Pathology - Etiology
and
Therapeutics
of
Haemorrhage.
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When I chose haemorrhage as the subject of my thesis, I did so not from the desire of adding some new matter to a subject which has been so thoroughly investigated by the ablest of men, but from the fact of my wishing to furnish as concise an account as it was in my power to give, of the Etiology and Pathology of those forms of haemorrhage which result as it were spontaneously. I have also offered some of the principal drugs which are of avail in all such cases of haemorrhage, particularly paying attention to the different drugs which are of service in different kinds of haemorrhage. Painfully aware as I am of the fact, that this thesis lacks originality, still I hope it will be accepted as a true account of the subject which I have chosen, and which I would have dealt with more satisfactorily, had time been at my disposal.
Haemorrhage may be of two kinds, Spontaneous or Traumatic, the former belonging to the domain of Medicine, the latter to that of Surgery. I intend confining myself chiefly to the Spontaneous form of Haemorrhage, and such as come under the more immediate notice of the Physician, and shall dispense with the Traumatic form, or those which are the result of direct injury, with a few remarks occasionally, where such may be necessary.

Pathology of Haemorrhage.

By haemorrhage is understood the effusion of blood in mass, either in small or large quantity. Formerly it was very generally taught that this took place by what was styled menstruation, and hence the discharge of menstruation was thought to confirm other evidences of it. So strongly was the late Professor Hamilton impressed with this idea, that he felt
into the wards of the hospital, a woman afflic-
ted with prolapsus uteri to demonstrate the theory.

Many late writers, and Virchow especially, have asserted that haemorrhage never takes place without the rupture of the coats of a vessel; and when we consider that the blood vessels are everywhere closed membranes, we find it very difficult to imagine in what other way a blood-sphærole could find exit. In proof of this, we know that the blood corpuscles are about the 3000 of an inch in diameter, and when we examine the capillaries, we find no openings of that size in their coats; consequently the idea of “haemorrhage by exsudation” is nothing more or less than a fallacy, and one of those many theories which have been and are too often raised in medicine, and which have no proofs to maintain their cause.

At the same time, however, some eminent pathologists of the present day (S. Handfield Jones and Liebkine) whilst generally discrediting the occurrence, assert that in their minds it is not absolutely certain
that there is no such thing as the haemorrhage. By deduction of the older writers, but
on what grounds they make this statement is difficult to conceive, since they themselves
assert, that in all cases where blood is ef-
fused in any quantity, the walls of the
vessels must have given way, and that
this may be the case in every instance
where a bloodglobule goes out from its
channel.

Besides we need only come back to our own
University, and we will have the opinion
of Professor Bennett who maintains that in
all cases the last stage of congestion is the
deduction of liquor exuvinated through the
walls of the vessels, sometimes accompanied
by extravasation of blood corpuscles, owing
to the rupture of the capillaries. This is
another proof that the blood corpuscles cannot
pass through the walls of the vessels without
rupture of their coats taking place, and
deductions which are only coloured by hae-
murine, and contain no bloodglobules, do
not constitute a haemorrhage in any case
whatsoever.
We will suppose haemorrhage to have taken place, and to have stopped naturally, let us enquire into the manner in which this arrest does take place, and into the causes of it.

In venous haemorrhage the veins, quickly collapse, and a clot is formed within and sometimes around them; or the vessel which speedily checks the bleeding. But Mr. Pyne asserts that the lips of a vein will unite together at once provided they remain approximated after the vein has been divided. But should the lips be separated from each other, there is in the first instance an injection of blood into the surrounding cellular tissue; then the formation of a firm, round, smooth confluence, exterior to the wound; and, lastly, an exudation of lymph from the vessels of the vein, which, resting upon this clot, extends from one edge to the other, and gradually unites them together, after which, the clot being absorbed, the cure is completed.

In arterial haemorrhage, if a vessel is completely divided, owing to its elasticity, it is retracted within its sheath, and its
calibre becomes diminished for some little distance from the bleeding orifice. Owing to this the flow of blood becomes diminished, and the blood coagulating within the sheath, around the orifice of the vessel, and also within the contracted vessel itself, gradually ceases to flow, and a firm coagulum closes up the mouth of the vessel. This after a time becomes organized, and renders the occlusion permanent.

This coagulum, which closes up the mouth of the vessel, is mostly due to the fibrine of the blood, and the fact is well illustrated by those instances occasionally met with, in which it is impossible to haemorrhage from the slightest wound, in which it seems pretty certain, that the blood must be very deficient in fibrine.

But in the haemorrhages to be dealt with in this thesis, the lesions will generally partake more of the partial division of a vessel. In such cases, blood is extravasated between the artery and its sheath, and by this means the vessel is compressed; a coagulum results, and eventually adhesive inflammation.
either simply seals up the aperture in the coat of the vessel, or dilates the canal of the vessel entirely at that spot.

These observations chiefly made in the case of mechanical wounds of vessels, must not be applied without qualifications to ordinary haemorrhages, as met with by the Physician, where the lesion is often the result of some process analogous to ulceration, and is in many cases preceded by inflammatory action, which would consolidate the tissues around the vessel. These causes might render the haemorrhage less prone to cease, and the aperture less easy of occlusion; we must therefore assign more influence in the arrest of such haemorrhage, to the two other causes, namely, diminution gradually during haemorrhage of the force of the heart's action, an increasing elasticity of the blood, and in some cases the removal of some local congestion, may jointly be sufficient to stop the haemorrhage.

In most haemorrhages nature seems to aid their stoppage when too long continued, for we know from acute observations, that blood coagulates
more speedily and rapidly when fainting is about to take place from excessive loss of blood, that at the commencement of the haemorrhage... For example, blood when first drawn coagulates in about 5 minutes; when fainting is about to take place it coagulates in about 3 minutes and sometimes even as soon as in 2 minutes. The explanation that has been given of this phenomenon is, that the Blood flows away in a manner best calculated to allow of the escape of the volatile matter, and the coagulation of the Blood is thus considerably favoured...
The volatile matter which is said to escape is a substance very analogous to Ammonia; but whether it is Ammonia or some other volatile alkali, still remains to be discovered. I shall a little further on refer to the effect of Ammonia in preventing the coagulation of the Blood...
Haemorrhage may itself have in some cases a beneficial effect, by rendering the composition of the Blood more normal; for we shall find, that a great increase of the Blood corpuscles, and a non-proportionate increase
The fibrin, having a tendency to render the patient liable to haemorrhage, and the results of some experiments by M. Claudal show conclusively, that the most constant effect of bleeding on the composition of the blood, is to diminish the red-corpuscles, and slightly to increase the fibrin. Thus in a case of acute rheumatism, the first bleeding gave 5 parts of fibrin in a 1000; the second bleeding, 7 parts of fibrin in a 1000. In a case of pleurisy, the first bleeding gave 3.9 parts of fibrin in a 1000; the second bleeding gave 3.8 parts of fibrin in a 1000. In pneumonia and peritonitis, the amount of fibrin was also increased with each successive bleeding.

Haemorrhage may be symptomatic, idiopathic, or merely an accidental complication; and the importance to be attached to it will vary accordingly. In one case it may be diagnostic of serious disease, in another organ. In another it may be the result of some morbid constitutional state, or local obstruction. In such cases it may be the result of certain forms of
Epistaxis and Haemoptysis, or Athieic, as some forms of Haematometria and Malaria, and such haemorrhages frequently produce marked good or bad results. The Athieic forms of haemorrhage are always due to the increase of the corpuscles of the blood, whilst the Athieic forms are due to the diminution of the fibrine.

Just as the albumen was supposed to preclude over the water of the blood, so the fibrine was supposed to preclude over the blood corpuscles. Consequently, where there was a disproportion between the normal amounts of the fibrine and the corpuscles, as for instance when the corpuscles were increased, and the fibrine was diminished, then the fibrine lost its power over the blood corpuscles, and could not prevent their escape from their channels.

Again, haemorrhage may simply occur in some well-marked disease, and it is important to point out some tendency of that disease, as for instance, the occurrence of haemorrhage in Typhoid Fever, would lead one to suppose that the danger of a
Fatal result, was greatest from that cause. In any of the above cases, the haemorrhage may of itself be sufficiently serious, to demand the whole attention of the physician.

Etiology of Haemorrhage.

The causes of haemorrhage can be advantageously divided into the predisposing, and the exciting.

The predisposing causes may be connected with:
1. The blood itself or the blood vessels.
2. The tissues with which it comes in contact.
3. The constitution of the individual.

I. In general, when there is a great increase in the mass of the blood, we see a marked susceptibility to haemorrhage, especially when this is accompanied, as it often is, with a powerful action of the heart.

This tendency is no doubt increased by the fact, that the red corpuscles are enormously increased, whilst the fibrine is never increased, but often diminished. For we
shall see that certain alterations in due pro-
portions of the chief constituents of the blood,
appear to induce a tendency to haemorrhage.
This is probably the cause of the great tendency
to haemorrhage, which is observable in certain
general diseases, and which will be best ap-
preciated by considering some of the chief
diseases, and the alterations which the
composition of the blood undergoes in persons
labouring under them.

But before noting these general diseases, I
may just remark, that it has been found
that certain substances injected into the
blood, have a tendency to give rise to haemor-
rhages. Thus Alkalies, especially Soda and
Ammonia, when injected into the blood, have
a tendency of darkening the blood and
giving rise to haemorrhages from mucous
surfaces. Individuals also who have taken
inordinate quantities of alkalies, are partic-
ularly liable to haemorrhages from mucous
surfaces.

In typhoid fever, in which haemorrhages
are very frequent, especially towards the
last stage of the disease, the fibrine has
been found to be notably diminished. In this disease also, the blood corpuscles were found to be from 10 to 20 per 1000 above the normal standard, thus showing a tendency to bleed.

In all fevers produced by a morbid poison, there must be some change in the corpuscles of the blood, by which their solution is impaired, and thus the corpuscles continue to increase daily with the progress of the disease, whilst the fibrine is diminished. For we know that where there is a decrease of fibrine in the blood, it is not due to any chemical change in the blood, but to a suspension of its solution. The solution of the corpuscles, from which the fibrine of the blood is chiefly derived.

In those cases, hemorrhages of various kinds are liable to occur. In all analyses of the blood in this disease made by Sicard, the fibrine had entirely disappeared. In another it amounted to only 905 parts per 1000; the normal amount of fibrine in the blood being from 293 parts per 1000.

In the fever in which a peculiar liability to hemorrhage exists, the fibrinemia is
analyses by M. M. Becquerel and Rodier, was not at all diminished, sometimes even increased, but the quantity of the globules and of the salt of the urine was in each case diminished.

After excessive loss of blood which has a powerful effect in reducing the quantity of the red corpuscles, and the acidemic state generally, local congestion are very apt to occur.

In Leucocytocemia, the white corpuscles are much increased, and the red corpuscles diminished. In this disease haemorrhage occurs from various parts. Haemorrhage occurs occasionally in certain forms of Bright's disease, a notable instance of which came under my own observation lately in Dr. Besnier's wards in the Infirmary. Profuse epistaxis continuing for several days. In this disease also, there is great diminution in the power of producing the red corpuscles of the blood, and the albumen of the urine is notably diminished. It appears as if the albumen of the urine were drained of, by the urine, these remain
a less quantity in the fluid. This idea is confirmed by the results of Mr. Audral's experiments, where he found that according as the quantity of albumen in the urine diminished, so it increased in the fluid. Dr. Bright himself found that the pericardiac disease was of low specific gravity. This is not however invariably the case, for in some analyses of the fluid in Bright's disease made by Simone, the albumen was considerably increased in quantity. These facts would seem to show that the tendency to haemorrhage does not depend so much upon the increase or diminution of any one constant constituent of the fluid, but upon a disproportion in the normal amounts of the constituents.

But generally, the greatest tendency to haemorrhage and congestion exists in the plethoric state, in which the red corpuscles are much increased, and Audrail considers that this is generally associated with a deficient proportion of fibrine. He confirms this statement by the results of several analyses he made in cases of
Arterial congestion. In one instance of a female who had been struck down by apoplexy, the first bleeding showed the globules at 170.5 parts in the 1000, whilst the fibrin was only 1.9 parts in the 1000. In a few days when consciousness had returned, a bleeding showed the fibrin increased to 3.5 parts per 1000, whilst the globules had diminished to 137.7 parts per 1000. 

It doubt it can be said, that somewhat similar abnormalities in the composition of the blood exist in other diseases, which diseases are not usually accompanied with haemorrhage, and it is probable that in many of the cases where haemorrhages occur, coincident with such changes in the composition of the blood, the haemorrhage may in reality be owing, not to the blood at all or in a small degree, but to the capillaries wanting tone, thus being very liable to rupture, and when ruptured not prone to contract.

Atheromatous and fatty degeneration of the walls of the vessels, are obviously the predisposing causes of many haemorrhages.
II. The effect which various tissues and organs have in predisposing to haemorrhage is not very well marked. The lungs are scarcely ever inflamed, without some amount of haemorrhagic effusion taking place; this is no doubt owing to the extreme delicacy of the structure of the lungs, and to the vessels in the air cells being almost recovered.

Great delicacy and laxity of tissue may also give rise to haemorrhage, as is seen in certain protozoal growths, as the soft varieties of cancer. Frequent attacks of ague, render the patient very liable to haematocynesis. This may be owing to the perniciousness of some original disturbance of the circulation, in the region of the stomach and the spleen.

III. As to the influence which the general constitution of the individual has in predisposing to haemorrhage. The purplish temperament appears to be by far the most liable to haemorrhage. This may be explained by the fact, observed by Dr. Ludwig and Savarret in their experiments, that
The highest proportion of red corpuscles were possessed by those individuals who had the greatest amount of vigour, health, and strength. The influence of age appears to have most effect in determining the seat of haemorrhage. Thus we find that Epistaxis is most common in children; Haeumoptysis in the early period of life from the pelvic viscera in advancing years, and in the brain in old age.

Seasons are paid to have an influence also in determining the seat of haemorrhage. Chouet asserts that haemorrhages occur from the rectum, urinary organs, and uterine, more frequently in cold than in warmer seasons, and that Epistaxis and Haeumoptysis are more common in summer than in winter.

Cold has a well-marked effect in producing contraction, and increasing the toxicity of the blood vessels, especially the smaller ones, and the effects of a cold dry atmosphere in constraining the integuments, and producing a state of hypostasis of the superficial vessels, and
in this way repelling the froth upwards, is probably the cause of those haemorrhages which are paid to occur in persons ascending great heights, especially from the most abrupt and steep, and so far very susceptible of haemorrhage. This appears a much better explanation of the phenomenon than by attributing it to the alteration of the superficial pressure of the atmosphere, though both causes may be combined. The fact that these haemorrhages only occur in certain individuals, admits of this explanation, and of the following hypothesis, that as the toxicity of the smaller vessels, varies in different individuals, according to the general state of the body, an amount of contraction which in a person in vigorous health, where the natural toxicity of the vessels was somewhat excessive, might produce haemorrhage, would have no such effect in persons, where the natural toxicity was defective, in fact might be of decided benefit, as we often see on a smaller scale in the effects of bruising air.
This effect of cold accounts for the fact that apoplexy has been observed to occur much more frequently in cold than in warm weather.

This seems to be the best place to notice that peculiar state of the ptyaline, which exists in certain individuals, and is known as the "haemorrhagic diathesis." In this state of the ptyaline, slight injuries bleed profusely, and death has been known to result from apparently spontaneous epistaxis, or from trifling surgical operations, such as for instance the extraction of a tooth. This peculiar constitutional state must be owing, either to some alteration in the blood itself, or want of tone in the capillaries, whereby they are not able to contract so well as they would otherwise do.

We know that in individuals who are not affected with this haemorrhagic tendency, in certain feeble states of the ptyaline, the capillaries want tone to contract well, and severe haemorrhages follow very slight causes. In this diathesis, perhaps, it is the toxicity of the vessels
which is most at fault, since they may not contract when cut across. Whitby states that this haeomorrhagic diathesis depends upon an unusually delicate constitution and vulnerability of the vascular membranes, together with a thin watery quality of the blood in general. Audral asserts that fibrine is deficient in the blood of those persons who are subject to the haeomorrhagic diathesis, and thus it appears that it is the blood itself, which is the cause of this state of the system. Majendie proved by his experiments on dogs that depriving the blood of its fibrine caused the fluid corpuscles to escape more readily from their channels. He only removed the fibrine by coagulating it by means of rods, and then returned the corpuscles and fluid part of the blood to the circulation again. In all his experiments, haemorrhagic spots were found to occur on the surfaces of organs. We must however make some allowance for this experiment, since he produced the decrease of fibrine by artificial means, and we do
not known whether there is any natural decrease of the fibrin, in any disease, in which spontaneous haemorrhages do occur. However, Dr. Lane cured a case of haemorrhagic diathesis by transfusion. He infused 5 ounces of blood from a healthy person into the circulation of a person labouring under this diathesis, and the haemorrhage was speedily checked. From this it appears that there must have been some abnormal condition of the blood, which abnormality was rectified by the addition of the healthy blood. It seems most probable, that the blood was rectified and rendered normal, not possibly by the addition of fibrin, as one would be led to suppose, but by the addition of the salts contained in the healthy blood, in furtherance of which argument we have the fact, that salts when added to blood in small quantity, tend to hasten the coagulation of the blood, but when added in large quantity, they prevent coagulation for several days. Hence it is not at all improbable, that the small quantity of salts in the 5 ounces of healthy
Blood, had the effect of hastening the coagulation of the blood.
In this diathesis the fibrin has a tendency to coagulate later than usual, the reason of which we do not know. Consequently anything that will hasten the coagulation of the blood will at once check the haemorrhage.
5 grains of the Sulphate of Soda, in a tablespoonful of water every hour, or else every 2nd hour, has a beneficial effect in hastening the coagulation of the blood.
This haemorrhagic diathesis is occasionally hereditary, and often exists in several members of the same family. Like many other diatheses, it may be only partially developed, and is probably more frequent than generally imagined. Dr. Copland states, that he has observed that haemorrhagic diatheses are more common in the offspring of patients who have suffered from them, than in others, and that this tendency is developed in several members of the same family.
This haemorrhagic tendency is not temporary, but a permanent persistent
conditions of the person affected. There are conditions of the system however in which this haemorrhagic tendency may be acquired, and continue as a temporary disease, as in scorbutus and leucocythemia. Another singular fact is, that some persons are affected with habitual constitutional haemorrhages. This is however a rare affection. When it exists, the periodical attacks are most commonly from the rectum. This circumstance led Chovel to propound a theory of male menstruation, considering these attacks of coposition, which he believed to be not uncommon, the analogues of the periodical uterine haemorrhage in the female.

Immediate Exciting Causes of Haemorrhage.

Haemorrhage frequently is a direct result of hyperaemia, as distinguished from inflammation; though it may accompany inflammation, it is not a special and characteristic product of it. This hyperaemia may be phreatic and
active, or, asthenic and passive. Thus haemo-
ptysis, which occurs occasionally in
healthy persons after running great dis-

tances, or making some violent exertion
is asthenic, whilst haemoptysis which oc-
curs in obstructive pulmonary disease of the
heart, causing congestion of the lungs, is
asthenic.

Haemorrhoids, which often give rise to ha-
emorrhage, and which result from pit-
ting on a wet paddle or a coldstone, are
instances of asthenic hyperaemia; whilst
those which occur in congestion of the liver,
are instances of asthenic hyperaemia.

Generally speaking, the exciting causes
of haemorrhage may be said to be: ob-
struction to the current of blood in some
organ, or to its return to the heart; or
excessive impulse of the arterial blood.

Obviously when the tone of the vessels
was low, such causes would act more readily.

Ulceration in various tissues and organs
is another very frequent cause of hae-
emorrhage.
Therapeutics of Haemorrhage.

The various means of arresting haemorrhages, their use and mode of action, effects, and the course of exhibiting remedies employed, next come under our consideration.

The patient should in all cases be kept perfectly quiet, cooling drinks should be administered, and anything likely to excite the patient, and to quicken the circulation, should be carefully avoided. Mechanical measures, such as pressure, can seldom be of avail in haemorrhage, not depending on an injury of some kind. In some obstinate cases of epistaxis, plugging the posterior nares is of great service, and will seldom fail to arrest the haemorrhage. Attention to position is of service in most cases of haemorrhage, and is sometimes sufficient of itself to check the haemorrhage. The particular position to be assumed by the patient, will of course depend upon the
part of the haemorrhage, but generally the patient should be in the recumbent posture and if in bed, should be as lightly covered as possible with bedclothes.

The remedies which are of service in facilitating the arrest of haemorrhage, may be divided into two classes: 1st. Those which act directly, and are properly called haemostatics. 2nd. Those which act indirectly.

The first class of haemostatics, with some exceptions, are efficacious both when applied externally and internally; some however are more suitable for internal, and some for external administration.

Their action generally can be chemically explained, although it is difficult to explain the peculiar efficacy of some, without supposing them to possess a specific action. One or two are only applied externally, and then they act mechanically.

Of the second class of remedies, or those which act upon haemorrhage indirectly, some act on the circulation by diminishing the force of the heart's action, and quieting
The system, or act generally as refrigerants, there again are of service in improving the toxicity of the blood vessels, or in altering the composition of the blood, where it exhibits a tendency to haemorrhage, and there we should include those means which are found to be of service in restoring the normal circulation after severe haemorrhage.

Haemostatic remedies when applied externally, probably all act alike, only some are more soluble than others, and some exist in chemical activity. Mineral astringents by their chemical action coagulate albumen, and in this way act as styptics when applied externally; they also cause muscular fibre to contract, and this action set up chemically, is continued by the vital force. Other external haemostatics owe their activity to tannin, and have a similar action. In some of these as Mastic leaf, this is aided by a mechanical action, the portion of leaf entangling the blood. This indeed is the sole action of some popular application.
As small wounds, as for instance a piece of cobweb, portions of the Aparie, &c. &c. Various cauterys, as the blithe of Silver, and the heated iron, have a powerful ef-
fect in stopping haemorrhage, and act in one of several ways, such as either
mechanically closing up the bleeding or-
ifice, by destroying the tissue and form-
ing a coagula, and such an injury ap-
pears to have a natural revulsive effect
upon the blood; or the applications may
be only sufficient to cause contraction of
the vessels, and afterwards to set up adhe-
sive inflammation.

Cold can also be included under this head,
as it has a powerful effect in checking
haemorrhage when applied locally, either
in the forms of ice or of cold water.
As before stated, the action of most internal
haemostatics can be chemically ex-
plained. Some however seem to possess
a specific action. These will be noticed
more particularly hereafter. Generally
they must be given in such quantities,
that after absorption and dilution, they
may still be capable of exerting a perceptible action on distant parts, on reaching the terminal capillaries and coming out of the blood.

For this reason, the mineral acids, alum, and the salts of iron, are the only mineral medicines which can be given internally with advantage, because other mineral substances cannot be given in such large doses without danger of poisoning. The vegetable astringents which are suitable for internal administration are more numerous. In most instances their efficacy undoubtedly depends upon tannin which they contain in greater or less proportion. A few however appear to possess a specific action.

We now proceed to notice most of the remedies separately, particularly with reference to what cases each is most applicable. In doing so, I shall endeavour to furnish as concise a description as it is in my power to give of the different actions of the remedies, confining myself to the most important remedies alone.
Alum.

This substance is much used both in internal and external haemorrhages, as its efficacy is not impaired whilst in the blood, and it can also be applied locally with very great advantage. It possesses the property of coagulating albumen, and causes the contraction of muscular fibres. A famous nostrum, at one time in great repute, was the haemostatic solution of Vespiani. This solution owed its great efficacy to Alum. Its composition was, Gum Benzoinum 3 xvi.; Alum 67; Water 10; boiled together for some time. Veligano states, that this solution will instantaneously coagulate the blood, and convert it into a thick, homogeneous, consistent clot, and is one of the most certain means of arresting haemorrhage when applied locally. Although Alum forms an insoluble compound with tannin, it is nevertheless often administered along with vegetable astringents. Experience seems to be in favour of the combination, and the
Pulvis Aluminium Compositus of the Edinburgh Pharmacopoeia, consists of Riders 1 part, and Alum 4 parts. This is a very useful astringent in passive haemorrhages from the stomach and bowels. Alum cannot be administered along with the Acetate of Lead.

**Acetate of Lead.**

This salt acts externally as an astringent, and when given internally appears to possess a remarkable power of suppressing internal haemorrhages. It is very highly esteemed in haemoptysis. As it lowers the action of the heart and acts as a sedative, it is beneficially employed where the indications are to quiet the circulation and to check haemorrhage. In fact its greatest efficacy in some cases may probably be owing to this sedative effect. It requires great caution in its administration, as in large doses it acts as an irritant poison, occasioning dyspeptic symptoms,
and if too long continued, might induce symptoms of lead poisoning. It should not be administered along with alum, or with any of the mineral acids; in fact, with the exception of opium, it is best administered by itself. A good form in which it can be given is in pills of from 2 to 5 grains, or combined with opium, as in the Bilultae Municbi Opiatae of The Edinburgh Pharmacopoeia.

Iron.

The preparations of iron generally are very appropriate for giving tone to the capillaries, and for restoring deficient red colouring matter, either in case of anaemia or after severe haemorrhage. Of the astringent salts, the Sulphate of Iron, and the Sesquichloride of Iron, may be advan-
tageously used both internally and exter-
nally to arrest typical bleeding.

For internal administration, the Sulphate of Iron appears to possess the greatest as-
tirgent power, and for external appli-
-cation, the sesquichloride of Iron is most service. It is however very frequently pre-
scribed with very favourable results, in
atonic haemorrhages from the Kidney
and bladder. Both these salts may be
advantageously prescribed along with
sulphuric acid, where it is desirable to re-
store the deficient red colouring matter of
the blood.

The soluble salts of Silver, Zinc, and Copper
and the Bichloride of Mercury, are all
used externally to check haemorrhage.
They cause dilated vessels to contract,
and when applied in concentrated form,
act as caustics.

**Creasote.**

This substance possesses the power of
coagulating albumen, and it is on
this property that its efficacy as a stypic
chiefly depends. It also possesses seda-
tive powers, but cannot be given in
large doses. It is often of great service
where the bleeding proceeds from small
vessels, as in some forms of haematemesis, and in haemorrhage from the intestines. It is also used as an injection in dysentery. It seems in fact to be most efficacious in those cases, where the seat of haemorrhage causes its internal administration to partake very much of the mode of an external application.

It may be given in the form of a pill, or as a mixture dissolved by spirit, or suspended by mucilage, or it may be inhaled. For this latter purpose from 4 to 10 drops should be dropped into a quiet stream at 150° Fahrenheit, and then rapidly inhaled by the mouth.

**Matricoo.**

This plant is highly esteemed as a styptic and astringent. It is of great service externally, when the blood proceeds from small vessels, and its styptic properties may be mechanically aided by the hollow corpuscles becoming entangled and intertwined by the structure of the leaf.
The under surface of the leaf in such cases, is said to be much more efficacious than
the upper. When administered internally, it possesses in a high degree, the properties
of the vegetable astringents generally. It has however fallen into great disuse lately
as a styptic.

**Turpentine.**

The oil of Turpentine is undoubtedly useful in many passive haemorrhages from
mucous surfaces. This effect is probably owing to some influence it exercises over
the capillaries. Its effects however vary very much, consequently it is not very
often employed. It is best administered with the yolk of egg. Occasionally
its administration gives rise to haematuria from irritating the kidneys.

**Acetic Acid.**

This acid in the form of vinegar is a very
good refrigerant, and in haemorrhage
is often beneficially employed to reduce the circulation. When applied locally it acts as an astringent. Heligau states that in bleeding from the intestines, especially when it proceeds from the large bowel, emulsions containing vinegar have been found of great service.

**Mineral Acids.**

Generally Sulphuric acid, Hydrochloric acid, Nitric acid, and Phosphoric acid, when taken in a dilute form, act as refrigerants. They abate thirst and reduce the frequency of the pulse. Practically, Sulphuric acid is the only one used in the treatment of haemorrhage. Headland states that free Sulphuric acid when it enters the blood combines with the Alkali contained in it and forms a salt which is not as astringent, but becomes free again when exerted. It is only gaseous when the Hemorrhage is from mucous surfaces. It possesses also a tonic effect. It has been found of great service in certain passive haemor-
-Thrombi as haemoptysis, epistaxis, and slight but protracted bleedings from the uterus, stomach, and intestines.

**Ergot of Rye.**

An alcoholic extract of this substance, under the name of Ergotin, is much recommended as a haemostatic by M. Boureau. Locally applied by means of lint ointment in it, it has been found of great service in arresting bleeding from small vessels, and where compression could not be had recourse to. Its effects are not so decided when administered internally. The reports of other surgeons confirm its haemostatic effects.

**Tannic & Gallic Acids.**

On these acids, but more especially tannic acid, the astringent properties of vegetables depend. Tannic acid acts principally upon the pectins and albumen and diminishes the calibre of the capillaries.
-laries by causing contraction of unstriped muscular fibre. Hence it is peculiarly useful when applied locally in haemorrhage from small vessels. But as it undergoes, after passing into the circulation, conversion into gallic acid, the latter is more useful in cases where remote or distant organs are affected, as in haematuria. Its presence may be demonstrated in the urine of those who have taken it, by its characteristic reaction with a boric acid salt of iron. Gallic acid does not precipitate albumen, hence it is of little use when applied externally, but of the greatest possible use when taken internally. Delaneau states, that it is of great use in all forms of haemorrhage from the kidneys and bladder, provided no inflammatory symptoms are present, and especially in those forms resulting from injury. He also strongly recommends it in haemorrhage from the stomach and bowels, and Professor Simpson recommends it in some forms of uterine haemorrhage. Various vegetable astringents, as Riis,
Catechu, Phatany, &c. are often of very great service in passive haemorrhages. They owe their efficacy chiefly to Tannin, they contain, and some of them combine, a tonic with an astringent property.

**Opium.**

This drug is often very beneficially employed in haemorrhages from the lungs, uterus, and bowels. It should be prescribed in the form of Morphia, as then the sedative and tonic effects of the drug are produced, without so much primary stimulation, as when Opium itself is given. It is especially useful in cases of the system after excessive loss of blood.

P. J. A. van Breda