A TREATISE ON BLOODLETTING,
GENERAL AND LOCAL,
HISTORICALLY, THEORETICALLY, & CLINICALLY CONSIDERED
FROM THE PHYSICIAN'S STANDPOINT.

BEING A THESIS
FOR THE DEGREE OF M.D. 1893.

BY

R.J. ERSKINE YOUNG, M.B.C.M. 1891.
The practice of Bloodletting has occupied the attention of Physicians and Surgeons from a remote period. As a remedy, real or imaginary, for disease, it has passed thro' many phases - at one time being used as a panacea for almost every disease incident to humanity, and again, in later years, falling into disuse. Moreover, apart from diseased conditions, bleeding used to be systematically practised on the healthy subject. It was no uncommon thing, for instance, for an individual to call at the doctor's to be bled coincidently with his or her visit to market. And again, it was an almost universal custom for young women, e.g. domestic servants, to undergo the operation of venesection, (or phlebotomy, as it used to be called) twice a year - generally in the Spring and Fall. Sydenham was an advocate of yearly bleeding for those who had an apoplectic tendency.

Dr John Shand, in a paper read before the Edin. Med. Chir. Society in session 1890-91, says; "I knew "and conversed with two men who were sure that con- "siderably over 60 times in their lives they had been" "bled - for many years regularly at the rise and "fall of the year. One of the two was generally "
"bled at the roadside by one of the stone-breakers,"
"an occupation that, in the South of Scotland, seems"
"to have been combined with venesection, just as "
"painter and glazier are. Professor Sir Douglas "
"Maclagan narrates his being bled at the age of 13 "
"months."

As regards these customary venesections, Sir
J. Paget says, "Not one of these persons suffered
harm."

In the following pages, I first propose to treat
the subject from a historical point of view; then, to
discuss the reasons why the practice of Bloodletting
has fallen into disrepute; thirdly, to describe in
detail the operation of venesection, dry and wet
cupping, and leeching; fourthly, to discuss the
modus operandi of both general and local bloodlet-
ting; fifthly, to enumerate the various considera-
tions which must be taken into account, before we
employ this method of treatment, i.e. Guides for
bleeding; and lastly, to describe the Indications
for treatment, with clinical illustrations.
PART I.

HISTORY OF VENESECTION.

One of the sons of Æsculapius, Podalirius by name, is said to have invented bloodletting. Æsculapius lived about the 12th century before the Christian era. Podalirius accompanied the Greeks in the Trojan expedition, and is celebrated in various passages in the Iliad for his Medical skill. His practice, however, was principally surgical, as illustrated by the following incident. About 1134 B.C., Syrna, daughter of the King of Caria fell from a "lofty roof." She recovered after being bled by Podalirius, who received as a reward her hand, and the Carian Peninsula. It is, then, to this gentleman that we may give the credit of the introduction of bloodletting into Medicine.

Bloodletting has therefore rather a romantic origin.

It was during the 6th century before Christ that the name of Pythagorus flourished. His school indirectly contributed to the advancement of Medicine; but I can find no mention of the practice of bloodletting either by himself or his pupils. On the contrary, "Placing" as he did "the seat of the Soul and of life"
"itself in the blood, he denounced bloodletting as a" "needless waste of life," and this opinion was up-
held by a long line of distinguished disciples, among
whom were Chrysippus and "the world renowned Era-
sistratus." We now come down to the time of Hippo-
crates. This man was destined from the first to
effect a complete revolution in his profession. He
was born about 460 B.C., and was brought up amongst
the Asclepiades, i.e. the descendents of AEsculapius.
He has been called the Father of Medicine.

While he acknowledged the unerring superintend-
ence of nature, he believed disease to be due to the
presence of humours, which must be removed. "Reple-
tion" he says, "is to be relieved by evacuation," and vice versa. Therefore, while always taking his
indications for treatment from nature, he frequently
used depletion either in the form of a "variety of
purgatives," by sudorifics and diuretics, or by
"General Bloodletting." For instance, in acute
disease of the chest, he says, "If the pain point "
to the clavicle, or if there be a heaviness in the"
"arm, or about the breast, or about the diaphragm, "
"one should open the inner vein of the elbow and "
"not hesitate to abstract a large quantity." (Gen-
une Works of Hippocrates, Vol.I, p.290). In in-
flammatary disease, he says, "Venessection should
precede all other methods of cure." The practice
of bloodletting in Pneumonia and Pleurisy is to be regulated, he said, by certain well-marked conditions; viz:—1st, The seat of the pain, 2nd condition of the patient, and 3rd, the character of the sputum. In the genuine works of Hippocrates, one paragraph is descriptive of either cerebral haemorrhage or embolism. He says, "when a person suddenly" "loses his speech in connection with obstruction in" "the veins, one ought to open the internal vein in" "the arm, and abstract more or less blood according" "to the habit and age of the patient. Hypochondria" "... and other phlegmasiae — diseases” "connected with the retention of humours — do not” "admit of resolution if treated at first by medicine;” "but venesection holds the first place in conducting the treatment.”

Such then, was the practice of Hippocrates. After his death, there was little change made in the practice of medicine for some centuries. The successors of Hippocrates, for the most part, followed up his principles. But there were some who opposed them. For example, Chrysippus, inasmuch as he discarded bloodletting, and even disallowed the use of active purgatives. He practised during the latter half of the second century.

About three hundred years before the Christian Era, the foundation of the School of Alexandria was
laid. Among its Professors, was a pupil of Chrysippus, whose name was Erasistratus. He followed his teacher Chrysippus in opposing bloodletting.

About a century before the Christian Era, Asclepiades of Bythinia seems to have gained considerable popularity as a Physician in Rome. He vilified the practice and principles of his predecessors, and described the teachings of Hippocrates. He, like Chrysippus, and Erasistratus, refrained from the use of active remedies, and trusted principally to the efficacy of diet, exercise, and the liberal use of wine; although, according to another authority, he occasionally used emetics and bleeding.

The next name with which we associate bleeding, is that of Caelius Aurelianus, who flourished probably, during the second century before Christ. He did not admit the existence of humours, and he therefore rarely practised general bloodletting.

We now come to the reigns of Vespasian, Trajan, and Hadrian, whose tenures of office as Emperor, lasted from 70 to 138 A.D.; and it was during their reigns that the Hippocratic Practice quite revived. This came about in the hands of Aretaeus, who thought very highly of the practice of venesection in certain selected cases, as illustrated by the following. He says, that in cases of Pleurisy,
"There is no time for Procrastination of the great" Remedy. . . . Wherefore then on the selfsame day, we must by all means open a vein. In "Pneumonia," he writes; "We are to open instantly the veins at the elbow on the right and left side," so that revulsion of the humours may take place from either side." (Extant Works of Aretaeus).

The course of my narrative now brings me to the time of Galen. This man was destined to form an era in the history of Science. He lived in the time of the Emperor Aurelius. He was an admirer of Hippocrates, whose principles he professed to act upon, and therefore we may conclude that he employed venesection and other active remedies, as did the "Father of Medicine." Galen was looked upon as the man of his time. According to the late Dr Aikin, "His fame can only perish with the Science itself." One may say both of Hippocrates and Galen, that "they" excluded the possibility of improvement in the "science of medicine for centuries after their time."

During the middle ages, the science of medicine partially fell into decline. Venesection, however, continued to be practised by the successors of Galen, viz: - Oribasius, who lived in the 4th century; Aetius, in the 5th; and Alexander Trallianus, in the 6th.

We now turn our attention to a new school, which
arose in a different part of the world, viz., Arabia. This was during the 7th century. The Arabians practised Blood-letting in a peculiar manner; for, as Dr George Balfour tells us in the Edin Med. Journal for 1858-59, "Regarding it as very unfavorable to" "coction, and as a mere evacuation, they did not " "practise it during the increment of fever. While" "this continued, the patient was kept forcibly " "awake; but when it lulled, and the crisis ap- " "proached, he was bled, and allowed to sleep, and" "no doubt the weary wretches hailed the lancet as" "the divinest boon of Heaven to man."

From the 12th to the 15th century, medicine was at its lowest ebb; and it is therefore likely that there was little or no practice of bloodletting during these "dark ages." During the 16th century, there was a revival of the principles and practice of Hippocrates, at least, by many. Hence, we may conclude that bleeding again came into favor, whilst others still rejected it. Among the latter was Van Helmont, who was born at Brussels in 1577. He studied medicine and graduated as M.D. in 1599. Dr Balfour, on "Haematophobia," (Edin Med. Journal, 1858-59) says: "Regarding plethora and congestion as errors of his" "Archaeus, and the blood itself as free from " "blame, he (Van Helmont) saw no good to be at- " "tained by its detraction. Moreover, he pointed"
"out the serious injury that might arise by lessening the mass of vital spirits circulating with the blood," "and clearly demonstrated the evils consequent on "over-bleeding." Van Helmont was therefore Pythagorean in his principles. In 1682, Lucas Antonius Portius published a work which contains the views of many authors compared and criticised. His conclusions are that "bloodletting is no certain remedy for "disease - that it's omission is never a cause of "death, while many have died from the effects of "bloodletting alone. Lastly, that it evacuates no "materies morbi, corrects no humours, and is of neces-"sity followed by no certain result. . . . . and "that it should never be employed, except when from "sudden afflux of blood to a noble part, the integri-"ty of vessels is threatened."

It is with the year 1628, that we associate the discovery of the circulation of the blood by the "im-
"mortal Harvey." This discovery does not seem to have had much, if any, effect on bloodletting practices; be-
cause Sydenham, who lived in the 17th century, was strongly in favor of venesection. He was born at Win-
ford Eagle, in 1624, took his M.B. in 1648, and died in 1689. In his treatment of Pleurisy he says, "My "sheet anchor is venesection." And, as if that were an invariable line of treatment, he says, "As soon as "I am sent for, I bleed from the arm to ten ounces or"
"more . . . the same again the next day, and"
"the same again on the third day. I even go on to"
"the fourth, so that unless the patient previously"
"recover, he has, in cases where the pain and other"
"symptoms are very violent, four continuous bleed-
"ings. . . . . Never have I known any mischief"
"from the detraction of blood, though unskilful men"
"may think otherwise." (Works of Sydenham, Vol. I.
p. 250).

He also bled in erysipelas, quinsy, renal calculus, ophthalmia, and asthma. In Pneumonia following
measles, he recommends venesection, "once, twice, or"
"thrice, as the case may require, with due intervals"
"between." He also makes the statement that "the "
"diarrhoea which follows measles is to be cured by "
"bleeding."

In inflammatory and post-pneumonic phthisis, he
says, "This disease must be attacked by bleeding, "
"and purging." In fact, we may say that there are
few diseases in which Sydenham did not employ bleed-
ing in some form or other. In Apoplexy, he recom-
mends that twelve ounces should be taken from the
median basilic, and then from the jugular, eight
ounces. Referring to this disease in another place
he says; "If a man be threatened with this great"
"danger, either by having had this disease before, "
"or else by his age and habit of body, . . . . "
"he ought, in the first place, to bleed yearly, " "after the winter solstice, and the next day, let " "him take a lenient purge. The reason why I would " "have bleeding precede purgation, is that there " "would otherwise be danger that the purge given " "upon full veins, on account of the tumult it raises" " should hasten the mischief it was designed to pre-" "vent." (Works of Sydenham).

In the year 1747, a book was published entitled "Medical Essays and Observations." The author was by no means an upholder of the views of Cullen; still, he used the lancet to a moderate extent. He says, "The more we evacuate, the disease continues longer," "so that the very vulgar rule to bleed till the " "crust disappears, or the blood turn better, as they" "say, is very hurtful. But once bleeding, more or " "less answers all intentions."

We have now reached the time of Cullen. William Cullen was born in 1712 - took his M.D. in 1740, and died in 1790. He used the lancet to an almost appalling extent. "In his First Lines of Practice " "of Physic" (published in 1829) he says of "Pneumonic inflammation." "The remedy, chiefly to be depended" "upon is that of bleeding at the arm. . . . The" "remission of pain, and the relief of respiration " "during the flow of blood, may limit the quantity " "to be withdrawn, but, if these symptoms of relief "
"do not appear, the bleeding should be continued 
"till the symptoms of a beginning Syncope come on. " 
"The bleedings will be more effectual when practised" 
in the course of the first three days than after- " 
"wards. . . . .With respect to the quantity . " 
"no rules can be delivered. . . . In the adult " 
"male of tolerable strength, a pound avoirdupois is" 
"a full bleeding. Any quantity above twenty ounces" 
"is a large, and any quantity below twelve, is a " 
"small bleeding. A quantity of from four to five " 
"pounds in the course of two or three days, is gen-" 
"erally as much as such patients will safely bear." 

In children above five or six, suffering from Acute Meningitis, he says venesection is to be relied on, 
"which may often be carried so far as to produce " 
"faintness." In Delirium Tremens, he says that bloodletting succeeded by opium is "quickly success- 

After Cullen's death, the Chair of Practice of Medicine in the University of Edinburgh, fell to Dr 

James Gregory, who had been his colleague for some 

years. Gregory was born in 1753, and died in 1820. 

He was as strong an upholder of venesection as his predecessor Cullen. Here is an example; "A man was" 
"brought into hospital with Acute Pleurisy. A large" 
"bleeding was ordered; so he underwent three large " 
"bleedings in 24 hours. Later on, when the man grew"
"worse (!), thirty-two ounces were removed in the "
"presence of Dr Gregory. Next day, he was still "
"worse (!!), so he was bled again to 20 ounces, mak-
"ing 97 ounces in all, within 48 hours. Hiccough and" "spasms in the face now supervened. He was laid " "down, and these symptoms disappeared. After this," says Dr Gregory, "he was in a manner cured. The " "violent symptoms ceased, and he made a quick recov-
"ery. If he had died after the fifth bleeding, " "whether instantly or not, there could have been no" "dispute at all," confesses Dr Gregory, "that I had " "killed him with such horrible bleeding." (Quoted by Dr Allison in the Edin.Med.Journal 1856-57).

One can obtain an interesting and vivid account of the bloodletting practices of the middle of this century, by consulting Dr Marshall Hall's book on "The morbid and curative effects of Loss of Blood" published in 1830.

Marshall Hall was born in 1790, and died in the year 1857. In his practice, he attracted many pa-
tients by his partial disuse of venesection, then so popular. Altho' he did not uphold excessive bloodlet-
ting, yet he regarded it as a specific for inflamma-
tion and fever. He says that inflammation protects from the effects of loss of blood; and that blood-
letting to a further extent becomes dangerous, when the protective effect of the inflammation has gone.
Under "morbid effects of loss of blood", he tells us that a man was brought into hospital with broken ribs, penetrating into the lung. Pulse became full and hard. He was bled to 18 ounces; later to 20 ounces; and the next day, 18 ounces were again removed. At noon he felt better, but, since the pulse was jerky, small, and compressible, (which condition was attributed to inflammation), another bleeding of 18 ounces was ordered. The dresser, however, perceiving the effect of the loss of even a few ounces, desisted from drawing any more. Subsequently, the surgeons ordered still another bleeding of 20 ounces. "The pulse after this became a mere flutter, and the man survived only a few hours."

In 1845, or thereabouts, the "hue and cry" was raised against bloodletting, at least in some of the Continental Hospitals, for the Physicians of the Homeopathic Hospital in Vienna, (and Dr Skoda of that city) avoided bleeding altogether. They treated pneumonia expectantly.

But this reaction against bloodletting did not make itself felt in this country, until another decade had passed. The year 1857 must always be a "red-letter" year in the history of general bloodletting, because it was during that year, that the great bloodletting controversy took place. At this controversy, there was endless discussion and the
subject of venesection was, so to speak, pulled to pieces. Those in favour of it were Drs Allison, Alex. Wood, Andrew Wood, and Professor W. Gairdner - Dr Bennet being on the opposite side. During 1857, Dr Smart, of Edinburgh, was Dr Bennet's House Physician, and as he then had four waiting days, he was able to fill the wards with Pneumonic cases in different stages. The treatment in these cases was of a stimulating and supporting nature, and under such treatment, the majority of the patients recovered. Thus, Dr Bennet described excessive bloodletting in pneumonia and inflammations; yet he says in his "Principles and Practice of Medicine;" "Small and moderate" "bleedings directed to palliate certain symptoms, es-
"pecially excessive pain and dyspnoea, may be reasonably had recourse to, without fear of doing injury. There are cases (of obstruction to circula-
"tion) where it will still be useful, due to diminu-
tion of tension." In uraemic coma, he says, "We now
"recognise that coma due to Uraemia in vigorous con-
"stitutions should be treated by venesection. . . " "It will prove not only a valuable, but a necessary
"remedy."

Since the time of Bennet, up till within a few years ago, bloodletting has fallen more or less into abeyance. During the last five years, however, there has taken place a partial reaction in favor of
bloodletting. This, I believe, will gradually make itself felt more and more, till bloodletting again takes its place among our useful remedies.
HISTORY OF LOCAL BLOODLETTING.

This practice, like venesection, is of great antiquity. If we look into its history, we find that those who employed general bloodletting, also approved of the practice of local depletion. Cupping is the application of the "cucurbitula," or cupping-glass. "The instruments," says Hippocrates, "which are used for cupping, are broad below, and "gradually become narrow, and are so constructed "in order to suck and draw in from the fleshy parts." In his time, they were made of horn or metal. In the condition of "swellings of the feet" due to an "influx of blood," (probably varicose veins) he says, "Blood is to be abstracted especially from the "veins which are the seat of the influx, if they be" "conspicuous; but if not, deeper and more numerous "scarifications are to be made in the swellings, "and whatever part you scarify, this is to be done "with the sharpest and most slender instruments of "iron." He gives various directions for cupping, and among others he says; "if the cupping instru-" "ment is to be applied below the knee, it should be" "done when the man stands erect."

Caelius Aurelianus was a staunch upholder of local blood-letting. In his treatment of acute
disease, the cure was effected by topical bleeding, general bloodletting being rarely admitted. Abstinence was strictly enjoined. In the treatment of inflammatory diseases, abstinence, rest, and friction were employed at first, then local bloodletting.

As already told, the Hippocratic practice quite revived in the hands of Aretaeus. Aretaeus cupped in "lethargy" boldly. In apoplexy, he says, "if the disease be protracted, and the head at fault, we must apply the cupping instrument to the back of the head and abstract blood unsparingly - for it is more efficacious than phlebotomy, and does not reduce the strength. But dry cupping is to be first applied between the shoulders, in order to produce revulsion of the matters of the occiput.

For the relief of the pain in pleurisy, he recommends dry cupping and scarification. He says, "The benefit from cupping is most marked in cases of pleurisy." In pneumonia, he says, "Dry cupping is altogether beneficial."

As an upholder of Local Bloodletting, Celsus comes next in order. He tells us that there are two sorts of cupping glasses or cucurbites - the one of copper, and the other of horn. "The principal use "

* Extant works of Aretaeus, published by Syd. Soc.
"of the cucurbital is, when the disorder is only in" "a part, the emptying (of it) is sufficient to ren-" "der it sound." He says that cupping is useful in acute disease where the strength will not admit of bleeding from a vein. "This remedy, as it is less " "violent, is more safe." In flatulence, he says, "Cupping without scarification is necessary." In peri-pneumonia, he also recommends us to "make use " "of dry cupping to the precordia." In "distemper " "of the womb, cucurbitals must be applied to the " "sides of the groin if there be not strength for " "general bleeding." Lastly, in Acute Hydrocephalus and other pains in the head, "it is of general use," he says, "to apply cucurbitals to the temples and " "back of head."

Local Bloodletting found a partisan in Galen. At least we may presume so, inasmuch as he believed in and practised the principles of Hippocrates, but I can find no record of any special case in which he employed topical bleeding.

I have already stated that venesection was employed by the Arabian Physicians to a modified extent. It is doubtful if they employed Local Bleeding.

Passing over the period known as the Dark Ages,

* Celsus' Medicine pp. 64 and 146.
and the time of Van Helmont, we come to Sydenham with whom local bloodletting found favor. In the convulsions of Dentition in children, he recommends a plaster to the "hinder part of the neck;" and hints that in certain cases he would likewise use "revulsion by ... cupping." In the treatment of apoplexy he recommends "revulsions of all sorts," as rubbing and binding the limbs, and the application of the "cucurbitula" to the shoulder blades (?) arms and legs.

Wm. Cullen, in his Practice of Physic, not only recommends general, but also local bloodletting. "In pneumonic inflammation," he says, "when a large quantity of blood has been already taken, and when it is doubtful if more can be with safety drawn in" that manner, some blood can still be taken by cupping and scarifying. Such a measure will be more particularly proper when the continuance or recurrence of pain, rather than the difficulty of breathing, becomes the urgent symptom, and then the cupping and scarifying should be made as near to the pained part as can conveniently be done." In Acute Gout, he opposes the repetition of venesection; but leeching, he says, may be used more freely. In Acute Meningitis, he recommends leeching in children.

* Works of Sydenham.
In cases of bites from a rabid animal, he says, "The first thing to be done is to apply a powerful "cupping glass over the wound."

Dr James Crawford Gregory was an upholder of local bleeding. It was this Dr Gregory who completed Cullen's "First Lines of Practice of Physic." In his chapter on Ophthalmia, he says, "Large "general bleedings may be used, but are seldom "necessary. It is commonly sufficient to apply a "number of leeches round the eye. It is perhaps "better still to draw blood from the temples by "cupping and scarifying." Both Dr Wm. Cullen and Dr J.C. Gregory were staunch upholders of the prac¬tice of local bloodletting.

Topical bleeding also found favor with Marshall Hall. In "Local Congestion," he says, "It is re¬markable how small a quantity of blood taken will" "relieve the patient. Two or three leeches are "sometimes sufficient. If cupping be employed, the" "early relief obtained will denote the proper quan¬tity of blood which should be allowed to flow."

It is not long since an appointment existed of "Cupper to the Royal Infirmary." In 1848, a man of the name of D.S. Cafe filled the position. He acted in this capacity for 13 years, namely, till 1861.

* Marshall Hall's "Morbid and Curative Effects of Loss of Blood."
His successor was Charles Cumming who occupied the position up till 1869, after which the appointment ceased to exist.

I have already mentioned the bloodletting controversy that took place in 1856-1857. While Dr. Bennet described excessive general bloodletting, he advocated "Small and moderate bleedings." In addition, he recommended the use of cupping (both dry and wet) and leeching.* Although since 1857 general bloodletting has been a *questio vexata*, local depletion, especially leeching, has continued to be used by many up to the present time.

N.B. In the history of local bloodletting, I have, for the sake of brevity, referred only to those who approved of and practised it.

In the diagram to be found on the next page, I have tried to show at a glance the different positions bloodletting has occupied in the practice of different men, from its extravagant use on the one hand, to its total disuse on the other.

*Bennet's "Principles and Practice of Medicine."
Bird's eye view
of the
History of Bloodletting
Hippocrates and successors

General and local.

A. C. 102

A. D. 150

Local bleeding

C. A. 200

C. A. 150 - 180

Invented

Podalirius B.c. 1134

Pythagoras 600 B.C.

Chryssipus Erasistratus B.C. 280

Strongly advocated.

Upheld.

Frequently used.

Occasionally used.

Excessive use described.

Rejected.
PART II.

WHY IS BLOODLETTING NOW SO RARELY PRACTISED?

There are four reasons:

1st. It has been said that Inflammation has undergone a change in type. This is a subject that is much disputed, and there are various opinions held by different men regarding it.

When we know, as a matter of history, that Hippocrates upheld and employed bloodletting in the fifth century B.C., and that Pythagoras described it during the sixth, we cannot merely say that they were both wrong. When Hippocrates was called the Father of Medicine in respect of the principles he laid down, we cannot conceive that he blindly advocated bloodletting. Again, we cannot imagine that Pythagoras as blindly disapproved of and described its employment. We can, therefore, come only to one conclusion, viz., that, during the Hippocratic age, inflammation was, as a rule, sthenic in type; while in the time of Pythagoras, it was more asthenic.

This theory of change in type has most probably held good ever since then, thus accounting for the widely different opinions regarding the uses and effects of bloodletting, beneficial or otherwise.

Has the type of disease in general changed
during the present century? I certainly believe that it has done so, and my belief is supported by the following facts.

In 1789, Dr Gordon of Aberdeen saw and treated a large number of cases of puerperal fever. His treatment consisted in the removal of 20-24 ounces of blood from the Median-basilic vein. "When I " "took away," he says, "10 to 12 ounces, the patient " "always died. But when I had the courage to take " "away 20-24 ounces of blood ... . . . . at the " "beginning of the disease, the patient never failed" "to recover. For many years, therefore, the" "treatment of epidemic and contagious puerperal " "diseases was simply heroic bloodletting."

In 1829, Gooch had the courage to controvert the ideas formerly entertained; he was at first in favor of bloodletting, and he got satisfactory results if, in cases of puerperal fever, he performed the operation early. If performed late, a fatal issue was the result. Later on, he recognised that an unvarying line of treatment by venesection did irreparable harm.

In 1823, Dr Copland invariably employed stimulation by camphor, with the result that "scarcely " "a case terminated fatally."

With these facts before us, we cannot but recognise that the average constitution of the people of
one generation must have differed widely from that of the people of another generation, and that the type of any specified disease must differ according to the constitution of the individual in which it occurs. I believe that we, at the present time, live in an asthenic age, as illustrated by the number of asthenic pneumonias that occurred as sequelae of the late epidemic of influenza. In fact, we rarely see a really sthenic case of an acute inflammation. But, I believe, that as type has changed in the past, it will continue to do so in the future; and before long, disease will take on a gradually more and more sthenic type; and as this takes place, medical men will revert more and more to the use of the lancet.

2nd. Our knowledge of Pathology differs widely from that of Hippocrates, Galen, Sydenham, and others. This is the case, not only as regards inflammation, but with respect to disease in general. Hippocrates, Aretaeus, and Galen, with their successors, bled in order to remove humours (the so-called Humoral Pathology): Pythagoras and Van Helmont denounced venesection, because they would thereby "lessen the "amount of vital spirits circulating with the blood".

3rd. The effects of loss of blood were not recognised as such. They were attributed to the inflammation on account of which the patient was bled.
For this reason venesection was repeated in order to remedy the morbid effects of the previous bleeding. Accordingly, the patient was frequently bled to death.

4th. The last-mentioned fact has naturally given rise to personal and popular prejudice against bloodletting.

Taking these facts into consideration, can we wonder that general bloodletting has almost entirely fallen into disuse?
PART III

THE OPERATION OF VENESECTION.

This is simple in the extreme, but still requires due care in its performance. The usual site for venesection is at the bend of the elbow, and the usual vein - the median-basilic. Some prefer the median-cephalic vein; and in cases of arteriotomy, the temporal artery is usually chosen. The operation of venesection used to be performed by barbers, who were therefore called "barber-surgeons." They would have been more aptly named "barbarous-surgeons" as the frequent occurrence of aneurysm at the bend of the elbow abundantly testified. The former existence of barber-surgeons explains the modern barber's pole. The pole itself represents the short stick grasped by the patient who was about to be bled; the white stripe of paint on the pole represents the bandage that was wound round the upper arm so as to distend the veins of the forearm; and the red stripe represents the blood itself that was withdrawn.

In performing the operation, one must bear in mind the close proximity of the brachial artery. The Anatomy of the parts is as follows. As already stated, the vein chosen is the median basilic. This is one division of the median vein of the forearm,
the other being the median cephalic. The former crosses at the bend of the elbow. Just beneath it lies the brachial artery, the bicipital fascia intervening. Since this is all that protects the artery, we cannot wonder that the barber-surgeon's razor (!) not only divided the vein but also pierced the fascia and artery in addition. Consequently, brachial aneurysm was a tolerably common occurrence.

There are three stages in the operation:

1st. The patient sitting in a chair, i.e., in the semi-erect posture, a bandage or handkerchief is wound round the lower third of the upper arm, so as to distend the veins below that point.

2nd. Compressing the vein just below the point of incision with the thumb to prevent premature escape of blood, a shallow incision is then made in the length of the vein of about one third of an inch long. A Syme's abscess-knife is as convenient an instrument as any for this purpose. The blood is allowed to flow into a graduated vessel to the desired amount. If it do not flow with sufficient freedom, the patient should be asked to clench and open the fist.

3rd. After sufficient blood has been drawn, pressure with the finger should be made at once to prevent the entrance of air, and to stop the bleeding; after which the application of a pad and bandage is all that is necessary. In Arteriotomy, the temporal
artery is usually chosen. A small transverse incision is made in the wall of the artery, and after sufficient blood has been withdrawn, the artery is completely divided so as to allow of retraction and closure of each end.
PART IV

THE OPERATION OF LOCAL BLOODLETTING.

This is done either by leeches or wet-cupping. If leeches are employed, a little difficulty may be experienced in getting the animal to fix on to the part. This may be effectually removed by the application of a drop of cream or milk; or a small puncture may be made so as to tempt the animal with the taste of blood. If the leech is to be applied to the gum, it is well to use a leech-glass. Bleeding from a leech-bite is often difficult to stop. This, according to Dr Haycraft, is due to a substance secreted by the Pharyngeal glands of the animal. If ordinary haemostatics fail such as Matico, Tannic Acid, Alum, etc., Pinus Canadensis or Hazeline are generally successful. As a rule, pressure is all that is required.

WET CUPPING.

In performing this operation, there are, as in general bloodletting, three stages. The first is that of dry cupping. For this purpose one may use ordinary tumblers in an emergency; but proper cupping glasses have a round bevelled edge. There are generally three glasses of different sizes. One may use either blotting paper wet with methylated spirit,
placed at the bottom of the cup, or one may hold a
lighted wick inside the cupping-glass, the latter
being of course held open end downwards, there being
just sufficient space between the edge of the cup
and the skin to allow of the rapid entrance and
withdrawal of the wick holder. If wet blotting
paper be employed, all that is necessary after
lighting the paper, is the rapid application of the
cup to the skin, this, of course, serving to extinguish
the flame.

The cup is allowed to remain on till the skin
becomes ecchymosed. It is then removed and the
scarificator applied which is the second stage in
the operation. It is not necessary to go into de-
tails regarding this instrument. Suffice it to say
that, by means of it, several cuts are made in the
skin (and subcutaneous tissue if necessary) by six
or eight short parallel blades.

The cupping glasses are again applied, with as
little delay as possible, and blood is withdrawn to
the desired amount. This is the third and last
stage in the operation of wet cupping.

DRY CUPPING.

This operation has been already described under
"wet cupping."
PART V.

THE MODUS OPERANDI OF VENESECTION.

In the practice of Venesection, we must necessarily diminish the amount of blood in the patient's body, to a greater or less extent. This removal of blood acts in one or both of two ways in different cases, as follows:

A. By action on and through the Nervous System.

B. By mechanical action.

Section I.

Modus Operandi of Venesection in cases where the equilibrium of the circulation is disturbed, e.g., in the early stage of acute bronchitis, pneumonia, or pleurisy, and the cold stage of ague.

(Vide Part VIII. Indication I.)

The fever process originates with the entrance of a poison into the blood. One of its first effects is to cause irritation of the vasomotor centre in the medulla. We know that this centre acts more on the smaller arteries, than on the larger vessels, although they also have their vasomotor supply.

Increased action on the part of the vasomotor centre means a diminution in the calibre, not only of the cutaneous vessels, but of the arterioles
generally ("vasomotor spasm"), which in its turn produces a diversion of the blood from the skin, to the larger vessels supplying the internal organs. It is this that causes elevation of temperature, and the other symptoms of commencing fever. The inevitable result of the diversion of blood is increased intra-arterial tension, which produces exactly the kind of pulse that is met with in the first stage of the fever process.

Now, what we want to do is to remove this irritation of the vasomotor centre. We shall obtain this result by performing a moderate venesection.

It is very difficult to explain the modus operandi in a case of this nature, and no theory has, as yet, been advanced regarding it.

It may act; Firstly, By removing a certain amount of the fever poison; Secondly, By a removal of a certain quantity of heat; - in both cases in proportion to the amount of blood removed. Thirdly, The most probable theory regarding it, is that it produces an immediate though partial fall in the arterial tension, which is probably sufficient to allay the vasomotor irritation. This partial diminution in tension initiates the more marked and complete fall which takes place when the general "vasomotor spasm" has passed off, which is made manifest by the determination of blood to the cutaneous surface.
As a result of the cessation of the vasomotor irritation, both the cutaneous vessels, and the arterioles generally, resume their normal calibre; there is a more equal distribution of the blood throughout the body; there is a marked diminution in pulse tension, and the equilibrium of the circulation is gradually restored.

Is this theory regarding the fever process borne out clinically?

It is, undoubtedly, as evidenced by any case of commencing fever. The presence and action of the poison soon shew themselves by various subjective symptoms.

There is the well-known feeling of general malaise, headache, and unfitness for work. The patient feels cold, and is often to be found crouching over the fire. An actual rigor may take place. The temperature is considerably above normal. The urine is high-coloured and scanty, while the pulse is accelerated, hard and tense.

On removal of five or six ounces of blood from the arm, the arterioles dilate, and the skin becomes suffused, i.e., the blood is diverted from the internal organs to the cutaneous surface. The subjective symptoms of coldness, headache, and general malaise gradually disappear; the pulse undergoes a marked fall in tension and rate, and the patient may fall asleep.
The earlier, venesection is performed, during the stage of invasion, the more marked will be its beneficial effect.

But the question may be asked:- are there no other means we can employ, by which we can restore the lost equilibrium of the circulation?

There are, in-as-much as in certain cases, a similar result may be brought about by an early and judicious use of antipyretic and diaphoretic medicines, e.g., Antimony or Aconite (asthenic cases); Pulv. Ipecac. Co. or Liq. Ammon. Acetat. (asthenic cases).

Now what is diaphoresis? It is a general diversion of the blood from the internal organs to the skin; the sweat glands become active, and the result is a profuse discharge of blood serum.

How does this differ in effect from general bloodletting? The effects as already detailed are much the same. But these effects will not always be brought about by a rash or ill-considered employment of either method of treatment in any specified case. We must make a careful choice, if we would have a good result.

In children of from three to eight years of age, a small teaspoonful of mindererus spirit, if given, say, in a threatening acute bronchitis or pneumonia, often produces the most beneficial effect.

A child is one day feverish and fretful, with a short painful cough; after administration of the above, every six hours, extending over a period of
twenty-four to thirty-six hours, the patient will be found in many instances to have a temperature practically normal, with relief to all the symptoms. I have frequently observed this in cases under my own care. Needless to say, these cases are not to be bled.

In boys or girls from eight to seventeen, under similar circumstances, Mindererus Spirit, or a cautious administration of Aconite in small doses will bring about a similar result.

After the age of eighteen, there are two types of cases which are met with, each requiring different treatment.

1st. Asthenic cases. These are disposed of in a word by saying that they are to be treated by stimulating diaphoretics.

2nd. Sthenic cases. Such will be, as a rule, successfully treated by depressant diaphoretics; but in many cases, Venesection is preferable, if not absolutely necessary, especially in such a type of fever or inflammation as is met with in young adults of the male sex. He is as a rule, vigorous, full-blooded, and healthy, and "has never known a day's illness." His pulse is hard, tense, and incompressible. Perhaps he has had a severe rigor. His temperature is considerably elevated, and he complains of severe headache. Perhaps already, he may be suffering from slight cough and dyspnoea. In such a case, a
limited Venesection is preferable to diaphoresis, inasmuch as it is more prompt in action, more efficient, and certainly quite as safe.

If he be an alcholic subject, due care must be exercised as regards the quantity abstracted. If the patient be obese, and has been addicted to alcohol for a prolonged period, he will not bear much bleeding without risk of collapse, which may occur out of all proportion to the amount of blood lost. Therefore, though the removal of a limited quantity, say four to six ounces, may be most beneficial, the abstraction of a further quantity may do as much harm.

Thus, I think, we have within our reach, a remedy, which, if employed with due care and consideration, enables us to prevent the development of an acute inflammation, provided we see the case in its early or hyperaemic stage; that is, before stasis has occurred.

If we watch the pulse of a pneumonic patient, we shall observe that, when effusion takes place, there is a fall in tension. Now, if we can anticipate the occurrence of effusion by bloodletting, and thus lower the arterial tension which leads to it, we shall confer great benefit on the patient, inasmuch as we may have averted a dangerous illness.
Modus Operandi

Venesection in Section I.

Poison.

Irritation of vaso-motor centre

" Vasomotor spasm"

Diversion of blood to larger vessels supplying

Internal organs

Increased Arterial Tension.

Bleed

Remove poison.

Diminish heat.

Diminish tension (to a partial extent)

Stop irritation of vaso-motor centre.

Skin becomes suffused.

Equilibrium of Circulation gradually restored.

Marked fall in arterial Tension.

Amelioration or Cure of Disease.
Section II.

Modus operandi of Venesection when employed to relieve the distressing symptoms attendant upon Obstructive Disease of the Heart and Lungs.

(Vide Part VIII. Indication 2nd)

As will be shown in Part VIII of this dissertation, venesection is most valuable in certain cases of obstructive disease of the heart and lungs, such as mitral and aortic disease, fatty and dilated heart, bronchitic asthma, emphysematous asthma, capillary bronchitis, and pneumonia. In all such diseases, there is often a greater or less degree of cyanosis. How does venesection act in relieving this condition? In cyanosis from whatever cause, there is a condition of malaeration of the blood. Blood which ought to be arterial, but which has become more or less venous, is sent up to the brain to supply the centres there. Now, we know that de-oxygenated blood stimulates certain of these centres, among which are the respiratory and vaso-motor. We have seen already that irritation of the latter centre causes spasm of the arterioles generally, and therefore a diversion of blood to the larger internal vessels, and increased systemic arterial tension. There is also spasm of the pulmonary arterioles,
which increases the resistance to the passage of the blood through them.

Here again, we wish to allay vasomotor irritation; and we can do so by a timely venesection. The modus operandi in such a case is difficult to explain. It may be, firstly, by a partial removal of the irritant, i.e. the venous blood in proportion to the amount of blood removed. Secondly, by an immediate, though partial fall in the arterial tension, as before explained. This results, as formerly shewn, in a diversion of blood to the skin, a freer flow of blood through the lungs, and relief to the symptoms. But in such a case, venesection also acts mechanically. Since proper aeration of the blood cannot take place, it accumulates in the right heart, which is constantly receiving blood from the Venae Cavae, and its escape from the left side does not go on pari passu. Therefore it becomes more and more embarrassed, and may fail to get a grip of its swollen current, if it be not relieved; and the relief afforded by a timely venesection is infinitely greater, is quicker, and certainly as safe as the most judicious use of strophanthus. The strength is in the organ, if it can only get a chance to act. By removing a few ounces, we lessen the extreme intra-venous tension; we give more space to the remanent blood; the heart gets a fillip, so that it is now able to powerfully
contract on the diminished volume; the pulmonary circulation is so far restored; there is now better aeration, and the dyspnoea and cyanosis to a certain extent, if not wholly, disappear. Thus, in the cases embraced under this heading, venesection acts partly through the nervous system, but its mechanical action is probably the major factor, in bringing about amelioration of the symptoms. If, during the course of a pneumonia, venesection be performed, its valuable antipyretic action will be frequently observed.
Modus Operandi
of
Venection in Section II.

Backward pressure from Heart or Lung disease.

Accumulation of Blood in Lung and Right Heart.

Heart laboring; unable to get grasp of its swollen currents.

Malacation of blood.

Venous blood supplied to cerebral centres.

Irritation of vasomotor centre.

Vasomotor Spasm.

Increased intra arterial tension.

BLEED

Extreme dyspnoea due to obstruction in circulation through lungs.

Venous blood supplied, supplied to cerebral centres.

Irritation of vasomotor centre.

Vasomotor Spasm.

Increased intra arterial tension.

BLEED

High intravenous tension.

BLEED
Remove tension. 

Partial diminution in respiration. 

Stop irritation of vasomotor centre. 

Shrinking of systemic arterioles relieved. 

Diminished intravascular tension. 

Relieve heart. 

Heart's action improved. 

Better aeration of blood. 

Dyspnoea and cyanosis disappear. 

Amelioration of symptoms. 

Direction of blood to skin. 

Marked external. 

Stasis of cloud.
Section III.

Modus Operandi of Venesection in certain cases of Haemorrhage.

(Vide Part VIII. Indication 3rd).

In haemorrhage into an organ, the blood that escapes is bound to have a more or less prejudicial effect on it, especially on such organs as the brain or lung. Though we cannot touch the already effused blood by venesection, we can do a great deal towards preventing further escape, viz:- by causing the bleeding to occur in a harmless direction. Thus, in apoplexy, in certain cases of severe haemoptysis, and of haemorrhagic phthisis, venesection may be of the greatest value. Its action here is purely mechanical.

When severe haemorrhage takes place, as after an accident, a rapid diminution in the arterial tension occurs. Fainting ensues; and during this period of enfeebled circulation, the haemorrhage may cease, due to the formation of a firm clot at the mouth of the vessel. Now, if in cases of haemorrhage into an internal organ, we can produce a similarly rapid fall in blood-pressure, there will be time here also for the formation of a firm thrombus at the site of rupture, which will in all probability prevent further
escape. In urgent cases of apoplexy, this result will be better obtained by arteriotomy than by venesection, as by it, the necessary fall in blood-pressure will occur more rapidly. For this purpose, the temporal artery is usually chosen. In haemoptysis and haemorrhagic phthisis, venesection will answer all purposes.
Modus Operandi of Venesection in Section III.

General high arterial tension.

Rupture of an artery, with its effects on different organs.

B L E E D

Rapid fall of blood pressure.

Formation of thrombus at site of rupture.

Cessation of haemorrhage.

Amelioration, cure of disease.
Section IV.

Modus Operandi of Venesection in certain cases of blood poisoning.

(Vide Part VIII. Indication 4th).

In the condition called uraemia, the blood contains substances which ought to have been excreted by the Kidneys. Various theories have been propounded regarding the cause of the uraemic and eclamptic convulsion, such as that of Frerich (irritation of motor centres by urea) - that of Braun (irritation of centres by transformation of urea into Ammon. Carb), that of Traube-Rosenstein (ventricular hypertrophy with increased arterial tension, causes effusion into brain-pressure, and anaemia of that organ) - and lastly, that of Macdonald Brown (irritation of vaso-motor centre by a poison, with resulting spasm of the cerebral capillaries and anaemia of the brain).

I believe that the most feasible theory, is a combination of that of either Frerich or Braun, and that of Macdonald Brown.

Every one agrees as to the presence of a poison in the blood in uraemia. We also know that blood that is merely de-oxygenated acts as a poison, and
as such, irritates the respiratory and vasomotor centres. Now, if such blood has this effect, how much more should uraemic blood (that contains excrementitious matter to a far greater extent, than when merely venous) give rise to irritation of the cerebral centres?

Moreover, if uraemic blood irritates the vasomotor centre, why should it not irritate all the motor centres as well?

Irritation of the vasomotor centre not only causes, as we have already seen, spasm of the cutaneous vessels and arterioles generally, but also gives rise to this condition in those of the lung and brain. The former increases the intravenous tension, by offering resistance to the passage of the blood (through the lung), which, of course, serves to embarrass the heart. The latter causes anaemia of the brain with resulting convulsion. The dependence of convulsion on anaemia of the brain has been proved by the experiments of Kussmaul and Tenner.

Again, just as normal stimulation of the motor centres, causes movement of the part over which they preside, so abnormal stimulation gives rise to convulsive movement.

Venesection in uraemia or puerperal eclampsia, fulfils a double purpose.

Firstly. By removing the poison, it subdues the
irritation of the vasomotor centre. As already observed, the effect of this is to open the stopcock, as it were, on the parts rendered anaemic by the spasm. The brain gradually receives its normal blood-supply, and frequently the convulsions cease. The extreme congestion of the lungs is also diminished, thus relieving the right heart. Here, venesection acts through the medium of the nervous system.

But by bleeding, we also stop the irritating effect of the poison on the motor centres. We diminish the poisonous material so far as to prevent the blood from becoming saturated with it, and thus avoid the resulting burst or explosion, which takes place in the shape of a convulsion. The effect, in this instance, is obtained by a mechanical removal of the poisoned blood.

Secondly. Bloodletting relieves the labouring heart. As a result of the spasm of the glottis which of course, causes grave interference with respiration, and of the tonic and clonic convulsion into which the whole body is thrown, there is a highly congested state of the venous system, with consequent embarrassment of the right side of the heart. As we
have already seen, venesection gives a fillip to the heart in this condition, and relief to the distressing symptoms attendant thereon. Its modus operandi in doing so is partly through the nervous system (vasomotor centre) and partly mechanical, as explained under Section II of this part.

In poisoning by charcoal vapours, the carbonic oxide in them forms a very stable compound with the haemoglobin, which is represented by the formula HbCO.

Since aeration of the blood is prevented from taking place, all the symptoms of asphyxia are present. The vasmotor and respiratory centres are stimulated, partly by the non-oxygenated condition of the blood, and perhaps also by the presence of the carbonic oxide in it. As a result of the stimulation of the respiratory centre, there are, at first, powerful respiratory efforts which increase in force.

The brain, spinal cord, and respiratory centre, ultimately became paralysed.

The irritation of the vasmotor centre, causes contraction of the arterioles generally. Arterial tension rises, and the resistance to the heart is still further increased by the convulsive efforts of the patient. Besides the spasm of the systemic vessels, the pulmonary circulation is affected in a similar manner. The heart becomes more and more
laboured, until death results by its cessation in a state of diastole. When we perform venesection in such a case, we have again a double purpose in view.

First. By a removal of the poisoned blood, we stop the irritation of the vasomotor centre. As before, the general spasm of the arterioles ceases, both in the systemic and pulmonary circulation. The arterial tension falls. There is determination of blood to the skin (which of course, would be unobserved, owing to the bright red color of the surface that is present, in carbonic oxide poisoning,) a diminution in the congestion of the lungs, with corresponding relief to the heart.

Second. Venesection also relieves the labouring heart, by diminishing the volume of blood within its walls, thus giving it a fillip, and prolonging its action. This will give time for the employment of other remedies, such as artificial respiration, and transfusion of fresh blood. In this instance, the modus operandi is mechanical.
Modus Operandi
of
Venection in Section IV.

Poison in Blood.

Irritation of motor centres.

Irritation of Vasomotor centres.

"Vasomotor Spasm."

Spasm of cerebral arterioles of pulmonary arterioles systemic arterioles.

Anaemia of brain.

Convulsion.

Clonic & Tonic Spasm Spasm of Glottis.

Embarassed right heart.

High Intravenous tension.

Stop spasm of cerebral arteries
Bleed

Remove poison, v.i.

Stop spasm of pulmonary arterioles.

Remove poison, v.i.

Stop irritation of vasomotor centres.

Diversion of blood is skin.

Convulsions gradually cease.

Convulsions gradually cease.

Diminish irriation of cutis.

Convulsions gradually cease.

Diminish arterial tension.

Convulsions gradually cease.

Circulation in brain gradually restored.

Circulation in brain gradually restored.

Remove poison.

Circulation in brain gradually restored.

Remove poison, v.i.

Stop spasm of pulmonary arterioles.

Stop irritation of vasomotor centres.

Diversion of blood is skin.

Amelioration, or Cure of disease.
Modus Operandi of Venesection in Section IV.

Entrance of Carbonic Oxide into blood.

Malaeation of blood

Blood is thus both poisoned by CO, & rendered venous.

Irritation of Respiratory centre.

Irritation of Vaso-motor centre.

Vasomotor Spasm.

Irritation spreads to centres for other movements thus causing

of pulmonary arterioles

of systemic arterioles

Powerful respiratory efforts which increase in force, after which

Increased resistance to circulation through lungs.

Irritation spreads to centres for other movements thus causing

Increased Intravenous tension.

Convulsion.

Embarrassed right heart.

Increased Intravascular tension.
High Intravenous tension.

Bleed

Embarrassed Right heart.

Remove poison

Bleed

Remove poison

Stop irritation of Vaso-motor centre.

Spasm of pulmonary arterioles relieved.

Diminish intravenous tension. Relieve heart.

Diminish irritation of motor centres.

Convulsions gradually cease.

Hearts action improved. Danger from heart-failure diminished.

Amelioration or cure of disease.

Remove poison

Bleed

Remove poison

Stop irritation of Vaso-motor centre.

Spasm of systemic arterioles relieved.

Diminish Intravenous tension. Relieve heart.
Section V.

Modus Operandi of Venesection in Plethora.
(Vide Part VIII. Indication 5th).

This condition, which is also called "polyhaemia or "general hyperaemia," signifies an excess of blood in the body generally. In sthenic cases, it is specially the arterial system that is overfilled. Plethora is caused either by excessive ingestion of the elements of blood, or by their accumulation. The latter is brought about either by deficient exercise, or by the suppression of habitual haemorrhages, such as occurs at the menopause.

The condition of plethora gives rise to many symptoms. The patient may complain of weight and fulness in the head; a distressing feeling of oppression. Severe headache is frequently an accompaniment of the condition, while giddiness is also sometimes present. The pulse is, as a rule, full and incompressible. The countenance is, as a rule, of a florid appearance. "Hot flushings" are a common complaint among women at the menopause. They are attributable to the plethora of the system at that period.

In both this and the ordinary variety of
plethora, venesection is often of great service. Since the complaint is due to an excess of blood in the system, it follows that a diminution of blood will result in palliation or cure of the symptoms. But treatment by bloodletting must be supplemented by careful attention to the general health, the taking of exercise, etc., inasmuch as the blood pressure soon rises again to its normal standard. The modus operandi of venesection in plethora is, in all probability, purely mechanical.
Modus Operandi of Venection in Section V.

Excess of blood in body.
Full, bounding & tense pulse.
Various subjective symptoms e.g. Headache etc.

BLEED

Pulse loses bounding character.
Tension falls.

Relief to symptoms.
Section VI.

Modus Operandi of Venesection in certain cases of Aneurism.

(Vide Part VIII. Indication 7th).

Cases of large aortic or innominate aneurism, are often very suitable for the operation of general bloodletting. The symptom which we hope to relieve by such treatment is the severe pain so often present.

Certain cases of large thoracic aneurism have been known to give rise, by pathological change in the anatomy of the parts, to periodic attacks of haemoptysis, which gives temporary relief to the symptoms. So much for "vis Naturae medicatrix;" and corresponding relief is obtained, and to a greater extent, by removal of blood from the median-basilic. The pain is due to the pressure of the aneurismal sac on adjacent nerves, and the pressure is dependent partly on the size of the tumour itself, and partly on the distension of it by the blood current at each cardiac systole. Bleeding, then, will give temporary relief, by diminishing the blood pressure, and therefore the distension of the aneurismal sac.

Here again, venesection brings about its action mechanically.
Modus Operandi
of Venesection
in Section VI

Pain due to pressure on nerves
which is partly attributable to distension of the
aneurismal sac by column of blood

BLEED

Diminish general arterial
tension and quiet circulation
through aneurismal sac

Pressure on nerves diminished
Pain Relieved
Part VI.

Modus Operandi of Local Bloodletting.

To give an adequate reply to the question; - "How do cupping and leeching act?", is a difficult matter. We have ample evidence that local bleeding relieves. How is this relief produced? Dr Bennet, in his "Principles and Practice of Medicine," would appear at first sight to prove that it is impossible for cupping to act by direct abstraction of blood from the (inflamed) parts. He says, "As to local " "bleeding, its supposed effects are inexplicable, " "on the supposition of drawing blood from the in- " "flamed internal parts. A man has pneumonia, re- " "sulting from changes in the vessels which are " "supplied direct from the aorta, and leeches are " "applied to the integuments, supplied by vessels " "derived from the mammary or lumbar arteries. Any" "direct anastomosis between the vessels on the " "surface, and those in the parts inflamed, is not " "to be thought of."

But he confines himself to one imaginary case, i.e., pneumonia, which suits his views remarkably well.
As a matter of fact, there is no direct channel for the blood to pass from the lung to the skin, except through the medium of the sub-pleural mediastinal plexus of Turner. Though this is the case, I hope to be able to furnish ample proof within the next few pages, that in other situations, there is abundant direct communication between the organ and the cutaneous surface, by means of arterial inoscullation. Again, if cupping and leeching in pneumonia, do not act by means of direct depletion, how do they do so? The only other way they can act is through the nervous system. Thus, just as general bloodletting brings about its effects partly by action through the nervous system, and partly mechanically, in like manner the modus operandi of local bloodletting may be divided as follows:—

A. **Action through the nervous System.**

B. **Purely mechanical Action.**

A. When an irritant is applied to the skin surface, local congestion is the result. In acute inflammation, there is pain due to increased arterial tension, and therefore pressure on nerve endings. Relief is obtained by reducing that tension, which may be brought about by application of heat to the part, or by some agent which will divert the blood towards the surface. This is most simply illustrated by the common occurrence of a thorn in the finger.
with its usual results. But it is also seen in inflammation of internal organs, e.g., the lung. But in such a case, anything which will congest the cutaneous surface, so as to affect the blood supply of the lung, must act in a great measure through the medium of the nervous system, specially the vasomotor centres - both the medullary centre, the subordinate centres in the spinal cord, and probably also the local vasomotor ganglia.

These centres in health overrule the arteries of the body as regards their calibre. Each subordinate centre in the cord has its own field of action, more or less on a level with it. All the subordinate spinal centres are controlled by the medullary centre. All, or nearly all, the arteries are connected with these centres through vasomotor fibres. These are divided into vaso-constrictor and vaso-dilator fibres, stimulation of which bring about respectively diminution and increase of the arterial calibre. The centres are easily affected by external stimuli, e.g., application of heat or cold, or other form of irritation to the cutaneous surface - the first causing dilatation, the second contraction of the vessels of that part of the skin to which the application has been made. Thus, when we apply a poultice or the cupping-glasses, to the side in active congestion of the lungs, afferent impulses are sent to the
vaso-motor centres. The stimulus is reflected along the vaso-constrictor nerves, to cause a diminution in the calibre of the pulmonary vessels of the congested area, and probably also of the afferent artery to that area. A stimulus is also reflected along the vaso-dilator nerves, so as to cause dilatation of the vessels of the part to which the application has been made.

B. Local bloodletting also brings about its effects by "purely mechanical action," i.e., the part is more or less directly depleted, through the medium of arterial inosculcation and distribution. In other words, there is a "mechanical removal of blood" from the organ. Time and space forbid of my discussing the anatomy of the arterial supply of the various situations, where cupping may be employed. But I will cite five supposed cases suitable for this operation, and discuss them individually.

First. In a case of acute pleurisy, the arterial anastomosis between the vessels supplying the parietal pleura, intercostal muscles, subcutaneous tissues and skin is as follows:

(1). Intercostal arteries. The anterior intercostals (proper), besides supplying the subcutaneous tissues and skin through their lateral cutaneous branch, also send branches to supply the parietal pleura.
(2). Internal Mammary artery supplies the skin on the anterior aspect of the chest, through its perforating arteries. Its mediastinal, pericardiac, and sternal branches anastomose with branches from the intercostal and bronchial arteries, to form a minute plexus beneath the pleura called the "Sub-pleural mediastinal plexus of Turner." And, while the anterior intercostals of the musculo-phrenic branch of the internal mammary supply the pectoral muscles and mammary gland, the musculo-phrenic also gives branches to the pleura.

Thus, partly through the intercostals, and partly through the internal mammary, there is a tolerably complete channel of communication between the pleura, intercostal muscles, subcutaneous tissue and skin. This, probably to a great extent, explains the benefit resulting from local bloodletting in a case of pleurisy, although there is also vasomotor action as before explained.

Second. In a case of bronchitic asthma, the relief afforded to the patient by cupping, may be partially explained by the fact that the bronchial artery, which supplies the bronchial muscle and the bronchi, communicates with the blood supply of the chest wall, through the medium of the "Sub-pleural mediastinal plexus of Turner." Its modus operandi probably depends more on vasomotor action.
Third. In a case of acute spinal meningitis or acute myelitis, a great diminution of pain often follows the employment of local bloodletting, which happy result is in a great measure to be attributed to the following anatomical facts.

The two anterior spinal branches from the vertebral artery, descend in front of the medulla, and unite opposite the foramen magnum. This single vessel descends a short distance, and is reinforced by branches which enter the spinal canal, through the intervertebral foramina to supply the cord and membranes. These branches are derived from the following vessels:

(1). The vertebral gives off lateral spinal branches.

(2). Ascending cervical of the inferior thyroid gives branches to cord and membranes.

Both No. (1) and No. (2) send branches which freely anastomose in and around the muscles of the neck.

(3). Intercostal arteries shortly after they arise, give off a dorsal branch. This dorsal branch has a spinal branch which, after giving a twig to the membranes, divides into two, one of which ascends, the other descends on the posterior surface of the vertebra, above and below respectively. The dorsal branch goes to supply the muscles, fasciae, and skin.
of the back.

(4). The lumbar arteries have an exactly similar arrangement which therefore need not be recapitulated.

(5). The Ilio-lumbar artery through its lumbar branch, supplies both the psoas and quadratus lumborum, and also sends a spinal branch to the cord and membranes, through the foramen between the last lumbar vertebra and the sacrum.

(6). The Lateral Sacral arteries, in addition to supplying the contents of the spinal canal, also supply the skin and muscles on the dorsal aspect of the sacrum.

The paired posterior spinal arteries descend posteriorly to the spinal cord, between which and the neighbouring vessels there is free anastomosis.

Thus there is a very free communication between the blood supply of the cord and membranes, and that of the muscles, subcutaneous tissue, and skin of the back.

In a case of acute Nephritis, we have another instance of direct depletion by means of local blood-letting. The renal artery previous to entering the Kidney, divides into four or five branches which are distributed to its substance. Each of these vessels give off branches to the suprarenal capsule, and the surrounding cellular tissue and muscles. These
branches inosculate with the dorsal branch of the lumbar artery of that region.

In the year 1863, Sir Wm. Turner published an original communication in the British and Foreign Medico-Chirurgical Review (July 1863) "On the existence of a system of anastomosing arteries between " and connecting the visceral and parietal branches "of the abdominal aorta." In this paper he demonstrated clearly the "existence behind the peritoneum of a well marked vascular plexus" to which he gave the name of "sub-peritoneal arterial plexus." "It communicates on the one hand with the arteries "of the abdominal viscera, and, on the other, with "the arteries of the different parts of the abdominal wall." That part of his paper bearing on the communication between the vessels of the Kidney and the lumbar arteries is what I wish to refer to specially.

If one or other renal artery be injected, he says; "It will be found that not only is the Kidney" "injected, but that the fluid employed finds its "way into that portion of the sub-peritoneal arter-" "ial plexus which is situated more immediately in " "the fatty capsule in which the Kidney is embedded."

"If now the abdominal wall be cut into, it " "will be seen that the parietal arteries are more " "or less perfectly filled, - the lumbar, the ileo-" "lumbar, circumflex iliac, the lower intercostals,"
"and epigastric arteries all containing injection," which has evidently passed into them, not by the "way of the trunks from which they arise, but "through the inosculations between those of their "branches which supply the inner aspect of the "abdominal wall and the sub-peritoneal arterial "plexus."

Thus we have ample evidence that in the opera-
tion of cupping or leeching the kidney, there is di-
rect channel for the blood to pass from that organ to the cutaneous surface.

Fifth. In a case of acute Orchitis, marked relief frequently follows the application of two or three leeches. As was proved by Sir Wm. Turner, in the above named paper, the spermatic artery gives off branches to the parietal layer of the tunica vaginalis, in which they form a well marked arterial network. He also says that these branches assist in the supply of blood to the various scrotal textures. Here again, the modus operandi is to a great extent mechanical, so that the blood is directly removed from the inflamed organ.

We cannot speak definitely with regard to the action of local bloodletting in any particular case. We can, however, make these two statements with a certain amount of assurance, viz.,
1. When there is no more or less direct communication between the organ and the skin, local bleeding acts through the nervous system.

2. When there is such communication, the direct depletion of the organ probably co-operates with the action through the nervous system.
PART VII.

BEFORE EMPLOYING VENEOSECTION, THERE ARE SEVERAL POINTS WHICH MUST BE CONSIDERED.

These are as follows:-

1st. **The age** of the patient. This can be disposed of in a word. In the extremes of life, Venesection is, as a rule, contraindicated. One cannot, however, lay down any hard and fast rule. But, other things being equal, we may generally bleed between puberty and the age of 50. As regards this point, each case had better be decided on its own merits.

2nd. **The sex** of the patient. Generally we will find that male patients bear bleeding better than female. Albeit, the reverse of this is sometimes the case.

3rd. **The constitution** of the patient. As a rule, we would refrain from the use of this remedy among those who are the victims of the strumous or cancerous cachexia. It may be broadly stated that patients suffering from the effects of a constitutional disease are to be subjected to this operation only after mature consideration. As regards this subject, Sir
Thomas Watson says, "The very young, the old, the "
"feeble, the cachetic, do not bear well the loss of "
much blood. This consideration is not to deter you "
"from bleeding such persons topically, when they are "
"attacked by dangerous inflammation; but it especial-"
"ly enforces with regard to them the golden rule that"
"no more blood should be abstracted than seems abso-"
"lutely requisite to control the disease."

4th. The nature of the disease from which he is suf-
f ering. It goes without saying that there are many
diseases which are to be at once excluded from the
category of those which are to be benefited by Vene-
section. I should say, however, that favourable ca-
ses are certain inflammatory diseases, many obstruc-
tive diseases of the heart and lungs, certain cases of
haemorrhage, certain forms of blood poisoning, pleth-
ora, certain cases of local hyperaemia, and lastly,
certain cases of aneurism.

5th. The stage of the disease must be carefully con-
sidered. This is referred to under the modus operan-
di of Venesection.

6th. The type of the disease. Of all the points which
require consideration before bleeding, this, I think,
is the most important. Inflammation may be sthenic
or asthenic. By a sthenic inflammation, we mean an
inflammation accompanied by a quick full bounding
pulse, high fever, accelerated respiration, and flush-

* Quain's Dictionary of Medicine. 1882 p.113.
ed cheeks - these symptoms occurring in a patient of good constitution. An asthenic inflammation, on the other hand, is just the opposite. The symptoms are of a low "typhoid," or adynamic type; the pulse is quick but compressible i.e., of low tension and badly filled; a varying amount of fever is present; and there is quickened respiration. The patient is either of a weakly constitution, or it has been impaired by some particular cachectic process. Needless to say, it is as a rule diseases of the former type that are to be treated by blood-letting, though this rule is not invariable.

7th. The state of the heart as regards its velocity and force, especially the latter. As to this point, Laennec says "The force of the beat of the heart under the stethoscope is an excellent criterion and "guide for the use of the lancet. In all cases where "the pulsations of the heart are proportionately more energetic than those of the arteries, we may bleed "fearlessly and be certain of improvement in the state "of the patient, excluding cases of nervousness and "exhaustion." In the British Medical Journal for Jan; 31, 1891, Dr Broadbent states that "With an over- "loaded right heart, the indication for Venesection "is a forcible cardiac impulse, with a small almost "imperceptible irregular pulse," i.e. the heart is struggling to contract upon its swollen currents,
thus giving a very forcible beat, but this beat is barely sufficient to reach the wrist.

8th. The state of the pulse. This point has been already referred to under "type of the disease." The state of the pulse is our chief indication as to whether the case is sthenic or asthenic; and the sthenicity or asthenicity of the case must be as a rule our guide for the employment or non-employment of the lancet, except under conditions previously specified, (where there is an "overloaded right heart") and also with the exception of those cases where evidence of atheroma is present in the radial or temporal arteries. Under such circumstances the inexperienced finger may derive a false impression as regards the tension and fulness of the vessel. Presence of tortuosity and the "arcus senilis" must be looked for in order to confirm the diagnosis of atheroma.

WHAT WILL GUIDE US AS REGARDS THE QUANTITY TO BE ABSTRACTED?

After having opened a vein and drawn a certain amount of blood, there are three points which will guide us as regards a further detraction.

1st. The appearance of the blood. This point is of importance in cases where the condition of the blood is dependent on deficient action on the part of the
heart and lungs. In such cases, the extremely venous hue of the blood is a most valuable guide. As has been already explained, bleeding assists the action of an overburdened heart, the aeration of the blood is improved, and the dark appearance is lost, giving place to the normal colour of venous blood. Therefore, in all cases of urgent cardiac dyspnoea, or of pulmonary dyspnoea accompanied by cardiac dilatation or embarrassment, we will do well, other things being equal, to continue bleeding until the colour of the blood improves. I generally find that this takes place after a removal of from four to six ounces. An abstraction of eight ounces or more is, however, sometimes necessary.

2nd. The effect upon the disease as regards relief of the symptoms. In a case of urgent cardiac or pulmonary dyspnoea, or in one of the severe pain of aortic aneurism, relief is often rapidly obtained after a withdrawal of five or six ounces of blood. Therefore, other things again being equal, we may safely bleed until that relief is brought about. On the other hand, in a case of uraemia or puerperal eclampsia, we do not look for such rapid relief, inasmuch as the convulsive seizures only gradually subside. Therefore we must regulate the amount of blood to be withdrawn by the effect on the other symptoms of the disease, e.g. the extreme vascular tension that is
so often present, - that effect being a diminution in the lividity of the face, in the bounding character of the pulse, and in the pulsation of the carotids.

This also holds good in carbonic oxide poisoning, - the florid appearance of the blood being due to a change in the chemistry of the haemoglobin.

3rd. The effect upon the patient as regards his pulse and facies.

It goes without saying that after opening a vein, we must carefully watch the pulse. A pulse which was formerly hard and tense, or full, bounding and rapid, loses these characters and becomes soft, more compressible, and in many cases, its rate considerably diminishes.

I make special mention of the effect on the patient's countenance. In the dyspnoea of mitral stenosis, one sees the typical dusky malar flush, the movement of the alae nasi at every inspiration, the bluish colour or actual cyanosis of the lips, and his general look of distress.

After such a patient has been bled to the extent of four or five ounces, we may soon note the appearance of inexpressible relief that steals over his countenance. This relief must be our danger signal as regards a further abstraction, inasmuch as that is at least unnecessary.
PART VIII.

BLOODLETTING CLINICALLY CONSIDERED.

I now wish to enumerate the indications for the employment of bloodletting, and to illustrate them by clinical cases.

They are as follows:-

1st. Certain conditions which give rise to a disturbance of the equilibrium between the circulation in the internal organs and the cutaneous arterial supply.

2nd. Many obstructive diseases of the heart and lungs, causing dyspnoea and cyanosis.

3rd. Certain cases of haemorrhage.

4th. Certain forms of blood-poisoning.

5th. Plethora.

6th. Local Hyperaemia accompanied by or resulting from inflammation.

7th. Certain cases of aneurism.

The first indication is exemplified in the early stage of acute bronchitis, pneumonia, or pleurisy. It is also seen in the cold stage of ague.

In all these conditions there are just the symptoms of a severe chill. There is "vaso-motor spasm." If we see the case thus early, we will, by a timely limited bloodletting, avert perhaps a long and dangerous illness.
In Dr. Shand's paper "Contribution to Venesection as a remedy" read before the Edin. Med. Chir. Society, Session 1890-91 he relates the following case:

"On seeing the patient, a rapid and cursory examination with ear and fingers satisfied me of congestion existing in both lungs, with all the symptoms of going on to the stage of inflammation or pneumonia. Accordingly, I bled him on the spot, and as he was a man of sthenic habit I literally followed out the well known Cullen's prescription of a pill of calomel and opium - one immediately after the venesection and one, minus calomel, at bedtime for three nights."

Dr. Shand was informed 18 months later by the man's wife that her husband had walked home after the venesection, and was at work in three or four days.

In the same paper, he describes another case of the "Congestive stage of acute pneumonia" treated by venesection; after which "Cullen's opiate was administered, and the improvement next day was so great that the remaining treatment consisted in . . . the citrate of potass in an effervescent form."

When in West Africa last year, I met with many cases of Malarial Fever, but circumstances did not permit of my performing venesection in any of them.

In the cold stage of malarial fever, stimulant
diaphoretic medicines are given with a view to shorten the cold, to avoid the hot, and induce the sweating stage.

But it is not in asthenic but in sthenic cases of ague fever that I would recommend an early removal of five or six ounces of blood followed by an antipyretic and diaphoretic draught.

The second indication for bleeding is obstructive disease of the heart and lungs, causing a greater or less degree of cyanosis. The diseases of the heart are mitral and aortic stenosis and insufficiency, also fatty and dilated heart, all of which sooner or later cause profound disturbance of the circulation through lungs and right heart. I refer specially to those cases where there occurs an overmastering of the heart, with rapidly increasing cyanosis, and intense dyspnoea. In such a condition the patient must certainly die if something were not done to relieve the engorged heart. That relief will be best obtained by a limited abstraction of blood. In this condition, Prof. G. Stewart says, "Relieve mechanically by letting blood."

This is well illustrated by the following case, the notes of which I obtained through the courtesy of Dr Haig Ferguson, of Edinburgh, who was physician in attendance. The patient was an elderly woman. For some time she had been suffering from mitral stenosis.
On account of this, she looked forward with considerable dread to her approaching confinement. She suffered from dyspnoea on slight exertion. Consequently the labor, which had to be completed by forceps, was attended with great distress as regards her breathing. There was, unfortunately, little or no loss of blood. After it was over, the dyspnoea increased and she quickly became cyanotic. Dr Ferguson performed Vene-section to six ounces. The result was perfect. The dyspnoea and cyanosis quickly disappeared, and the patient made a good recovery.

Dry and Wet Cupping will also prove of great service. My friend Dr Cowan, of Melrose Asylum, sent me notes of two cases of cardiac dyspnoea, treated by dry cupping. They are as follows: -

D.B. a man aet. 50, patient in Melrose Asylum, suffered from mitral stenosis. One day he had an attack of intense dyspnoea with precordial pain. He was dry cupped over the bases posteriorly in several places. Within five minutes, he was breathing quietly, and the pain had almost entirely disappeared. Cardiac tonics were also administered. The rapid relief afforded to the patient, almost immediately after the dry cupping, was, however, quite unmistakeable.
The next case is very similar. The patient was a woman, M.B., aet. 45, who was also the subject of mitral stenosis. She was one day seized with a paroxysm of dyspnoea and became partially cyanotic. She was dry-cupped in several places on the posterior aspect of the chest. Small doses of Tincture of Strophanthus were also administered. Here again, very great relief followed within a few minutes.

Failure of the heart is the chief danger in Pneumonia, which is often safely and successfully combated by Venesection. This is illustrated by the following case:

A.B., male patient; admitted into Dr Affleck's ward, R.E.I., suffering from acute Pneumonia succeeding a drinking bout. On admission, he was delirious and did not know his friends. Face was dusky. Nares moved with the respiratory act. Respirations 44; Pulse 164; Temp. 105°F. Duskeness increased to cyanosis. Pulse rose to 180. Venesection was performed to 8 ounces. Aspect immediately improved. Cyanosis diminished. Dyspnoea became less urgent; and the pulse quite regular and fell to 140. Though the illness ended fatally thirteen hours later, yet the relief of the symptoms was indisputable.
The danger of heart failure in Pneumonia is of necessity much greater, when that condition affects both lungs. When one lung has become consolidated, and when this is in progress or has actually occurred in the other lung, there is often great dyspnoea with a cyanotic facies. Venesection to the extent of from 8-12 ounces affords the greatest possible relief to the patient. In the Year Book of Treatment for 1893, at page 33, there will be found an account of a case of double Pneumonia treated by Venesection, and subsequent inhalation of oxygen. The patient was "com-pletely unconscious and apparently moribund . . . . . " "his face livid . . . . Fifteen ounces of blood were withdrawn . . . . and oxygen gas was then administered. In two hours, an extraordinary trans-formation had taken place; the patient was perfectly conscious . . . . . and he expressed himself as being comfortable and well."

In emphysematous asthma, and pure bronchitic asthma, the heart frequently becomes secondarily affected. The primary pulmonary, and secondary cardiac dyspnoea of this condition, may often be adequately met either by dry-cupping, by wet-cupping or by actual Venesection. In my own practice, I have frequently seen the very greatest benefit follow from
All three methods of treatment in different cases, as follows:

In November 1892, I received a hurried message to see a lady, Miss W., who was suffering from great dyspnoea, which was markedly expiratory. The heart had previously showed some signs of embarrassment due to the emphysematous condition. In the present instance, there were signs of marked venous engorgement. The pulse was rapid and somewhat small and tense ("square top" vide sphygmogram). Temperature was not appreciably elevated. Without delay, I applied three cups to different parts of the posterior aspect of the chest. I allowed all three to remain on for about five minutes, after which I reapplied them in different situations. This time, I allowed them to remain on for about half an hour. Before the half hour had elapsed, the dyspnoea had ceased, the pulse became softer and more natural, the patient could lie down in comfort, (whereas, previously to the operation she had been suffering from orthopnoea) and she enjoyed a fairly good night's rest.


Dr Roche, of Kingstown, relates the following case:—"A number of years ago, I saw a poor man suf-
"fering from emphysematous asthma ......... He was 
"nearly speechless ....... I opened the median-ce-
"phalic, and when five ounces were drawn his 
"breathing, voice, and appearance were immensely 
"improved, although he had been suffering from nigh 
"a week. He slept soundly and awoke the next morn-
"ing stating that he was better than he had been 
"for months. He had been bled previously for simi-
"lar attacks with similar results."*

On the 2nd of February 1893, I had occasion to
visit Miss M. aet. 40. She had been the subject of 
bronchitis for three weeks previous to the present 
attack. I found her in this instance, suffering 
from bronchitic asthma to the extent of orthopnoea. 
Pulse 120 per minute, and was hard and tense; Res-
pirations 36. Prof. G.Stewart was called in, and 
said that if cupping failed to relieve, Venesection 
had better be resorted to. I accordingly proceeded 
to perform dry cupping. I did so in six places over 
the posterior and left lateral aspects of the chest. 
The cupping-glasses were left on for half an hour. 
Shortly after they were taken off the patient was

much relieved, and able to sleep for a considerable time. At 7 a.m. next morning, she was very much better; pulse had fallen to 95 - respirations to 27. Her breathing was free from distress, and she expressed herself as having been much benefited by the treatment she had received.

In November 1892, I was called to see an elderly patient Miss K. She had been suffering from periodic attacks of bronchitic asthma. In the present instance, she was sitting up in bed with distressing dyspnoea, lips and cheeks were partly cyanotic; pulse 130 was full, bounding and tense ("square top" vide sphygmogram) I wet-cupped her in two places posteriorly. Within fifteen minutes, all her urgent symptoms were relieved. The dyspnoea and cyanosis had disappeared; pulse had fallen to 100 per minute, had lost its bounding character, and had become soft and natural. (vide sphygmogram) The act of respiration was easy and quiet, and I was subsequently informed that she enjoyed a good night's rest.
On Friday, Feb. 3, 93, I performed wet-cupping on a patient suffering from bronchitic asthma. I found her propped up in bed and suffering from marked inspiratory dyspnoea. Respirations were 36 to the minute; Temperature 98 F; Pulse 123. There
were loud sonorous rãles all over the chest, both anteriorly and posteriorly. I wet-cupped her, removing altogether about 3½ ounces of blood. Within an hour, the respirations fell to 30 per minute, and were quite free from distress and difficulty. In a short time, however, the dyspnoea recurred but ceased again in half an hour, and the patient fell into a refreshing sleep. (For pulse tracings vide p.78)

On the 6th of Feb. 1893, I performed venesection on Miss M., - the same patient whom I dry-cupped on Feb. 2nd. By this time, the dyspnoea had increased and now persisted, defying every known remedy for asthma. The patient was partially cyanotic and rapidly becoming exhausted. There was some degree of the "Facies Hippocratica." Lips and nails were of a marked purple color. Pulse was 140 - full and tense and of a somewhat bounding character. Respirations were 40 per min. The median-basilic was opened and six ounces were removed. The blood was almost black in color. Before five minutes had elapsed, the pulse became soft and natural, although the rate did not perceptibly diminish. Respirations fell to 32. Lips and nails lost their cyanotic appearance and became of a much more natural color. On being asked if she felt better, she replied "Yes," "very much better." Four hours after, I again saw the patient, and took a pulse-tracing. I would have
Pulse Tracings of case of Bronchitic asthma, treated by Wet Cupping on Feb. 3, 93. Vide pp. 77 & 78.

Miss M. Right Radial. Pressure 3 ozs. before Wet Cupping,
3/2/93.

Miss M. Left Radial. Pressure 3 ozs. before Wet Cupping,
3/2/93.

Miss M. Right Radial. Pressure 3 ozs. after Wet Cupping to
3 1/2 ozs. shewing full bounding character of pulse. 3/2/93.
done so previous to the bleeding, had it not been for the fact that she was so ill. The sphygmogram shews well the absence of tension (abrupt top).

Professor Grainger Stewart, who saw the patient on the day after the venesection, said to the friends that there was no doubt that the bleeding had saved her life.

This clinical picture must speak for itself.

Miss M. Pressure 4 ounces. Tracing taken 4 hrs. after venesection to 4 ounces. 4/7/93.

The third indication is haemorrhage in certain forms. One of these is cerebral haemorrhage or apoplexy. The universal remedy for this condition used to be phlebotomy. We now recognise, however, that venesection can never heal a rupture in the wall of a brittle artery. It is, however, useful in preventing further escape.

Bloodletting is specially useful in cases of apoplectiform congestion of the brain, thus giving rise to undue pressure on the nerve centres. This
pressure causes apoplectiform convulsion. The face
is of a purple hue, and the breathing is stertorouS.
The pulse is full and incompressible.*

The beneficial results of a timely venesection
in such a condition are indisputable. But if there
be any sign of weak action of the heart, bleeding
should not be resorted to. The following cases ill-
strate well the benefit attendant on venesection
in apoplexy.

Case 1. Dr Shand, in his paper (already re-
ferred to), describes a visit to a lady who was suf-
f ering from her third attack of apoplexy. "During"
"my ride I reflected as to the propriety of using"
"or not using the lancet. On arrival, I found the"
"question settled, not by Nature, but by accident."
"The lady had fallen against the sharp corner of a"
"table and wounded the temporal vein; and was able"
"to welcome me on entering the house. ........ The"
"lady died several years after, but during the in-
terval, had a longer immunity than usual from any"
"attack."

Case 2. My father relates the following:-
A man, J.S., aet. 50, was suddenly seized with

* Dr Wiltshire tells us that the pulse in apoplexy
should be examined at both wrists; for, as a rule,
it is larger on the paralysed than on the sound side.
(Quain's Dict. of Med. p. 113.1882 Edition.)
an apoplectic convulsion in George Street, Edinburgh. He was conveyed to his house, which was close at hand, and was bled to twenty-five ounces. His pulse, which had been hard and tense, became soft and natural. His countenance lost the extremely florid appearance, which had been previously present; he soon regained consciousness and made a good recovery.

Dr Huggard, of Davos-Platz, kindly sent me notes of two cases of Haemorrhagic Phthisis treated by Venesection, in addition to the account given in the British Medical Journal.*

**Case I.** A young man of good physique had copious haemoptysis on two occasions. When he came to Davos in 1891, he had slight flattening over the upper portion of the right lung, with some dulness; no râles; some expectoration containing elastic tissue and tubercle-bacilli, etc. In a few months, all evidence of disease had passed away - the man in the meantime having become plethoric. On two occasions, he had haemoptysis. "When I looked at the "plethoric face of the patient and felt the high "tension of the pulse," says Dr Huggard, "I was "convinced that the only rational treatment was to "get rid of the excessive quantity of blood, but by" "some other channel than the lung." He consented "to be bled, saying that it had been done before, "and for haemoptysis."

"I opened a vein in the arm, and allowed 48 "
"ounces to flow ...... His face gradually assumed "
"a more healthy hue, and the pulse fell to 80."

Afterwards, the patient made a good recovery, and
left Davos in the spring of 1892.

I wrote Dr Huggard asking why so large a quan-
tity of blood was removed. He says, "Not until the"
"amount mentioned had been removed did the tension "
"of the pulse fall distinctly. Not at any time "
"during the operation or after it, was there the "
"slightest tendency towards syncope. On the con-
"trary, while the blood was flowing, the patient "
"frequently spoke of the great relief he felt."

Case II. A young man, who had copious haemorr-
hage from the lungs more than once, and that while
in seemingly good health, came to Davos in the au-
tumn of 1891. He had many of the symptoms of in-
cipient Phthisis. Shortly after his arrival, he
had two attacks of haemoptysis. "The patient had "
"a very plethoric aspect. I removed 16 ounces of "
"blood from the arm. Very shortly after, he said he"
"felt a great deal better." By the end of November,
he again became plethoric and in the middle of
December, haemoptysis recurred; he was bled to 6
ounces. During this attack, moist râles became
widely diffused over the whole of the upper lobe of
the right lung. In the middle of Feb. 1892, the
plethoric look returned and he was bled to four ounces.
From this time, the patient continued to improve, and the disease steadily diminished until he left Davos in the spring.

"If the blood had not been drawn ... a rupture" would have occurred at the weakest point, viz., in "the damaged lung, and a series of copious haemorrhages would have taken place until the vessels had been sufficiently relieved; or, In this process "... the bronchial tubes would almost certainly have become filled with blood clots, and the result "would have been an inflammation favorable to the "extension of the tubercular process."

He says in his letter, "I do not by any means "believe in phthisis ab haemoptoe, but I do believe "that a large haemorrhage into the lung is a fruitful source of extension of the disease, partly by "blocking up the bronchial tubes, and thus giving "rise to a low form of inflammation; and partly, "through some of the blood, which fails to be re- "moved from the lungs, being mixed with tubercular "secretions and carried into damaged tissue." It is interesting to note that one of Hippocrates' aphorisms is - "From a spitting of blood there is a "spitting of pus; - from a spitting of pus arises a "phthisis and a flux."

Dr Sibley says, "that in order to avoid the "

"Genuine Works of Hippocrates in his "Aphorisms."
asphyxia resulting from fatal haemoptysis, one ought not to administer morphia, but rather a stimulant, e.g. ether, "so as to give power to the organism "
"to expel the blood by the mouth and prevent it "
"blocking up the lungs. At the same time, the most" 
"rational method would be to let blood escape from "
"a vein in the arm, and in this way endeavour to "
"prevent the almost inevitable asphyxia from the "
"general inspiration of a large quantity of blood "
"escaping into part of a diseased lung."*

I quote this as bearing upon Dr Huggard's cases.

As regards the practice of Venesection in hæmorragic cases of Phthisis, there are various points which must receive consideration.

First. I would say that venesection is, as a rule, not to be thought of, unless the disease be incipient.

Second. That condition for which we bleed, must be present to a greater or less extent, viz., plethora.

Third. The pulse must be fairly well filled and tense - in a condition likely to bear the loss of blood.

Fourth. The general strength must be good.

The constitution of the patient must not be undermined, as would be the case if the disease were advanced.

* Brit. Med. Journal Febr. 11. 1893
There are many who believe in "Phisis ab haemoptoe." At any rate, there can be no doubt that a semi-absorbed, decomposing blood clot in a lung already affected must afford a terribly suitable cnidus for the growth and spread of the tubercle bacilli. If this be the case, - surely haemoptysis in a case of Phthisis, or suspected Phthisis, is an occurrence of which we should stand in wholesome dread. Moreover, whereas haemostatics merely serve to stop the haemorrhage at the time, venesection not only does this, but in many cases averts the incidence of a subsequent attack. And as such cannot fail to be looked upon as a remedy of the highest value.

The fourth indication is to be found in certain cases of blood-poisoning, e.g. Uraemia, puerperal eclampsia, and carbonic oxide poisoning.

In Uraemia, venesection often proves of the greatest service, inasmuch as it not only relieves the labouring heart, but diminishes the amount of poisoned blood in the system. As the disease progresses, the blood becomes more and more saturated with the poison, until a "burst" or explosion takes place in the shape of a uraemic convolution.

Now, if by removing poisoned blood, we can prevent the occurrence of the convulsive seizure, we shall confer a very great benefit on the patient; and whether convulsion has occurred or not, venesection
tion will often prove of service.

Professor Grainger Stewart, in his chapter on Uraemia (Quain's Dictionary of Medicine p. 1703), after mentioning topical bleeding and diuretics in order to fulfil the first indication for treatment viz., that of re-establishing the excretion of the Kidneys, says:-

"Frequently the blood must be relieved more rapidly than the action of diuretics can accomplish; venesection to the amount of eight, ten, or more ounces, may be of use, especially in the puer"peral forms, and in the acute inflammatory cases."

The following cases will serve to illustrate the above facts:

Case I. A female patient, aet. 42, had symptoms of Bright for eighteen months. When admitted, she had general anasarca and high tension pulse. The amount of urine diminished. She was seized with uraemic convulsions one morning, and these continued. Later on, she passed into a condition of alternating coma and delirium, and pulmonary oedema developed. Twenty ounces, much darker than ordinary venous blood, were now withdrawn, ...... and the patient fell into a quiet sleep. She awoke in three hours, perfectly conscious. The pulmonary oedema ceased, the normal flow of urine was re-established, and the anasarca disappeared in two days."

Case II.* C.M., a man, aet. 26, admitted into hospital, and was found to be suffering from double pneumonia with uraemia. On the evening of the fifth day, he became comatose. Urine scanty, high coloured, and slightly albuminous. "There could be little " doubt that poisoning by uraemia had occurred. " Patient was now breathing stertorously and in profound coma. Pulse 140. The wet pack was applied four times ........ Venesection was now performed to sixteen ounces. The effect was immediate; pulse became stronger; lividity disappeared; eyes opened and assumed an intelligent look, and in a few minutes he answered questions.

"I could not resist the conclusion," says Bennet, "that venesection was the active agent that " "caused this man's recovery."

Case III.* "M.E., aet. 29., was confined of a "
"living male child on the evening of June 26th. . . "
"I was summoned to her at 3 a.m. the following morn-
ing, as she felt in very great pain all over. . . ."
"I saw her at 9.30 the same morning, and found that "
"convulsions had commenced at 6 a.m., and that these" 
"had occurred every twenty minutes. . . . She "
"was a stout, muscular, florid, full-blooded woman," 
"and when I saw her, she was unconscious, foaming "
"at the mouth, . . . vomiting freely. I at once "
"injected a quarter of a grain of Pilocarpine, and "
"waited for a quarter of an hour:—Another violent "
"convulsion then occurred; . . . I bled her "
"from the arm to 12 ounces. The effect was imme-
diate; the patient became quiet; the vomiting to a "
"great extent ceased; and she lay quietly in bed. . . "
"She shortly after regained perfect consciousness, - "
"desired to be changed, - and passed a good night. "
"The patient's urine contained no albumen."

Case IV.† Dr Crisp, of Corsham, Wilts, relates 
the following case. "I was called on the evening "
"of Dec. 14th last to see A.N. who was seven and a "
"half months gone in pregnancy. . . . There "
"were no specially suspicious symptoms. . . . "

† Brit: Med: Journal. April 19, 1890.
"On the following morning at 6.30, I was again called to see her, and was informed that she had had a fit. "I saw her again at 11 a.m. and she had a violent "epileptic seizure while I was present." In spite of chlortal and Bromide, etc., the fits continued, and "became so frequent, that by the morning of the 16th" "she had had 25 seizures. For 24 hours she had been" "gradually lapsing into a comatose condition, and "the intervals between the fits were so short that "they almost ran one into the other. . . . . On" "passing the catheter, only a small quantity of "smoky ammoniacal and albuminous urine came away. "". . . . I determined to perform Venesection, and "accordingly took away 8 - 10 ounces of blood from "the median cephalic vein. The fits immediately "ceased, but she lay unconscious for three days. . " ". . . . On the 20th, consciousness began to re-" "turn, and from that time the symptoms gradually ""disappeared, and she recovered strength rapidly. . " ". . . . She made an excellent recovery, and is ""now enjoying better health than she has had for ""years."

Many cases of Carbonic oxide poisoning afford opportunity for successful employment of the lancet.

The poison forms a tolerably stable combination with the haemoglobin, the chemical formula for which is HbCo..
In a case of this nature, fresh air, artificial respiration, and a moderate Venesection are often successful. Transfusion of arterial blood is, however, frequently necessary.

The fifth indication for bloodletting is "Plethora". This is a condition that used to be much more frequently met with than it is now. When present, it gives rise to different symptoms in different cases. In the case about to be related, Miss H., Brunton Place, severe headache was the outstanding symptom, which had accompanied every menstrual epoch since puberty. This was superadded to a distressing feeling of weight and fulness in the head, both of which rendered her absolutely unfit for duty, as long as the menstrual period lasted, and for three or four days after it had ceased. She was naturally of a plethoric habit of body. The palpebral conjunctivae were somewhat florid in appearance.

She also suffered from severe chronic metritis, for which she was treated by means of Glycerine plugs to the cervix, and hot douching.

Menstruation appeared on Sat. March 11. '93, and continued till Monday the 13th. By previous arrangement, I had intended to bleed her coincidently with the appearance of the menses, but was unable to do so until the third day. I accordingly performed
Venesection with a view to relieve the congestion and plethora of her system. I first took a careful pulse-tracing. The pulse was very full and bounding in character, as shewn by the high upstroke of the lever. The rate was normal. I now opened the median basilic, and removed blood, which was very dark in colour, up to ten ounces, after which the pulse tension fell. (vide sphygmogram) The next day, the patient experienced only a slight feeling of faintness. Whereas she had been unable to hold up her head from the distressing feeling of weight and oppression, she could now walk about and engage in her ordinary duties. "My head is so much lighter," she said to me a day or two after. She expresses herself infinitely relieved from the treatment.

I allowed about four weeks to elapse, and after careful consideration, I decided to repeat the operation. Accordingly, on Wednesday April 5th, I visited the patient. She said she had been very well since her last menstrual period, with the exception of slight headache for a day or two previous to my visit. I found the pulse again somewhat full and "bounding" in character, and her general appearance presented a rather plethoric state. I took a pulse-tracing (vide below), after which, I performed Venesection to about eight ounces. This was done while she was sitting up in bed, and she experienced no unpleasant
sensations.

On Wednesday April 12th the patient was again visited. The pulse was good. She was quite free from headache and she expressed herself as being as well as could be desired.


**Before first venesection**

[Graph representing the patient's condition before the first venesection.]

Miss H. Right Radial. Pressure 3 ounces. After Venesection to 10:00 13/3/93

**After first venesection (10 hours)**

[Graph showing the patient's condition after the first venesection.]

Miss H. Right Radial. Pressure 3 ounces. Before Venesection to 8:00 14/3/93.

**Before second venesection**

[Graph depicting the patient's condition before the second venesection.]
Miss H. Pressure 2½ ounces. Immediately after Venesection to 8 ogs. 5/4/93.

After second venesection (½ hour)

Miss H. Pressure 3 ounces. 5 minutes after Venesection to 8 ogs. showing reaction of circulation in arm. 5/4/93.

After second venesection (¼ hour)


After second venesection (2½ hrs)

Miss H. left radial. Pressure 3 ounces. Tracing taken on 6/4/93 after Venesection to 8 ogs. on 5/4/93 shewing fall in tension.

After second venesection (24 hrs)
There are many women who suffer from a plethoric condition at the menopause. This is manifested by giddiness, fulness in the head, and 'hot flushings.' If such patients were bled, they would probably be much benefited.

The sixth indication is local hyperaemia accompanied by, or resulting from inflammation. This is best treated by topical bleeding, of which leeching is the most common form.

I will illustrate this by reference to the uterus, the testicle, and the eye.

Miss H., aet. 36, complained of severe dysmenorrhoea, which was, in the main, dependent upon chronic metritis. She suffered from more or less constant weight and heaviness in the loins with severe pain before and during the menstrual period. During one of these attacks, five leeches were applied to the cervix and lateral fornices. Within three hours, the patient expressed herself much relieved as regards all her symptoms. As a result of this, and treatment by means of glycerine tampons, she was entirely free from pain at her subsequent periods.

Puerperal Fever is a disease which seems to have undergone changes in type since it first came to be recognised in Obstetric Medicine. At the present time, patients suffering from this disease seem to require stimulating and supporting treatment rather than depletion. One does, however, meet with sthenic
cases. In such, where there is severe pain and tenderness, the very greatest relief will follow the application of eight or ten leeches to the abdomen.

Acute Orchitis is a condition where leeching may be used with very great benefit, as illustrated by the following case.

Peter R., aet. 40, suffered from acute orchitis attended with the usual symptoms of pain and weight, etc. The left testicle was swollen and tender. Three leeches were applied to the scrotum, - the result of which was remarkable. Within an hour the swelling was much reduced and the pain was almost nil. Metastasis occurred to the right testicle, similar symptoms and treatment were adopted with a similar result. Boracic lotion, support, and rest in bed, completed the cure.

P.S., a boy, aet. 8, suffered from acute conjunctivitis, with pain. The usual symptoms of congestion - lachrymation - and a degree of photophobia were present. In order to diminish the inflammation, Pil. Hydrarg. 1 gr. thrice daily was administered without apparent benefit. A leech was applied to the temple of the affected side. The next day - the inflammatory condition was much relieved, - the pain almost entirely gone - the patient had slept well, and was in every way improved.
The following case illustrates well the relief of congestion, fever, and pain in pleurisy by Venesection:

R.S., aet. 24, complained of severe pain in left side with bad cough. He was as a rule strong and healthy. In the present instance, his face was flushed. Temperature 103.5° F. Pulse 115, and was full, bounding, and incompressible. Respiration 25. Physical examination of the chest elicited symptoms pointing to the presence of an acute pleurisy. I prescribed an antipyretic and diaphoretic. I saw the patient again in the evening in response to a hurried message. Temp. was now 104.7°, and Pulse was even fuller and more bounding in character than in the morning, and had reached the rate of 160. Respirations were 28. It was altogether a pronouncedly sthenic case. Antipyretics, alone, had proved useless. The pain in the side was worse, and he showed signs of commencing delirium.

I opened the median basilic and removed exactly six ounces of blood. I then prescribed antipyrin. Next morning the pulse was 90. Temperature 99.5°. Respiration 20. He was cool and comfortable, and had enjoyed a good night's sleep. His pain was very much relieved, and in every way, he was like a different patient. The doctor, for whom I was acting as "locum," informed me subsequently that the patient made a good recovery.
Bleeding in pleurisy is as a rule contraindicated when it is secondary to Bright’s disease.

The seventh indication for treatment by Vene-section is the severe pain of aneurism, which will often be inexpressibly relieved by such treatment. "I have seen cases," says Bennet in his Principles "of Practice of Medicine," where great dyspnoea and "pain, caused by large thoracic aneurisms in vigorous" "men, have been greatly alleviated, . . . . . . " "for from twelve to twenty-four hours, by a bleeding" "to the extent of only five ounces."

At page 626 of the same book he relates a case of thoracic and abdominal aneurism, where the patient was repeatedly bled to the extent of twenty-six ounces. One day he was bled to thirty-four ounces at his own urgent request. The good effects of the treatment were so evident as to cause the patient continually to request that he might be bled. In fact, after every bleeding, the pains left him, and he enjoyed longer or shorter periods of perfect ease.

Mr Hulke relates a case of a woman who was the subject of abdominal aneurism. She came regularly to hospital in order to be bled. She had eight to ten ounces removed frequently, because great relief to all her symptoms followed.*

Dr Pye-Smith tells us of a man who was the subject of aneurism. He suffered agony - which was unrelieved by morphia, chloroform, and ice. Venesection was performed with much benefit, and he fell into a refreshing sleep.

Mr Jonathan Hutchinson mentions that the London Hospital Museum contains a specimen of aneurism that had been cured after repeated bleedings.

I quote these cases, inasmuch as I have had no personal experience as to the result of such treatment.

In the pages of this dissertation devoted to the consideration of bloodletting in its clinical aspect, I have recounted a large portion of my personal experience, while in addition I have borrowed certain cases from the current journals by way of further illustration. There are many who have had a much wider range of experience of the use of the lancet than I, and who could bear additional testimony to its value.

On the 27th of January 1891, Members of the Royal Medical and Chirurgical Society, London, had a discussion on "The Therapeutic Value of Venesection: its Indications and Limits." During the meeting, valuable clinical evidence was brought forward in

* * Brit: Med: Journal, Jan. 31, 1891.*
its favor. Dr Stephen MacKenzie and Dr Pye-Smith agreed that "the time was now ripe for reconsidering the subject." The meeting of this Society is referred to in the B.M.J. for Jan 31st 1891.

The article is headed "Revival of Venesection."

In fact, there are few members of the Medical Profession who will not allow that General and Local Bloodletting have a (perhaps increasing) sphere of usefulness in the treatment of certain diseases.

In such, then, let us not neglect it.

(Signed) R.J.ERSKINE YOUNG.
8 RANDOLPH CRESCENT  
EDINBURGH  

Dear Sir Rehaard,

There are just two points that I wish to make about your paper. It is very interesting and well expressed and should be used to form the basis of a paper at the Medical-Clinical Society.

What seems to me the best way to do this is to let your personal experience of the value of blood letting form the basis of the paper. Under some such title as "Notes on Cases illustrating the Value of Blood Letting" after a few introductory remarks you might narrate your cases under the headings you
already have. You might then explain the
factors observed, and
indicating the cases where it may be expected
the beneficial, alluding only briefly to the
Groups of Cases of which you have not had
experience but where you think the method
will be useful.
From the concise way that you have
put your views I hardly need to emphasize
the advantage of brevity, but I will allow
not 20 minutes as a maximum of the time
that you ought to be able to read your paper.
I hope you every success upon in reading
your paper. I shall be glad to do any thing
that way that I can. A good paper might
do you a great deal of good part now in
many ways.
Yours very truly,
C. W. Cathcart.