BLEEDING: ITS USES FROM THE EIGHTEENTH TO
THE TWENTIETH CENTURY.

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THE USE OF BLOODLETTING FROM THE 18th TO THE 20th CENTURY.

Introduction.

Bloodletting has a long history and its origins are unclear. It was practised by the Ancient Egyptians, the Hindus (Susruta recommends bleeding from one of the veins of the external genitalia for venereal infection (45)), and is mentioned in the Chinese "Canon of Medicine" of around 2700-2600 B.C. (59). Hippocrates was the first to define the uses of bloodletting (22) (45), which were:

1. as an evacuant - to get rid of redundant matter in the system, 2. to change the determination of the blood to or from different parts, 3. restoring the free movement of the blood when it was obstructed, 4. cooling the body when it was overheated. These liberal indications meant that bloodletting was indicated in almost every illness.

Hippocrates advocated derivative bleeding, that is, bleeding from the same side of the body as the symptoms, but did not specify the amount of blood to be taken. Accounts of bloodletting are given by Asclepiades and Celsus, and Aretaeus the Cappadocian, who introduces points of election in bleeding, for example, bleeding from the frontal vein in headache, epilepsy and vertigo or from the tongue veins in throat affections (45). Galen followed the Hippocratic practice of derivative bleeding and is the first to indicate the quantity of blood to be drawn. Arabian physicians like Avicenna, practised bloodletting extensively but insisted that blood should be drawn from the side opposite the disease - a practice known as revulsive bleeding (45).

The theory that excess of blood was a cause of disease persisted and for the medieval Arabs, bleeding, usually carried out by barbers, was a first resort in the great majority of diseases (63). In England in Anglo-Saxon times the Venerable Bede, in his "De minutione sanguinis sive de phlebotomia", indicates that the best time for bloodletting is from the 25th March to the 25th May since the
the blood is increasing between these dates. Certain days were unlucky in each month and the site of letting might be varied according to the phase of the moon(7)(8)(37). In the 15th and 16th centuries the connection of blood letting, still based on the humoral theory, with astrology was strong(24)(36) and the Bloodletting Calendar (Adelasskalender), first printed at Mainz in 1462, became popular. Bleeding was only to be applied at the most propitious times and the time was to be determined by consulting the "Zodiac man"(24). A sixteenth century manuscript detailing bloodletting days is to be found in Edinburgh University Library(23). Medicine and astrology walked hand in hand into the 16th and 17th centuries.

A minor commotion was started in 1514 when Pierre Brissot, a professor of the Paris Faculty, made a stand for the original Hippocratic method of derivative bleeding, instead of the revulsive bleeding inherited from the Arabian school of medicine. As a result of this heresy, he was banished by Act of Parliament. Both Clement VII and Vesalius were brought into the controversy, which came to a sudden end when one of Charles V's relatives died from revulsive bleeding during an attack of pleurisy(37). Phlebotomy was practised to great excess at this time and even in the healthy it was considered wise to "service" the system with a bleeding in autumn and spring(24).

The 15th century was the age of common public baths and there the bath-keeper was usually employed as a blood-letter as well, and the illustrations of the period show his clients enjoying a bath and a bleed at the same time. This practice continued well into the 18th century and is mentioned in Bright's account of his travels in Lower Hungary(9). An advertisement in an 18th century Tatler reads as follows:

"The Queen's Bagnio, in Long Acre, is made very convenient for both sexes to sweat and bathe privately every day, and to be cupped in the best perfection, there being the best and newest instruments for that purpose; Price 5s."
for one single person; but if two come together, 4s each;
- There is no entertainment for women after twelve o'clock
at night but all gentlemen who desire beds may have them at
2s. per night." (60).

A seventeenth century Parisian, Guy Patin, believed
that there "is no remedy in the world which works as many
miracles as bloodletting." He acted on this belief and
had a colleague bled32, and his son 20 times, for continued
fever, his wife 12 times for chest trouble and himself
7 times for a cold in the head (45) (59). One female patient
of this period suffering from convulsions in the Civic
Hospital of Prague was said to have been bled in all 800
times.

A word about techniques of bloodletting. Venesection
or general bloodletting was by far the commonest method em-
ployed — the median basilic vein being the obvious site (74),
but other sites were employed, particularly in the astro-
logical period, when the site was determined by the time of
the month and the year or the position of the heavenly
bodies. In some refractory cases temporal arteriotomy was
employed (22). Local bloodletting, from the time of Hippo-
crates, was done by cupping or the application of leeches,
and it was usual to apply these near to the site of the
trouble. The cup, originally made of brass or horn, and
later made of glass, had a partial vacuum created inside it
by holding it over a flame or burning material inside it,
and it was then applied to the skin to bring about disten-
sion of the blood vessels; the site was then scarified and
the cup reapplied, the partial vacuum being very effective
in increasing the amount and rate of blood withdrawn. The
cup was reapplied as often as was necessary to obtain the
required weight or volume of blood (60). General and local
bloodletting were frequently combined.

This introductory account sets the pattern against
which practice in the 18th and subsequent centuries must be
set. At the beginning of the 18th century great advances
had taken place, both in Science and in Philosophy and
these are relevant to the changes in medical practice which began in the 18th century and were continued thereafter.

**Observation and Experience.**

Scholastic medicine of the sort taught at Bologna and Montpellier was remote from the practice of, and the problems in, medicine, consisting as it did in teaching by reading the Latin translations of Arabic work. The rise of Science in the 16th and 17th centuries, best seen in the works of Copernicus, Kepler, Galileo and Newton, and the abandonment of scholastic philosophy for the new ideas of Bacon, Descartes and, particularly, Locke, had far-reaching if somewhat delayed effects on Medicine(78)(70). Locke's empirical views were propagated in Europe and especially in France by Voltaire whose portrait as the supreme sceptic is painted so admirably by Harold Nicholson in his "Age of Reason"(61). The current of the times was for change; the philosophy of observation fathered a medicine of observation and the pattern in Medicine was set by Sydenham in England and Boerhaave in Leyden. In Germany the spirit of observation was willing but its application was weak and vague hypothesising continued into the 19th century(18), a fault shared by the systematists.

Thomas Sydenham(1624-1672) based his practice on observation and experience and denied himself the temptation of speculation. His "Methodus curandi febres", (73) published in 1666, opens with the phrase, "A disease, in my opinion, how prejudicial soever its causes may be to the body, is no more than a vigorous effect of nature to destroy the morbific matter and thus recover the patient", and in this we see a return to the Hippocratic "healing power of Nature". It was Sydenham who rediscovered the benefits of fresh air, who introduced Peruvian bark and divested his prescriptions of all filthy and nauseating ingredients(36)(37). As the first physician to consider the actual cases of diseases that lay before him as a subject of scientific description and analysis, he is considered by some to be the
founder of modern clinical medicine (72). He let blood extensively in almost all diseases, but only in small quantities. His Processus Integri (1691) is said to have been the English physicians vademecum for over a century (36) (37).

Hermann Boerhaave (1668-1738) (51) (56) would qualify equally well for the title of founder of clinical medicine. A Systematist, basing his system on the concept of bodily fluids and solids, he is notable for his reduction of the four humors to the status of different components of blood, for being the first physician to teach his students to relate post-mortem findings to the clinical history, for his emphasis on the healing power of nature, and for the far-reaching effects which his teaching had on the development of medicine in Europe. The faculty of medicine at Edinburgh starting in 1726 was based on Leyden principles, (40) and among Boerhaave's famous pupils were numbered Albrecht von Haller, the experimental pathologist, Alexander Monro, and Gerhard van Swieten, the founder of the Vienna School of Medicine. According to Cullen (25), Boerhaave's system was dominant in Edinburgh in the eighteenth century. Hirsch (quoted in (18)) says that the "so-called Physicians of this period (i.e. before Boerhaave's influence) used pills and plasters, drugs of various kinds, clysters and repeated bloodlettings, which at times produced such a degree of exhaustion, that only patients with a strong constitution were able to rally from the effects of loss of blood". Boerhaave exercised moderation in the use of bloodletting in fevers but still countenanced its use in inflammation where "it relieved the obstruction" and in situations where "the viscera or vessel fibres (solids) were too strong" (18).

The Systematists.

Claude Bernard in 1865 (6) had this to say, in retrospect, of the Systematists, "These men start, in fact, from an idea which is based, more or less, on observation, and which they regard as an absolute truth. They then reason logically and without experimenting, and from deduction to deduction they succeed in building a system
which is logical, but which has no sort of scientific reality. Superficial persons often let themselves be dazzled by this appearance of logic; and discussions worthy of ancient scholasticism are thus sometimes renewed in our day". Among the Systematists must be included Boerhaave, with his doctrine of fluids and solids, on which he based his practice, including his use of bloodletting; John Brown (1735-1788) whose division of disease into sthenic and asthenic types, cured respectively by debilitation and stimulation, restricted the practices of bloodletting and purging (the antiphlogistic regimen) to phlegmasiae, exanthemata, peripneumony, phrenitis and violent smallpox; Stahl (1660-1734) whose sensible observation that "disturbance of the bodily system excited such motions in the body as are suited to obviate the hurtful consequences which might take place" was ridiculed by Cullen (25), who would have nothing of "Nature curing disease"; and Hoffmann (1660-1742) with his doctrine of the nerves (25). William Cullen (1710-1790), the Professor of Practice of Physic at Edinburgh, who noted that "interruption and irregularities in the motion of the fluids has a very large share in the diseases of the body, rather than changes in the condition of the fluids" - a change in interpretation which in no way diminished the relevance of bloodletting, must also be included with the Systematists. In spite of his cautions to his own students (25) about systematisation (as John Gregory had done before him (38)), Cullen developed his own system based on the concepts of nervous spasm and atony and advocated the use of the antiphlogistic regimen, with bleeding and purging, in Fevers and Inflammation (26), to diminish the action of the heart and great vessels. He recommended bloodletting in every -itis, and in mumps, measles, erysipelas, plague, haemorrhage, T.B., piles, dysentery, catarrh, apoplexy, epilepsy, mania, gonorrhoea and jaundice.
It is probably true to say that, in the 18th century, bloodletting continued unabated, supported at different times by the theories of different systems. William Buchan's book on "Domestic Medicine" (51) recommends bleeding for every ailment. In France, the Hotel Dieu was said to have run red with blood in the 18th century. (45). The new found belief in the healing power of nature may have influenced the practice of a few, but the evidence for this is poor. In any case, alternative therapies to the antiphlogistic regime were not particularly effective (20) (27) (31) (79). Isolated incidents of revelation certainly occurred, as in the case of John Fothergill (16) who achieved marked success in the treatment of "epidemic, putrid sore throat" with emetics, acids, bitters and light wines instead of the traditional purging and bloodletting of his fellow physicians.

However, with the development of the medical schools and the new steps that were being taken in clinical medicine and surgery, pathological anatomy and experimental medicine in Europe and England by people like Haller, Auenbrugger, Bordeu, Bichat, Pott, Cooper and the Hunters the stage was being set for a reawakening of attitudes in the 19th century. (1) (18) (46) (63) (72).

Benjamin Rush and American bloodletting.

Benjamin Rush studied medicine at Edinburgh under William Cullen and returned to Philadelphia, where, by his own account (69), he seems to have adhered to a conservative therapeutic regime until the outbreak of yellow fever in 1793. Prior to this time there is little to suggest that bleeding was used to any great extent in America (16) (46) (81).

Rush was an intelligent and reasonable man (he assisted Thomas Paine in the production of his pamphlet), broadly educated, with an enquiring mind and a humanitarian outlook on life, as anyone who reads his "Medical Enquiries and Observations" will realise. He adapted Cullen's spastic and atonic theory to one which implicated vascular tension in the genesis of disease.
In 1793, an outbreak of yellow fever occurred in Philadelphia, and Rush describes the failure in his hands of a number of the accepted cures of that time: ipecac-huanha, bark infusion, wine and brandy and vinegar blanket wraps. He describes how, following on these failures, he was paging through some papers, when suddenly he had a revelation which drove him to try the effects of violent purging with calomel and jalap and of bloodletting (to the extent of 20 ozs.) in these cases. Rush claimed immediate success with this regime and occasioned a violent controversy which raged in the Philadelphia newspapers between himself and the other practitioners of that period. Rush has given his own very intelligible account of his reasons for employing bloodletting and his answers to his critics. William Cobbett, the well-known British radical pamphleteer, said that Rush's cure was "one of these great discoveries which have contributed to the depopulation of the earth", was sued for libel, and lost his case. Waring, in his recent analysis, claims that Rush bled far greater quantities and that the mortality was much higher than Rush himself describes. Rush apparently listed ten qualities of pulse which indicated the use of bleeding and since the categories ranged from the full, frequent and tense pulse to the imperceptible pulse, no patient was likely to escape the inevitable bleed.

The truth of the matter is never likely to be known. The consequences were that bloodletting grew in popularity in the United States, the gospel being spread by Rush and his disciples (he had 135 apprentices between 1792-1811), and the practice was very well established by the 1830s. Thereafter, a decline set in, occasioned probably by the return of students from France and the teachings of Louis and also by the agitations of William Turner, a New York physician and disciple of Samuel Dickson, who petitioned against bloodletting to the New York State Legislation. (for Louis and Dickson - see later). By 1880, after considerable discussion in the journals, the use of bloodletting was restricted to internal inflammation and
cardiac congestion and by 1892 only cardiac congestion remained as an indication for bloodletting in America(16)(62).


Bloodletting in the first half of the 19th century in England is described in detail in the writings of Marshall Hall(41)(42), James Wordrop(77)(78) and Henry Clutterbuck(22), all writing between 1830 and 1840.

Hall(42) was well aware of the adverse effects of bloodletting and distinguished two different responses to it. The first response, characteristic of intestinal irritation, dyspepsia and chlorosis was that of syncope after only a small volume of blood had been withdrawn; such a response militated against repeating the venesection. The second response, characteristic of inflammations such as meningitis, arthritis, encephalitis, pleuritis, erysipelas and pneumonia was of a full flow of blood before syncope supervened. This was an indication that bloodletting could be safely repeated at a later date. Hall advocated sitting the patient up while letting blood and stopping the treatment as soon as syncope threatened - a crude, but effective method of preventing excessive blood loss. The vascularity of an inflamed part is still seen as the cause rather than the result of inflammation, and the mode of action of bloodletting is that "the augmented action of the heart and larger arteries; the distended and excited condition of the minute arteries are subdued; the vis a tergo being removed, the crowded, adherent and stagnant blood globules in the capillaries are set at liberty and reflow into the current of the general circulation, as I have seen in the web of the frog; the veins are relieved in turn, and in a word, the augmented circulation in the whole part is relieved."(41).

Hall indicates that bleeding to large volumes can be safely pursued in the young and strong, but that caution should be exercised with the old and frail. The primary indication for bleeding is a hard and incompressible pulse,
but under certain other conditions bleeding might be permissible depending on the experience of the physician. A certain mystique is implied. Local bleeding, especially by cupping, might be indicated if general bleeding had not subdued the inflammation.

Ahrdrop(77)(78) confirms that an incompressible pulse is a strong indication for blood letting and feels that local pain is another primary indication. He remarks on the beneficial effects seen in his patients as a result of spontaneous bleeding from varicose veins or piles. The mystique attaching to selection of patients is confirmed.

In his book on the subject, Clutterbuck(22) confirms the above although he disagrees with Hall's bleeding to syncope, preferring to bleed specific quantities (8-20 ozs.) and to repeat the bleed if an initial letting has no effect. He attempts unsuccessfully to identify the mode of action of bloodletting but does provide a useful analysis of the factors influencing the effect of bloodletting.

Thomas Watson in his textbook, published in 1843,(80) summarises neatly the justification for the use of bloodletting in inflammation by quoting Mr. Lawrence on the subject, "If we may be allowed to use figurative language, the obvious increase of heat in the part is analogous to that of fire; and blood is the fuel by which the flame is kept up: in fact, if we could completely take away its blood from the part, we should be able entirely to control or arrest the increase of action". Watson is also cautionary about the adverse effects of bloodletting "lest one rob the vital fluid of its plastic and nutrient materials."

A 19th century treatise on the art of cupping by Thomas Mapleson,(60) cupper to George IV (who considered it a luxury to lose blood by cupping and was cupped 200-300 times), indicates its usefulness in almost any situation but particularly in inflammation of the eyes, where the cup should be applied to the temples or behind the ears. The practice does not seem to have been widespread even in
London and Edinburgh had no resident cupper in 1820, nor until Mapleson's son became resident there in the second half of the 18th century (60). Physicians, of course, were capable of doing their own cupping.

The uses of bloodletting in the first half of the 19th century were extensive but a certain caution had been introduced by the authors of the works quoted above. It was indicated in inflammation of any sort (10) (22) (41) (87) (80), catarrh, croup, sinusitis, pleurisy, T.B., hydrothorax, asthma, dyspnoea, whooping cough, measles, influenza, pharyngitis, gastroenteritis, hepatitis, jaundice, delirium, phrenitis, fever, apoplexy, nephritis (by Bright (10)), haemorrhage, dropsy, scarlatina, syphilis, scrofula (22), diabetes (3), pericarditis (34), pneumonia (68), and alcoholic intoxication (76). Clutterbuck still recommends it as a "prophylactic for inflammatory disorders, if done every spring, since they are more common at this time".

It was not obviously not chance that determined the title of the leading English journal founded in 1823 - the "Lancet".

An early understanding of when bloodletting might be most useful was given by the dramatic experiments of Reid on hanged dogs (67), when he showed that cardiac function can be improved when the congestion of the right ventricle is relieved by venesection.

**Broussais and Bloodletting in France.**

As already noted, bloodletting was popular in France in the 18th century, but at the beginning of the 19th century French medicine and medical teaching under the influence of Pinel, Bicêtre and Corvisart was becoming more Hippocratic. The old concentration on symptoms and essentialism was slowly being replaced by a new emphasis on lesions and localism (1). At this time, François Magendie made the obvious conclusion from Harvey's demonstration of the circulation, that the use of points of election in was not only absurd but also useless. Called once in consultation
where the question of bleeding the patient simultaneously from the right arm and left foot was being hotly debated, Magendie said it reminded him of some of the best scenes of the comic stage(59).

Francois Joseph Victor Broussais(1772-1835)(13) served as a physician from 1803-1814 in Napoleon's armies and returned to the combined chair of Pathology and Therapeutics in Paris. He did away with Pinel's "Essential Fevers" and related all disease to inflammation and irritation, particularly of the gastrointestinal tract, an extension of the Brunonian theory of overstimulation. The obvious therapy for this was antiphlogistic - bleeding and purging - and thus he proceeded, following what he called his "Physiological Doctrine". He considered leeches a particularly desirable form of letting blood. He was a persuasive man, an able lecturer, and his ideas quickly spread as the figures for the importation of leeches into France at this time indicate;(1)

<table>
<thead>
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<th>Year</th>
<th>Imported</th>
<th>Exported</th>
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<tbody>
<tr>
<td>1820</td>
<td>-</td>
<td>1,157,920</td>
</tr>
<tr>
<td>1823</td>
<td>320,000</td>
<td>1,188,855</td>
</tr>
<tr>
<td>1827</td>
<td>32,634,494</td>
<td>196,950</td>
</tr>
<tr>
<td>1833</td>
<td>41,654,300</td>
<td>868,650</td>
</tr>
<tr>
<td>1834</td>
<td>21,885,465</td>
<td>868,650</td>
</tr>
</tbody>
</table>

Even this was inadequate to meet the demand.

In jaundice, leeches were applied to the hypochondrium, and in dysentery to the anus. In nearly every case leeches were applied in an attempt to arrest or allay inflammation(18). Broussais had himself bled 6 times when suffering from indigestion and had 1150 applications of 50-60 leeches(59). He made false claims for the influence of his therapy upon the mortality rate(1)(18) and was unable to reply to the criticisms that were levelled at him for this, Mouillaud and Lisfranc(57) followed Broussais in the enthusiasm with which they used bloodletting at this time. Dupuytren(32) records the common finding of false aneurysms of the brachial artery following careless venesection, a practice he used extensively himself(36).
Oliver Wendell Holmes (46) writing in 1860, had the following to say about the logical errors to which physicians are subject; "The mode of inference per enumerationem simplicem, in scholastic phrase; that is, counting only their favourable cases ....

The post hoc ergo propter hoc error; he got well after taking my medicine; therefore, in consequence of it.

The false induction from genuine facts of observation, leading to the construction of theories, which are then deductively applied in the face of the results of direct observation. The school of Broussais furnishes a good example of this error."

Broussais' genuine facts of observation were the effects of typhoid on the small bowel of Napoleon's soldiers - from this his theory derived.

And of Lisfranc, Holmes had this to say; "I can say little more of him than that he was a great drawer of blood and hewer of members. I remember his ordering a wholesale bleeding of his patients, right and left, whatever might be the matter with them, one morning when a phlebotomising fit was upon him. I recollect him regretting the splendid guardsmen of the old empire, - for what? because they had such magnificent thighs to amputate."

Broussais' inability to cope with the cholera pandemic in France may have contributed to the fall in his popularity, for his methods were certainly less popular when he died in 1838, and the views of Andral and Trousseau soon superseded his own.

In 1835, Pierre Charles Alexandre Louis (1787-1872) (59) published the results of the first application of the numerical method to therapeutics, "Racherches sur les effets de la saignee" in which he showed that bloodletting never arrested an attack of pneumonia and that its beneficial effects were difficult to prove. Louis, distinguished already by his pathological and clinical studies on T.B. and typhoid had produced a paper that was to have far-reaching effects on practice both on the Continent and in England. His paper emphasised the potential of therapeutic
scepticism, already apparent in the works of Laennec (50) (53) who was against the English and Italian practices of massive bleedings in pneumonia.

Elsewhere in Europe at this time, Skoda was pursuing a policy of opposition to bleeding and purging in Vienna, (59) while in Italy, bloodletting in massive quantities still seems to have been popular (53).

Meanwhile, in England a move was under way to abolish the practice of bloodletting under the leadership of Dr. Samuel Dickson.

Samuel Dickson and British Bloodletting.

Samuel Dickson had studied at Edinburgh and Paris before he went to Madras in 1827 (17). In Madras, he bled patients freely during the cholera epidemic which he encountered there and recorded a 71% mortality. In 1832 he published "On the Epidemic Cholera and other Prevalent Diseases of India," in which he deduced that the symptoms of cholera were due to diminished influence of the pneumogastric nerves rather than to primary bowel involvement and that stimulatory not depletory measures were therefore the treatment of choice. He commented on the adverse effects of bleeding which led to consumption, dropsy, dysentery and death.

Haning returned from India and settled in practice in Cheltenham, he proceeded to publish "The Fallacy of the Art of Physic as taught in the Schools; with the development of New and Important Principles of Practice." in 1836, an unqualified condemnation of bloodletting, based on a logical error but, nevertheless, appropriate. His new and important principle of practice - chronothermalism - the theory that disease was based on "some fitful error of time and temperature" - was inappropriate.

Reviews of this book of Dickson's ridiculed him to such an extent that he had to take to defending himself in the columns of the Lancet (when he could gain access to them) (30)(54). The Medical Times compared him to an "Irishman in a row at Dannybrook Fair, who flourishes his
shilleleigh in all directions and gives a knock on the head to everyone within arm's reach." (17).

( It is irrelevant to the theme of the essay, but interesting in the light of Pappworth's recent publication (64a) on human experimentation, to quote Dickson as he threatens the stethoscope with his shilleleigh, (30), "since mediate auscultation, (to use the prevalent jargon) became the fashion, has the medical student or have my critics, found that they could bring pectoral or other disease to a more favourable termination? I have never obtained but one answer to this enquiry and that answer was in the negative. Oh, but it has taught them to distinguish and to discriminate. Let us admit for the present that this is a fact.

Of what use, again I ask, is such discrimination if it influence not the practice......Latham says it distresses the patient. Whatever distresses and troubles the patient, not only alters all his cardiac and respiratory functions, so as to neutralise the indications which are presented by them, but actually aggravates the disorder itself. As the discovery of the degree of organic lesion, then, in no instance leads to difference of practice, I am content to judge of it from the patients general appearance, the number of his respirations and the sound he makes when he speaks, breathes and coughs, as appreciable by the naked ear. From an instrument whose application troubles and distresses the majority of patients, I look for no superior information." The similarity to many, if not most of Pappworth's arguments is striking, and the content provides a useful indication of the sort of physician Dickson was.)

In consequence of his theory of chronothermalism, Dickson was named "Ague-Dick". However, in spite of the many attacks upon him, his views were noted by some English practitioners and by 1845 his doctrine of chronothermalism had been adopted by American opponents of bloodletting, and the Penn Medical College of Philadelphia was founded to teach his doctrines (16)(17). He took to publishing his own journals in which he continued to attack medical practice and the backwardness of the healing art, since he was denied
access to the orthodox medical journals.

In 1843, Daniel McNaghten, an unemployed wood-turner who blamed his misfortunes on Sir Robert Peel's economic policies, shot Edward Drummond, Peel's private secretary, in an attempt on Peel's life. Drummond was bled to the extent of 56 ozs. in 5 days by his medical attendants and further depletion was accomplished by cupping glasses, three dozen leeches and a dose of calomel. He died. His death stirred Dickson's pen to produce a pamphlet entitled "What killed Mr. Drummond, the lead of the lancet?". A leader in the Lancet(55), for once, was inclined to agree with Dickson and suggested that, in the absence of inflammation, the bloodletting had been overenthusiastic. The inevitable letter in reply(29) to the Lancet cautioned against this questioning of the practice of two such eminent surgeons. Incidents such as this were bringing the bloodletting controversy to the public eye and may have been a very important factor in the subsequent decline of the practice.

Certainly, by the 1850's antiphlogistic measures, including bloodletting were losing favour, but Dickson's claim for the credit for these changes,"Gentlemen, to say bloodletting is a bad remedy is a bad thing - to prove it to be bad is another - to force the world to believe and act upon your arguments against it in the teeth of the opinion of the world, is a still greater achievement. That merit I distinctly claim. With Coriolanus, I can say, "Alone I did it"."(16), passed unrecognised. In the Harveian oration of 1860, by William Emmanuel Page - the abandonment of antiphlogistic measures over the past two decades was attributed to nobody in particular. The "change of type" theory (see later) - perhaps a change in atmospheric conditions or the human constitution - was endorsed and great was the applause(17).

It seems that the "change of type" theory was elaborated to save the professional face and it may be that if Dickson had supported his deductions with reliable statistics instead of a suspect theory, and had been more politic in
in his dealings with the most conservative of professions, he would have established for himself a more respected place in the eyes of the profession than that of Ague-Dick.

In Edinburgh too a bloodletting conflict was being waged.

Bennett, Alison and Edinburgh Bloodletting.

King (52) has studied the bloodletting controversy in Edinburgh in the 1850's.

In 1855 John Hughes Bennett (1812-1875), Professor of the Institutes of Medicine in Edinburgh, gave a lecture on the "Present State of the Theory and Practice of Medicine," in which he referred to the uselessness of bloodletting in pneumonia, claiming that it was doubtful whether venesection could influence the stagnant blood in the pulmonary capillaries or the coagulated exudation and that it merely lowered the strength and vital powers of the individual. Bennett believed that the decreased mortality from pneumonia in his time was due to the fall in popularity of bleeding and not to the "change of type" theory which Alison was known to support.

In 1856, William Pultney Alison (1790-1859), grandson of John Gregory and Professor of the Practice of Physic in the University, replied to Bennett in a lecture to the Medico-Chirurgical Society entitled "Reflections on the results of experience as to the symptoms of internal inflammation and the effects of bloodletting in the last 40 years." in the discussion of which, Bennett's name and his views had scorn thrust upon them, necessitating a caustic defence in the journals by Bennett. Bennett, attacking practices established by Cullen and Gregory, was very much the brash young man of Science in conflict with traditional and long established views.

The concept of inflammation at this time was still woolly and might be used for general or local symptomatology. The traditional therapy for inflammation was antiphlogistic or depletory, involving bloodletting or purging, or both, and Alison followed Cullen and the older writers in
believing that in cases of pneumonia with a strong pulse and difficult respiration, bloodletting was both effective and desirable. However, Alison now claimed to recognise cases of pneumonia with relatively unaffected breathing and a soft frequent pulse in whom bloodletting was considered undesirable — hence, the "change of type" theory and the explanation of the fall in mortality.

Dennett returned to the fray with a detailed and learned discussion of the pathology and nature of inflammation in pneumonia, in which he referred to the work of Louis and the decline of mortality from pneumonia in Paris in the absence of a "change of type", and in which he demonstrated that the use of antiphlogistic methods in inflammation was opposed to a sound pathology. He observes that the increase in the flow of blood to a part is the effect of inflammation, not the cause. He concluded by comparing the death rate of cases of pneumonia treated traditionally in the Royal Infirmary, which was 30\%, with the death rate in his own series of conservatively treated cases, which was 5\%. (4).

This publication was also included in his "Principles and Practice of Medicine," of 1858 (5) of which there is a copy in the Edinburgh University Library inscribed "Dr. Alison with the authors kind regards."

King (52) feels there is some evidence to support Alison's change of type theory, believing that bronchopneumonia at that time was becoming more common than lobar pneumonia, but it is doubtful if this was the most significant factor in the change of therapeutic policy. It is more likely that the policy change was due to a number of factors, including not only the combined effects of Louis' work and Dickson's pamphleteering but a slow change in the attitudes of the public to bloodletting — it was no longer regarded as the inevitable first step in therapy.

The controversy represents the growing conflict between the scientific physicians, who insisted on quantitative evidence of a theory with series of cases and suitable controls, and the traditional physician carrying on the work of his much respected and universally admired predecessors.
Bennett summed his attitude up as follows "why should we read the book of nature through the eyes of the sages of former times - when the light of science was comparatively feeble and imperfect - instead of bringing all the advanced knowledge of the present time to elucidate her meaning."

There is no doubt that Bennett's treatise "The Restorative Treatment of Pneumonia" published in 1865, marked the end of the use of excessive bloodletting.(23).

It would not have been out of keeping for the medical profession, then, as it has done since, to protect itself from the obvious and save its face with a sweeping generalisation like the "change of type" theory which satisfies the general public and the vast majority of unenquiring physicians.

The Late Nineteenth Century.

The decline in the use of bloodletting continued after this heated exchange of the 1850's and the growth of a rational attitude to its use is seen in the writings and works of Sir William Broadbent(11), William Gull(39) and William Markham.

Broadbent recognised the use of bloodletting in modifying the distribution and pressure of blood in the venous and arterial systems, and, for him, the primary indication for its use was in failure of the right heart, either secondary to pneumonia or to left heart failure. He also advocated its use in hypertension, uraemic convulsions and threatened apoplexy.

Gull was a scientist who recognised the limitations of therapy only too well, and his attitude can be seen in the following aphorisms from his works(39);

"Drugs given in disease are, not infrequently, for the most part harmful, perhaps universally so. The object of medical treatment is to maintain the life processes."

"There are many good general practitioners, there is only one good universal practitioner, - a warm bed."

"The one fatal blunder of the profession is the belief that we can treat, with advantage to the patient, the acute maladies, and that we ought and have power to treat the
tissue changes, though all admit we are ignorant of the nature and living course of the changes."

Markham, in his address to the Royal Medico-Chirurgical Society in 1859 defined the major benefit of venesection as it is defined today - the relief of cardiac congestion(16). Inevitably, reactionary views were expressed and MacDougall(58) writing in 1887, regrets the over-hasty dropping of bloodletting which he finds effective in a number of disorders including epilepsy, croup, pleurisy, pneumonia, pulmonary oedema, mitral disease, renal hypertension, haemorrhage, eclampsia and hypertensive encephalopathy.

Sir James Paget(64) in 1875, reflected that he had no recollection of serious harm being done by bloodletting during his apprenticeship, although in a few cases he considered its use mischievous. He describes the post-operative regime of the 1840's as including bleeding, purging and other forms of interference and notes that "now the view prevalent, not only for post-operative cases, but also for acute rheumatism, pneumonia and all acute inflammations is that, in most cases, the effects of injury and disease should be allowed to take their course in the confidence that they will come to a natural good end, and that we have no medicines potent to alleviate or cure them".

Sir Charles Sherrington(71) relates the story of when he was a house physician at Addenbrookes in the 1880's and a 15 year old boy with acute pneumonia was admitted under the care of Sir George Humphrey, who asked Sherrington, "Did you ever see a buffy coat? No? A physiologist should see one. I'm going to bleed him" which he did, and in due course the boy made a good recovery.

The use of bleeding in pneumonia, by this time, was severely restricted and by the turn of the century it was only indicated in those cases with right heart failure(36)(62). Other indications at this time were arteriosclerotic cardiac insufficiency, cerebral haemorrhage, emphysema, heart disease, sunstroke, and yellow fever and polycythemia - all diseases with sound haemodynamic indications for bloodletting.
With the development of modern therapeutics in the 20th century the absolute indications for bloodletting became few. It is now recommended for haemochromatosis(33)(82), primary polycythaemia(21), and the debate on its use in secondary polycythaemia incop pulmonale is, as yet, unresolved(2)(35)(43)(44)(47). Recently attention has turned to its possible value in myocardial infarction, as a method of reducing blood viscosity(19)(49). At last, bloodletting is being used in a rational context, in situations where its efficacy can be assessed.

Friedberg(35) and Wood(82) both mention venesection as rational treatment for congestive cardiac failure and I had the unusual experience of employing it in this context when I was in Nigeria in 1969 and was confronted with a 35 year old woman with gross pulmonary oedema in a hospital that had not seen morphine, digitalis or diuretics for several months. (I also had the opportunity to confirm that cupping and scarification are still used in Nigeria, particularly by the Muslim Hausa in the North.) The investigation of the use of bloodletting in the traditional medicine of the developing countries is obviously another interesting subject which would be rewarded by further study.

In conclusion, it may be said that this survey of bloodletting in the 18th-20th centuries has confirmed that the problems of medicine through these centuries in coping with the indications and uses of bloodletting are essentially the same as the problems that can be seen in medicine today. The clash of modern and traditional views of therapy as seen in the Bennett/Alison controversy is exemplified in many fields today, perhaps best in the treatment of chronic cor pulmonale; the professions reluctance to pay attention to renegades like Samuel Dickson - exemplified in present bitter attitudes to the views of M.H Pappworth; the devising of remedies from theory on the assumption that they must be effective - of which the modern treatment of hypnotic poisoning serves as an example; and the developing of facile aetiological theories, i.e. systematisation - the current
example of which is the auto-immune vogue.

These problems are discussed in the modern context by Todd in a paper in the Lancet (appropriately?) entitled "Errors in Medicine" and published in 1970. (75). His conclusion, which might have been written by Sydenham or Gull, serves as a warning to us all, "The prime qualities needed to overcome these errors are nous and humility. We should constantly realise that medicine is a subject of extreme complexity. Despite all the advances of recent years, our ignorance is profound in many spheres. And despite all the modern spectacular remedies, the recovery of most patients is due much more to nature than to anything we can do."
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