought to light, and himself confirmed, the experiments of Nicholls. Nicholls had demonstrated in 1728 before the Royal Society of London,[110.] that the internal coat of the pulmonary artery might be ruptured by forcing air into the vessel, while the external, which was not ruptured at all, formed aneurysmal tumours over the artery. Scarpa likewise found that "the external cellular sheath, being of an interlaced texture although much less dense than the muscular coat, is capable, of yielding gradually to the impulse of the blood and of supporting great distension. As soon as the internal membrane of an artery which opposes the greatest resistance to the impulse, and prevents more than any other the bursting or preternatural dilatation of the arterial tube, is ruptured, the muscular tube is also ruptured or is immediately torn, and allows the air or any other (sic) fluid injected with force into

the tube to flow into its external cellular sheath."

Although Scarpa over-rode his theory of sacular aneurysm his pathology was good. He recognised that the arterial wall was vascularised and that like other living tissue, it might die or be subject to that "slow, morbid, steatomatous fungous, squamous degeneration" which he so often noted. Most of his cases began with the history of some violent strain, blow or fall, but from his pathology he considered that the arterial degeneration "had a share in the formation of aneurysm more frequently than violent exertions of the whole body, violent blows, or increased impulse of the heart." He described the various seats of external aneurysm and their appropriate surgical treatment and he commented fully on the natural radical cure brought about by the filling of the cavity with laminated fibrin originally alluded to by Valsalva and by Morgagni.[111.] His medical measures for dealing with internal aneurysm consisted in "debilitating remedies, abstinence, milk diet, perfect rest," while for the extreme dyspnoea he advised bleeding, sinapisms, or a small quantity of Hoffman's liquor anodynus mineralis in iced water.

Scarpa manifestly did good by destroying the erroneous and misleading eighteenth century classification (of true and false aneurysms) and by maintaining a lucid and accurate pathology, but he would have more truly merited the title of illustrious bestowed upon him had he relaxed the

inflexibility of his definition so as to include aneurysms by dilatation.

Burns[112] in 1809 and Hodgson a few years later, adopted Scarpa's views. Hodgson however wisely stated that the controversies which had existed upon the subject appeared "to have arisen from a reluctance to admit the possibility of more than one cause in the production of the same effect"[113] and he additionally recognised that aneurysm might originate as a dilatation of the arterial coats due to loss of natural elasticity. The various pressure symptoms of thoracic aneurysm and a differential diagnosis from cardiac displacement, enlarged bronchial glands or thoracic tumours, and cardiac hypertrophy ("the increased growth of the muscular substance of the heart") were excellently described by him. His cases showed a preponderence of the aortic lesion over all others, twenty-nine out of sixty-three. He also realised that natural cure might result from the pathological changes of gradual deposition of fibrin, and in an attempt to promote this, in treatment, he favoured excessive bleedings.

Two modes of dealing with the disease that were entirely novel except in so far as they typified the pathetic search for a specific for spontaneous clotting in the sac arose about this time. The first was Italian, introduced by Monteggia[114], who imagined that a natural cure might result from the injection into the sac of such

astringent liquids as solutions of lead acetate, perchloride of iron, tannin or of alcohol. Some of his cases benefited, but in the hands of others,[115.] the method was unsuccessful and was eventually abandoned.

The second was a form of acupuncture instituted in France by Velpeau[116.] (1830) and adopted two years later in London by Phillips.[117.] By inserting needles into the sac and leaving them in position for several days they thought to produce clotting, but here also results did not justify the risk.

Whilst the chief virtue of the historian is to be consecutive in time even at the cost of being inconsecutive in thought, the several other methods of treatment of internal aneurysm which the nineteenth century produced may, as a concession to prevent interruption of ideas, conveniently be considered here.

It has been seen that Velpeau first applied the principle of acupuncture to aneurysm, for although Everard Home[118.] in 1825 had penetrated the sac with a needle whose extremity was then rendered white hot, his object was to promote coagulation purely by heat. But out of these two ideas now sprang the method of galvano-puncture. The credit of this is due mainly to Pravas of Lyons and Guerard of Paris. "Ce jeune medicin,"[119.] said Pravas, "me proposa de tenter de faire servir le galvanisme à l'oblitération du sac anévrysmal. Je saisis avec empressement cette idée et

nous convînmes d'essayer d'abord d'intercepter le sang dans une artère volumineuse." This was in 1831. But although this method was employed by various surgeons at different times the most notable application of electricity in the treatment of aneurysm was not to be reached until the Moore-Corradi method was formulated after the year 1864. In that year Charles Moore of the Middlesex Hospital had attempted the cure of aortic aneurysm by introducing fine wire, seventy eight feet in all, into the sac, but his patient died from sepsis on the fifth day thereafter. Since that time catgut, horsehair and silk have been used, yet Hunner in 1900, collecting cases, found that of eight thoracic lesions thus treated all had terminated fatally whilst of six abdominal, only three had recovered. However it was after this that Corradi proposed a modification of Moore's method by passing a galvanic current through the wire. With improved technique this Moore-Corradi treatment is still in use, but even so, its uncertainty is manifest from Thane's collected statistics where out of thirty four cases, six only were cured, with five improved. The more recent results of H.A.Hare[120] are scarcely less unconvincing, for in cases which were benefited the inevitable doubt arises as to whether these patients would not have done equally well had they elected to eschew the operation and to adopt a simple medical régime.

In the same year (1864) which had seen the initiation of Moore's method, Jolliffe Tufnell published a pamphlet entitled "The Successful Treatment of Internal Aneurysm illustrated by Cases in Hospital and Private Practice." This was nothing more or less than the treatment devised a century and a half ago at Bologna University by Valsalva and Albertini. They, acknowledging the wisdom of the Hippocratic method of healing varices, applied the master's precepts towards the cure of internal aneurysm. Tufnell, giving ten ounces of solids and eight ounces of liquids daily, substituted stated quantities of bread and butter, meat and potatoes, for Valsalva's restricted pudding diet, he favoured his patients' palate if not his blood pressure by allowing four ounces of claret daily, and he omitted the reasonable bleeding practised especially by Valsalva, Albertini and Morgagni in the eighteenth century and by Hodgson in the nineteenth. His results showed the startling analysis of five successes out of six cases, but apart from the intense hardship of such a régime it did not prove equally valuable in other cases although in early lesions it has still been indicated.[121.] It is unfortunately the fact that Tufnell had the indifferent taste to speak slightingly of Valsalva and somewhat injudiciously (as the treatments were in essence similar) to refer to Valsalva's "ill-conceived propositions" - and if only for this reason it appears unjust that the method should be associated in the

minds of the majority with the name of its adaptor and not of its author.

But perhaps the most important advance came when potassium iodide was advocated in the treatment of aneurysm, and the main credit for establishing its use in practice was due to G.W. Balfour who put forward his views in 1876.[122] He regarded its curative value as due to lowering of blood pressure, though the first explanation propounded was that the virtue lay in its anti-syphilitic properties. He also considered that large doses, i.e. over twenty grains, were not necessary, unlike Byrom Bramwell who later used up to thirty grains three times a day. Bramwell's results indicated that the most noticeable effect was the relief of pain, and his observation has been well borne out by the results of administration of this valuable drug in modern times.

But the surgeons would not readily relinquish the treatment of aneurysm to medical hands and still working from the primary principle of acupuncture Sir Wm. Mc.Ewen in 1890[123] gave the idea an original turn by advocating the introduction of a special aseptic pin like a sewing-needle with which he scratched the inner surface of the sac in order to produce a white thrombus. A further operative interference with the lesion was devised in 1896 by Baccelli who experimented with the procedure of introducing coils of metal into the walls of aortic aneurysms.

In the following year Lancereau advocated his method of gelatin injection. He used 200 - 250 cc. of a 2.5 % solution of gelatin in saline subcutaneously administered every four or five days, giving in all as many as forty injections. He made more than one thousand injections without once causing tetanus and from his statements, with considerable benefit in many instances.[124.]

Such were the chief means devised in the last century to combat this dread disease. If nothing more they at least persist as a tribute to the ingenuity of their originators, and to the courage of the patients who submitted themselves.

It may now be attempted to trace as concisely as possible the evolution of the modern conception of aneurysm, and to avoid digressive straying amongst the redundant and overlapping literature of the period, much voluminous matter must be omitted.

The first notable advance after Hodgson's work was due to James Syme. Although William Hunter had described traumatic arterio-venous aneurysm Syme was the first in this country to report the spontaneous arterio-venous form. in a case from which the specimen is still preserved in the anatomical museum at Edinburgh University.[125.] Thurnam, however in 1840 gave the original account of the typical continuous murmur with systolic intensification, and an excellent account of the symptoms and of the characteristic cyanosis.

In 1847 Crisp's treatise[126.] was published, and Crisp dealt fully with the various sites of rupture of thoracic aneurysm. His book contained an analysis of 551 cases, and he observed that only one eighth of these were in females and so concluded that violent and laborious occupations, especially those involving sudden muscular effort, predisposed to the disease. It is surprising that during the first half of the nineteenth century the idea of syphilis as an etiological agent was neglected; although mercurial treatment was still believed to produce aneurysm Crisp[127.] denied this.

Rokitansky in his work on arterial diseases (1852) in addition to recognising saccular and fusiform types, gave the causative factors as inflammation and suppuration of the artery wall and spontaneous tears of both inner coats. In 1856 Broca[128.] confirmed the studies of Burns and Rokitansky and finally shattered the eighteenth century confusing conception of false aneurysms which he properly defined as "ceux dont le sac est constitué par une membrane entièrement nouvelle, les trois tuniques de l'artère étant divisées à la fois,"

In the year 1865, Sir Samuel Wilks[129.] in this country was the first author to draw attention to the syphilitic origin of arterial disease, ascribing to syphilis certain nodules found on the cerebral arteries in a woman who died from a cerebral haemorrhage five years after infection. General

attention, which had for some decades fallen away from the view of a specific etiology in aneurysm, now became focussed upon it once more, and the beginning of the most brilliant modern work may be traced to Helmstedter,[130.] who in 1873 definitely assigned the lesion to the middle coat, showing that in a common aneurysm tears in the elastic fibres of the media were the primary and essential changes. Helmstedter's figures, although he was probably unaware of this, depicted a syphilitic mesaortitis. Koster[131.] in 1875 further advanced this opinion by stating that the lesion was not an endarteritis but a mesaortitis of special syphilitic type. These findings on the histological side were additionally reinforced by Welch's exhaustive statistical study[132.] which appeared in the following year, for its main worth lay in the direction of attention towards syphilis from proved figures, as Welch found that 66 % of his cases had suffered from this disease.

The symptoms and signs of aortic aneurysm were in like manner scientifically studied. Impaired phonation from pressure on the recurrent laryngeal nerve, the occurence of systolic thrill and diastolic shock, the occasional presence of a systolic murmur in the trachea (Drummond), the anisocoria, the effects of compression of a bronchus by the sac, were now generally recognised in the literature, while in 1878 the classic sign of tracheal tugging was described by Surgeon-Major Oliver.[133.]

Eppinger[134] in 1887 fully confirmed Koster's work but he, like Scarpa, did not concede the dilatation type as a pure aneurysm, although he admitted verminose and mycotic aneurysms, which he fully described. Thoma[135] however in 1888 made an important study of dilatation aneurysm of the aorta. The media, he too looked upon as the coat primarily at fault, not so much from rupture of its fibres as from atrophy consequent upon interference with nutrition. This diminished resistance he believed to be compensated for by arterio-sclerotic plaques which might so reinforce a thinned and weakened media as even to obliterate a small aneurysm. How like Paré's view this is has been seen. Thoma also described a "traction" aneurysm at the concavity of the aortic arch at the point of insertion of the ductus Botalli.

In 1903 Chiari[136] further emphasised the relationship between syphilis and aneurysm. He considered that the essential specific pathological changes were small areas of granulation and fibrous tissue in the media, often with central necrotic zones and newly formed vascular elements surrounded by infiltrating round cells, and also thickening of the vasa vasorum in the adventitia with perivascular round-celled infiltration. He held that changes in the intima were secondary and showed simply varying degrees of arterio sclerosis.

Briesemeister in the same year and Marchand[137] in 1904

investigating independently the relationship of syphilis and arterio-sclerosis in the development of aortic aneurysm both arrived at the conclusion that syphilis was a definite cause of the medial degeneration.

Several years later, in 1909, Treponema pallidum was demonstrated in five cases of syphilitic aortitis by Wright and Richardson:[138] thus was arrived at the most universally held present day view that internal aneurysm, often determined by such important adverse influences as strain or high blood pressure, arises most characteristically from syphilitic arterial disease.

To include an account of the various well-known aspects of the disease from a modern standpoint, a labour of compilation and not of research, would be in itself no inconsiderable task and one foreign to the aim of this work.

However modern classification still maintains the broad differentiation between false and true aneurysm dimly perceived by the Greek physicians, re-introduced by Scarpa and emphasised by Broca, it recognises the saccular and fusiform true aneurysms of Hodgson, and rightly adheres to the cirsoid and dissecting types of Breschet and Manoir, and to Hunter's arterio-venous forms.

The microscopic pathology of the disease to day is no better than that of 200 years ago, which was good enough to stand the test of time: although inevitably the

microscopic morbid anatomy is, as has been shown, of recent date.

The signs of external aneurysm as described by Galen are taught in the text books of this day: those of the internal lesion have grown from the basic work of Laennec, and an endeavour has been made to indicate how certain outstanding signs and symptoms have crept into the literature.

In therapeutics, whilst it is impossible not to doubt the authenticity of all cases of the old physicians, the salient fact remains that the treatment of their times was not less successful than ours.

Thus it has been essayed to trace the history of aneurysm in its vague and indeterminate beginnings, in its conflicts with fixed dogmas and false philosophy, in its waxing and waning with the rise and fall of the waves of medical progress. If this thesis, without idealising or reconstructing to a chimerical perfection these old ideas, or on the other hand, of ruthlessly demolishing them to nothingness on the anvil of modern science, has shown how the present conception of aneurysm arose, and how the fabric of our knowledge of this disease has been woven from the work of past years, then it may not have been written in vain.

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