

**On blood letting : an account of the curative effects of the abstraction of blood : with rules for employing both local and general blood-letting in the treatment of diseases / by James Wardrop.**

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ON

**BLOOD-LETTING.**

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AN ACCOUNT  
OF THE CURATIVE EFFECTS OF THE  
ABSTRACTION OF BLOOD; WITH RULES FOR  
EMPLOYING BOTH LOCAL AND GENERAL  
BLOOD-LETTING IN THE TREATMENT  
OF DISEASES.

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BY

**JAMES WARDROP, M. D.**

SURGEON TO THE LATE KING,  
&c. &c. &c.

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**LONDON:**  
J. B. BAILLIERE, 219, REGENT STREET.  
(PARIS, RUE L'ECOLE DE MEDECINE.)  
M.D.CCCXXXV.

ADDITIONAL TEXT

BLOOD-LETTING

R34006

## ADVERTISEMENT.

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*The greater portion of the materials which compose this Volume has been already published in detached parts. Eminent as the advantages, both of oral discourses and of periodical journals, have indisputably been in affording facilities for the diffusion of knowledge, the Author yet ventures to hope that this collection of various practical doctrines, connected with the subject of Blood-letting in the treatment of Disease, will not prove unacceptable.*

*Embracing some of the most important discussions in medical science, the following observations were not submitted to the Profession without much care and deliberation, and the favourable reception which they obtained, has induced the Author to collect and publish them in the present form. In accomplishing this, however, he has not failed to use his best endeavours to render the work more comprehensive, by dwelling at greater length on some points, and by giving additional cases illustrative of several interesting topics.*

Charles Street, St. James's Square.

October, 1835.

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## DISCOURSE I.

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### GENERAL OBSERVATIONS ON THE BLOOD.

*Of the Blood ;—its Functions ;—its “ Living Principles ;” —its Morbid Changes ;—its quantity in Man ; —its Sensible Qualities—smell—taste—temperature.—The Coagulation of the Blood ;—its Phenomena ;—Utility of Coagulation in stopping Hemorrhage,—in uniting divided parts,—in the process of Reparation,—and in the Cure of Aneurysms. —Deficiency of the Coagulatory Power in the Blood, sometimes Hereditary,—fatal Cases,—Treatment.—Consistence of the Blood ;—Component Parts of the Blood,—serum,—red Globules,—coagulated lymph. —The Buffy Coat.*

THE abstraction of blood from the human body is one of the most powerful of our therapeutic means, and the observations which I am about to make on this subject are to be considered chiefly as the result of my own experience in a great number of diseases amongst the different classes of society. Diseases assume an almost infinite diversity of form in the various ranks of the community, and this ought always to caution us against attempting to draw any general conclusions from examples of diseases

only amongst a particular class of persons. Those who may have been in the habit of seeing diseases chiefly amongst the peasantry, or in the army, or in the navy, will be much struck with the various shades which the same complaints present in this metropolis, where patients are met with whose constitutions have suffered from indulgence in all the vices, and from all the mental excitement to which man is exposed amid this vast concourse of human beings.

A more fit opportunity cannot, perhaps, occur to dwell on the importance of carefully watching the effects of the same remedy in different examples of the same disease, and to point out how diseases are modified by the various circumstances and relations of each individual case.

Two examples of a disease scarcely ever occur which are precisely the same in all respects, and though they may resemble each other in many essential points, still they will be found to differ either according to the period which the disease has existed—the age—the sex—the temperament of the patient,—or according to some other circumstance which demands consideration in the treatment, and which ought more or less to modify that treatment. This observation applies in a particular manner to those diseases for which medicine possesses what is called a “specific” remedy. In treating these diseases, much depends on the state of general health in the individual before such specific medicines are administered. From want of such care how often do we hear of the different preparations of mercury, bark, and iron, disagreeing with particular patients? In

almost every instance this will be found to arise from some part of the alimentary canal being in a deranged state, which state ought to have been corrected previous to administering the specific remedy. The most useful medicines often fall into disrepute from want of such attention, whilst under other circumstances the dose must be changed, as well as the form of administering it. I do not mean to affirm that there are no individuals with whom particular medicines disagree. On the contrary, there are persons in whom cinchona, mercury, iron, and even milder drugs, as rhubarb, senna, and many saline medicines, have a decidedly pernicious effect. Such instances, however, are only to be considered as exceptions.

Diseases, I have already remarked, assume an infinite variety of character, not only in persons of different ages and constitutions, but also in people living in different districts of a country, and in different ranks of society. The limited observations, therefore, which are made on the treatment of patients in the wards of an hospital, have often had, the imputation of being incorrect from the same remedies having been used with very different effects in other classes of the community. I have often heard medical men, whose practice has been confined to one class of persons, such as soldiers or sailors, and who have acquired great expertness and skill in treating that particular class—I have often heard such practitioners remark, how different were the systems which they found it necessary to pursue when they were called on to treat the diseases of other classes of individuals, particularly those of

women and children, and such of the poor as are habituated to intemperance, and irregular habits of life.

I cannot dwell too strongly on the importance of this subject, as I think it may be distinctly traced that many errors in the treatment of diseases, have arisen from one set of practitioners being accustomed to act with greater energy than is necessary, and following indiscriminately a particular system, and another who, from seldom seeing the more violent forms of disease, practise with timidity and indecision.

These observations, while they may be applied to the use of any remedy, are yet particularly applicable to that now under consideration, as there is no means more generally used, and more decided in its effects, than the abstraction of Blood, and yet there is no point on which you will find greater diversity of opinion, and fewer distinct rules laid down, both as regards the circumstances and extent to which it should be employed. The practical errors to which I have now alluded, can only be corrected by a nice discrimination in individual cases, and the power of thus discriminating can only be acquired by being in the constant habit of observing diseases amongst all classes of the community, and watching every description of disorder, more especially at an early period of the practitioner's life,—when the perceptive powers are most acute, and the mind has not yet been fettered by theoretical and hypothetical doctrines. A habit of examining diseases in the living body, and also a familiar acquaintance with the appearances of diseased structure, lead to a

quick discrimination of the peculiarities of each individual case, and to a comprehensive knowledge of medicine.

Previous to entering on the consideration of the Curative effects of abstracting Blood, I propose to make some general observations on the natural qualities and the more remarkable changes of the sanguineous fluid.

The blood which is contained in the heart, in the arteries, and in the veins, is kept in a continual motion, called its *circulation*. During this movement it undergoes certain regular and constant changes in a healthy animal. It receives new liquids which are prepared by the process of digestion, and by cutaneous absorption; and it goes through changes in the lungs, where it is submitted to the action of the atmospheric air.

It travels throughout the whole body, furnishing to each organ certain materials and it is deprived of other parts by the various secretions and excretions. That the blood should have been considered as the *life* of the body need not be wondered at; for if its passage to any part be destroyed, that part dies; and if beyond a certain quantity be extracted from the system, the death of the animal then follows. But the blood is not only necessary for the life, but for the growth, of every part of the body; and when any organ suffers an injury, it is the blood which is immediately employed for its reparation.

It is not, therefore, surprising that the blood should have been supposed to possess in itself a "living principle," an opinion advocated by the ingenious HUNTER. The principle of life we must

Of the  
Blood.

Its func-  
tions.

Its living  
principles.

suppose to begin in some one of the component parts of a living animal ; and as we observe a chain of phenomena commencing from the entrance of the food into the stomach,—the conversion of that food into chyle,—the mixture of the chyle with the blood,—and the life and growth of the various parts of the animal from that blood,—is it not as probable that the “living principle” is first developed in the blood as in any of the other constituent parts of the animal ?

Its morbid  
Changes.

In order fully to comprehend the various functions of the blood,—the morbid changes which it undergoes,—its influence in repairing injuries,—and the effects of removing it from the body for the cure of disease, it will be proper first to consider its component parts, and the alterations in their qualities and proportions, all which form important indications in the diagnosis of diseases.

It was remarked by Dr. HEBERDEN, that neither the blood nor the urine can afford criteria for the treatment of diseases. I need make no comment on such an unphilosophical opinion ; and in proof of its erroneous tendency, refer to the works of Dr. PROUT, wherein you will perceive how important a comprehensive knowledge of the chemical qualities of the urine is, in the diagnosis of the diseases, not only of the urinary organs, but of the whole system ; and I have no doubt that if an equally philosophical mind were employed in the analysis of the *Blood*, much important information regarding the morbid changes of that fluid, and the modes of remedying them, might be discovered. It has indeed been, of late, too much the custom to ridicule the humoral

pathology; but this has not arisen from the attentive investigation of disease.

It is indeed extremely probable, that the qualities of the blood are considerably altered in many diseases, though such changes cannot always be detected. We observe, for example that there is a complete alteration of the serum in jaundice, and were it not for the change of its colour, we should perhaps have no evidence that the blood was at all altered in that disease. Odorous substances are also mixed with the blood, as balsams and asparagus are found in the urine.

With regard to the quantity of the blood in man, Quantity of the blood. HALLER supposed that about fifty pounds of fluid circulated in a person weighing one hundred and sixty pounds, of which he considered twenty-eight pounds to be blood.

There has not, however, been yet contrived any mode of ascertaining the precise quantity of blood in different people, and it is not at all improbable that the quantity may vary much in the same individual at different times; neither is it at all certain, whether persons afflicted with diseases which are relieved by the abstraction of blood from the system, have had an undue quantity of that fluid.

It is generally considered, that, in proportion to the size of their body, young persons have a greater quantity of blood than adults, that adults have a greater quantity than the aged, and that fat people have also less blood than the lean.

That there is a great difference in the quantity of blood in different people would appear probable, from the circumstance, that if a succession of in-

dividuals be observed afflicted with a similar disease, requiring the abstraction of blood for its cure, the quantity necessary to produce the same effect, varies very much in every different instance, which may probably depend on differences in the quantity of the blood in each person.

The quantity of the blood varies very much in dead bodies. In general it is abundant in those who have died from drowning, and those diseases which suddenly destroy life, as apoplexy, whilst those who die from lingering ailments have a very small quantity of blood.

Sensible  
Qualities.

Fresh blood emits a peculiar animal *smell*, and a thin vapour rises from it, which is nearly as insipid as water. It is glutinous to the *touch*, slightly saline to the *taste*, and its specific *gravity* is rather greater than that of water.

Tempera-  
ture.

The *temperature* of the blood has not been found to vary much in different diseases, its natural heat diminishing a few degrees in the cold fit of ague, and increasing during inflammatory fever; and it has also been observed that the arterial is warmer than the venous blood.

Coagula-  
tion.

Coagulation is one of the most important properties of the blood. Whenever blood is removed from its proper vessels, a process of coagulation takes place, and this coagulation happens sooner or later, according to particular circumstances.

Healthy blood coagulates in about three minutes and a half; the coagulation is usually completed in seven minutes, and in twelve minutes the mass becomes firm.

Blood coagulates in the ratio of its specific gra-

vity, the lighter the blood the more slowly does it coagulate ; and coagulation takes place more or less quickly, according as the orifice from which it flows be small or large, or the stream fast or slow.

Coagulation too is rendered slower by cold. We observe it take place quickly when the blood is received into a basin or flat vessel, and it coagulates soonest if the vessel be metallic. The rapidity of the coagulation also depends on whether it be the first or last portions which are abstracted, either from an artery or a vein.

Blood, which is kept at rest, coagulates more slowly than when it is stirred or agitated. It coagulates most quickly when drawn through a small orifice, and allowed to trickle down the arm. Strong action of the arterial system appears also to dispose the blood to coagulate slowly, but, when the vascular action is diminished, as in fainting, coagulation takes place more quickly ; and hence the assistance nature derives from syncope, in plugging up the orifice of a bleeding vessel.

The power of the blood to coagulate is essential for the performance of many important functions in the animal economy, whether in a state of health or disease. Uses of  
Coagula-  
tion.

1st. It is this quality of the blood which arrests the bleeding from a wounded vessel.

2nd. Coagulation is the means of limiting spontaneous hemorrhages, by plugging up the open mouths of the vessels from which the blood is poured out.

3rd. It serves to agglutinate the divided edges of wounded skin.

4th. It is important in the restoration of a lost part by forming a covering to prevent the contact of the external air with the newly-exposed surface.

5th. It forms a parenchyma or matrix for the passage of new vessels, in the restoration and regeneration of parts that have been destroyed, as in the process of granulation.

6th. It is the power of coagulation which nature employs to prevent the bursting of an aneurysmal swelling.

7th. And lastly, it is equally useful in plugging up the canals of diseased veins, and in agglutinating their wounds.

For stop-  
ping he-  
morrhage.

As regards *spontaneous hemorrhage*, it has been already observed, that this coagulating power of the blood answers a very important purpose. There are many diseases wherein an effort is made by nature to relieve the general system, or a particular organ, of a superabundant quantity of blood, and little or no disposition is made to arrest its progress, until considerable debility or syncope supervenes, which has the effect of promoting the necessary coagulation. And, moreover, when blood is lost by a wound, the diminution in the quantity of the blood, by retarding the force of circulation, creates a power in that blood to coagulate more speedily, and thus arrests the hemorrhage. Hence is derived the useful practical lesson of encouraging a state of syncope, in order to assist in stopping hemorrhage. Indeed, when syncope does take place, during operations, we ought to watch the state of the wound after the syncope goes off before venturing to close it, for the vessels often begin to bleed, when, in order to

prevent secondary hemorrhage, they ought to be secured by ligatures.

The importance of this property of coagulation in the blood, is also exemplified in repairing injured or lost parts of the body. When the skin, for instance, is divided, the cut edges adhere, and this adhesion is effected by a quantity of coagulated blood being interposed between the lips of the wound. Here the coagulated blood seems to act as a mere bond of union, and I may observe, as a general rule, that whenever we are able to keep the lips of a wound together by the adhesive property of the blood alone, blood is the most preferable, and the best plaster.

For the  
Reunion of  
Wounds.

HUNTER believed, that the coagulum thus formed between the edges of a wound, possessed within itself a power of generating vessels, and thus became organised; but whether under the ordinary circumstances of reparation, new vessels are formed in the midst of the coagulum, or whether they shoot into the coagulum from the adjacent surfaces, and are continuations of those which have been divided, it is certain that vessels meet together and anastomose freely in the coagulum, which, along with the nerves that are also supplied, ultimately constitute a complete organization of what originally was a mass of coagulated blood.

The power of the blood to coagulate for the purpose of the restoration of parts, is exemplified when a portion of the skin is accidentally removed. In such a case, coagulated blood is first deposited on the wounded surface, and coagulable lymph is then

For Re-  
storing  
Parts.

effused by the arteries between the coagulum and the wounded surface, for the purpose of forming a matrix for granulations; the growth of which granulations and their subsequent cicatrization repairing the lost part.

For the  
cure of  
Aneu-  
rysm.

The power of coagulation in the blood is also employed by nature for the cure of *aneurysm*—one mode at least of spontaneous cure entirely depending on this process. When an aneurysm is formed, the blood which fills the dilated part of the vessel, or the proper aneurysmal tumour, does not circulate either in the same direction or with the same velocity as in the natural condition of the vessel. The consequence is, that a process of coagulation of the blood in the tumour commences, and the extent of this process varies according to the form, size, and position of the aneurysm. In some cases the tumour, however small, is found completely filled with a mass of coagulum, whilst in other cases the parietes of the artery have derived comparatively little additional thickness.

The coagulum, however it may be formed in aneurysmal tumours, is not produced quickly, and consists in the deposition of one lamina of fibrin upon another, which fortifies the parietes of the tumour, and prevents its bursting. In cases where the aneurysmal cavity is completely filled, an absolute cure of the disease is thus accomplished, the diseased portion of the vessel being rendered no longer liable to rupture. There is, however, a difference to be observed between the coagulum of an aneurysm and a common clot of blood, though the

distinction has not been clearly pointed out by pathologists.

This quality of coagulation in the blood, which, as I have endeavoured to show, is so powerful an agent in arresting hemorrhage as well as in accomplishing other restorative processes, has in some persons been found wanting, and hence bleedings even from very small vessels have not been capable of being stopped, and the hemorrhage has in some instances even proved fatal. As few such cases are recorded in medical works, it may be expedient on this occasion to bring together all the materials I have been able to collect on this interesting subject, and mention those examples of this peculiarity of the blood which have come more immediately within my own knowledge.

Deficiency  
in the  
Coagula-  
ting  
Power.

A gentleman found on several occasions great difficulty, and it often required many hours, before he could stop the bleeding occasioned even by superficial scratches, such as he sometimes met with in shaving. At length he accidentally received a slight wound on one of his fingers, and every effort to arrest the hemorrhage failing, he expired.

Case.

I attended a patient where the introduction of a common seton needle in the side was followed by a fatal hemorrhage. The gentleman who had an enlarged spleen, was advised to have a seton introduced, and the operation was performed in the usual manner by Sir ASTLEY COOPER. Alarmed by the quantity of blood oozing from the wound, I was sent for to see the patient in the evening of the same day. On withdrawing the cord, pressure carefully applied with graduated compresses did not

Case.

avail, and the hemorrhage being so profuse as to make it appear probable that some vessel of considerable size had been wounded, I thought it expedient to divide that portion of integument between the two perforations made by the seton needle. Having done this, I found that the blood issued from numerous orifices' and I secured no less than nine vessels with ligatures. Blood continued, however, to ooze from numberless small orifices over the whole surface of the wound, which every mode of treatment usually resorted to failed in arresting, and the patient died in a few days.

Case. An interesting case which I conceive to have been of the same description, is recorded by Mr. BLAGDEN in the eighth volume of the Transactions of the Medical and Surgical Society. A young man, at different periods of his life, experienced great difficulty in stopping the bleeding from very slight wounds. At length he had a tooth extracted, which was followed by a violent hemorrhage, that neither styptics, pressure, the actual cautery, nor a ligature on the carotid artery, could control, and he died a week after this injudicious operation.

Case. Mr. WILSON, mentions a case where a child died from the bleeding of a small bite on the tongue. "I once had an opportunity of inspecting the body of a young person in whom, during life, a very small degree of pressure on any part of the skin, produced the appearance called black and blue to that degree, that the nurse in dressing him, although a very careful woman, frequently left the impression of her fingers on different parts of his body. I have frequently seen the child with bruises of a livid co-

lour, arising from falls, or even pressing against anything with the slightest force ; if a pin happened to scratch him, great difficulty occurred in stopping the bleeding, and the application of a single leech was productive of so much danger from the continuance of the hemorrhage, that the child's life was nearly lost. The complexion of the child was fair, and the appearance delicate, but not unhealthy ; the pulse was full, but never hard, and the functions of the viscera generally seemed to go on as in other children. When between three and four years of age, the child bit its tongue ; there was an impression of the teeth both on the upper and lower surface, but not very deep ; the bleeding from the wounds continued for some hours, and having resisted all attempts to stop it, I was requested to see the child. I tried compression and every kind of styptic, which produced a temporary, but no permanent effect, so that although the child lived five days, and during that period I saw it several times in the day, and frequently remained an hour or two with it, though I never failed in producing a temporary stoppage of the bleeding, it was renewed almost as soon as I left the house. I included the whole of the bleeding surface in a ligature, which for a short time stopped hemorrhage, but ulceration very soon took place, and a fresh bleeding occurred ; to use the needle was now impossible, as the least puncture produced a bleeding almost as violent as that from the wound. I destroyed the surface by caustic, but the eschar was soon thrown off, and the bleeding renewed ; the child became very weak, and, as the bleeding occasionally occurred during

See his  
Lectures  
on the  
Vascular  
System.

sleep, was watched over very carefully ; but on one occasion, when upon the supposition that he was asleep, he had not been looked at by the nurse for half an hour, she found that a very slight bleeding, not exceeding a teaspoonful, had taken place, and that the child was dead."

Case.

A curious case came within my own observation, where this deficiency in the coagulating power of the blood appeared to be *hereditary*. A family of which there were several branches, all found a particular difficulty in stopping the hemorrhage from any very slight wound they might have accidentally received, and one of the brothers who had the common operation for fistula performed, died of a bleeding which was occasioned by the incision made in the operation.

Case.

But by far the most interesting case which has come within my knowledge, and where there was not only a want of power in the blood to coagulate, but where that peculiar state of the sanguineous fluid existed in many branches of the same family, occurred in the practice of Mr. WARD, surgeon, at Ewell, and I shall conclude this part of the subject by relating the circumstances as they were communicated by him to me :—

"The particular state of the boy's constitution was manifested at two months old, when his arm was unusually bruised by a slight blow ; and soon after this accident, there was much difficulty in restraining the hemorrhage occasioned by a superficial wound of the lip, and since then, whenever he has had a slight scratch. When he first came under my care, he had received a superficial wound in the

palm of the hand a few days previous, and appeared much exhausted from hemorrhage. I attempted to restrain it by pressure, oil of turpentine,—caustic,—and by strong acetic acid; and after giving him some aperient medicine, he took the diluted sulphuric acid in large doses, and astringents. The case becoming very desperate, for the hemorrhage continued unabated for two days after I first saw him, I now ordered a dose of superacetate of lead with opium every three hours, when the hemorrhage soon abated, but whether from the effect of the medicine or not I was unable to determine. It appeared to me to have had considerable influence. I formed some idea of the extent of the hemorrhage by having the arm placed above a plate, when twelve ounces of blood was collected in as many hours. This blood was not at all coagulated, and I could only observe clots when the blood was suffered to collect in folded linen, and then in very small quantities. The boy, after this attack, was completely exsanguined, suffered excessively with all the symptoms of protracted hemorrhage, and it was several months before he recovered.

“ Since that time he has been under my care for a wound on the head, the hemorrhage from which was restrained with less difficulty, because pressure could be more effectually used, and at the same time I applied the lunar caustic freely. The bandage remained for more than a week, when an ulcer, having a very offensive smell, of about the size of a shilling, remained. This went through the natural process of granulation, and certainly healed more rapidly than under common circumstances.

At this time the boy is well, and is in the eighth year of his age.

“ The circumstances connected with this boy’s family are equally remarkable. His mother has a numerous offspring, and a brother, who is twenty-two years old, is afflicted in a similar way, and is also an almost constant sufferer with rheumatic gout. He had five uncles and two aunts ; all his uncles had the same hemorrhagic tendency, three died from a division of the *frænum linguæ*, one from the extraction of a tooth, and the other had the same disease, but died from some other cause !

“ The aunts had not that tendency in their persons : the one had three boys, two of whom are thus afflicted ; the other has two boys and two girls : both boys are afflicted in the same way.

“ From the above account, there can be no doubt of the *hereditary nature* of the disease ; and it is a singular circumstance, that it is confined in this family to the male branches.”

Treatment. The treatment of such cases becomes an object of interesting inquiry, and a successful analysis of the blood might perhaps teach us how to supply the deficiency in its power of coagulation. Those substances, which dispose the blood to coagulate, seem to have more effect in restraining the bleeding for a time than those which excite the artery itself to contract. Hence styptic applications have been employed ; and these act by producing a chemical change in the blood with which they are mixed, and thereby form a cake or cement, to supply the place of a coagulum.

Sir C. SCUDAMORE has recommended with much

confidence, the application of a saturated solution of the sulphate of alum for arresting hemorrhage. This salt, by producing an immediate coagulation of the blood, forms a coagulum at the mouth of a bleeding vessel, and thus accomplishes the first step of that process by which bleeding is arrested. The alum solution should be used warm, in which state it favours the coagulation, and this warm application is not to be considered inconsistent with the application of cold to the parts in the immediate vicinity of the bleeding vessels, the effects of which in diminishing the action of the vascular system is well established. The alum solution is to be applied either by a compress wet with it, moderately pressed on the bleeding part; or it may be injected into a bleeding cavity, such as the nose, uterus, bladder, or rectum.

See his  
Essay on  
the Blood.

Besides the cases to which I have now alluded, wherein a want of the power of coagulation in the blood seems to depend on a peculiarity of constitution, and in some instances on a hereditary taint, there are other causes which produce deficiencies in the power of the blood to coagulate.

In many diseases, where the solids are verging towards putrefaction, the disposition of the blood to form a firm coagulum is much lessened, as in typhus fever and scurvy. In animals, too, that die suddenly from over exertion, the blood does not coagulate. Most persons are aware of the difference in the blood of a hare which has been shot, and of one which has been run down by hounds; and in persons who are suddenly killed by lightning, or during violent fits of passion, or criminals by

hanging, the blood does not coagulate. Alkalies, and common salt, entirely prevent the coagulation of the blood, whilst mineral acids, promote that process. Is it on this principle that the internal use of mineral acids is so beneficial in hemorrhages? Can this effect of sea salt on the blood, account for the state of the sanguineous fluid in persons afflicted with sea scurvy? it being well known that this complaint is the effect of eating salt provisions, and that the blood in such persons is unusually thin. We know that this complaint is also cured by the exhibition of acids. It is a characteristic feature in the menstrual flux, that the discharge does not coagulate like common blood, nor does it ever become putrid, until after artificial evacuation, as is exemplified in cases of imperforated hymen, where its exit had been often prevented even to an advanced period of life.

Consistence of the Blood.

The consistence of the blood is another quality which merits attention. Blood, in inflammatory cases, is not only longer in coagulating, but it is also much thinner than natural, which thinness has been proved by HEWSON to depend on the greater attenuation of the coagulable lymph or fibrin. The whole mass of inflamed blood, before coagulation, is actually thinner than the serum of the same blood after coagulation has taken place, and the crassamentum or clot separated from it. Hence the disposition of arteries in an inflamed part to throw out coagulable lymph, may, more or less, depend on this change in the blood.

Whilst blood is flowing into a basin, our eye enables us to form some notion of its consistence, but

this is best ascertained by the time it requires to coagulate. A firm texture of blood has been generally considered as a mark of strong action in the arteries, and as pointing out the propriety of abstracting it, and, on the other hand, when its texture is very loose, the utility of repeating venesection has been considered questionable.

Soon after coagulation, blood separates into two substances, the crassamentum and the serum. The Serum.

The Serum, or watery part, exudes through the pores of the coagulum, whilst the crassamentum contracts, leaving the sides of the vessel containing it, and preserving its form.

The proportions of the serum and crassamentum are various. In healthy blood they are nearly in equal quantities; whereas, in very stout and laborious people, and also during some inflammatory diseases, the crassamentum is in the larger proportion.

The serum is a fluid of a pale straw colour, has a slight saline taste, is somewhat viscid, rather heavier than water, and mixes readily with it. When exposed to a moderate heat, it coagulates into a light straw coloured glutinous mass, and the same effect is rapidly produced by its sudden admixture with an equal quantity of boiling water.

The part of the serum which is thus coagulated, either by the application of heat, or an admixture of acids, possesses most of the chemical properties of the white of egg, and has been termed the *albumen*. Its Albumen.

When serum is coagulated by heat, there oozes from the mass a small quantity of a viscid substance, Serosity.

which has been termed the *serosity*, and is a mucous fluid.

Its Glo-  
bules.

The serum has been found of a white colour, like cream, and to contain globules, which peculiar appearance has been attributed to an admixture of the chyle with the blood. This appearance, however, has usually been met with in the serum of persons whose appetite has been impaired, and who have been subject to sickness and vomiting. HEWSON supposed this change of colour to arise from absorbed fat, and says that all the persons in whom he found the serum white were plethoric, and were relieved by blood-letting. If a person be bled soon after dinner, the serum appears milky.

The serum is in greater quantity in what has been called *sizy* than it is in healthy blood, and the greater quantity which makes its appearance when you examine a vessel containing such blood, arises from the strong contraction of the fibrin forcing all the serum out of the clot. In such blood, the coagulum is remarkable in its shape; in place of having a smooth, plane surface, its edges are inverted.

When serum collects in a preternatural quantity, either in the cellular texture, or in any of the serous cavities, as those of the pleura, pericardium, or peritoneum, it produces the disease called *dropsy*.

The Red  
Globules.

The red globules were supposed by Hunter to be an indication of physical strength; the stronger an animal was, the more red globules did its blood contain. Wild animals have a greater proportion of red globules in their blood than those which have been domesticated, and there is a curious difference

in the colour of certain muscles in the same animal, depending, no doubt, on the colour of the blood; this is particularly remarkable in the pectoral muscles of the black-cock, one set being much paler than the others.

The colour of the globules themselves varies in different vessels of the body, and there is a difference in the shade or intensity of the colour of the blood from the quantity of globules which it contains. There are also diversities of shade of red in the different systems of vessels. It is of a bright scarlet colour in the systemic arteries, and purple in the veins, and it is changed from the scarlet to the purple in passing from the ramifications of the aorta into the veins. Hence the variety in the shades of red, in different inflammations, arising from the differences in the proportion of the number of arteries and veins of the inflamed part.

Various  
colours of  
Blood.

When kept at rest, the blood in the arteries becomes of a dark colour, and in extravasations of arterial blood into cavities, if not exposed to the atmospheric air, it also assumes a dark colour.

Although blood is usually dark in the veins, it is not so under all circumstances. For when a large orifice has been made in a cutaneous vein, the blood which immediately follows the withdrawal of the lancet is black, and this is sometimes succeeded by blood of a florid scarlet colour.

The blood is also found of a florid colour in the veins of a part affected with common inflammation; and if the bandage used in phlebotomy has been kept some time on the arm, the blood which first flows from the orifice is very dark.

In diseases obstructing respiration, the blood is likewise of a very dark colour. This is the case during a fit of asthma. In diseases where the respiration is quick, as in phthisis, the blood is usually florid, and indeed, in inflammatory diseases generally, the blood is more than naturally florid.

The red globules are not distributed, like other parts of the blood, throughout the whole frame, as appears from the want of the red colour in certain parts of the body. In some diseases their number is increased, at least in particular parts, and this may alone depend on the change in the size of the containing vessels. When much blood has been taken from the body, the red globules are not so soon renewed as its other parts, hence the paleness which often exists for a long time after copious depletions.

The Men-  
strual  
Flux.

MR. BRANDE found, that the menstrual flux in its component parts resembles a very concentrated solution of colouring matter in a diluted serum.

Changes are also observed in the colour of the external or cutaneous bloodvessels in many diseases, which informs us that changes must have taken place in the sanguineous fluid. Observe the varieties of red in the colour of the lips and cheeks, in the eyes, and in the skin covering diseased parts. Observe the various shades of redness in the skin around different ulcers—changes which alone, in many instances, tell us the nature of the disease!

RICHERAND amputated the arm of a very old man, who for thirty years had an ulcer, which was connected with a varicose state of the veins of the limb; and the health of this individual was much

impaired. During the operation it was observed, that "the blood as it flowed from the arteries was much less red than that which was lost by a young man whose leg was removed on the same day. In fact the venous blood appeared as if dissolved, of a violet colour, or somewhat like that produced by log-wood. It did not coagulate like that of the young patient, but separated into a serous fluid, containing a few clots very little coloured."

The coagulable lymph, *gluten*, or *fibrin*, is that part of the blood which, as has already been mentioned, forms with the red globules the *crassamentum* or clot. The Co-  
agulable  
Lymph.

When the *crassamentum* is deprived of its red globules, which may be readily done by allowing a small stream of water to pass upon it, and by squeezing out the serum, what remains is the coagulable lymph. It is a white, tough, elastic mass, having a fibrous appearance, even in some instances apparently formed into *laminæ*.

This is the ingredient of the blood which renders it susceptible of coagulation, when removed from the living body, both in healthy and in certain diseased processes,—a change, which, whether we regard its rapidity, its degree, or its various modifications, forms an important diagnostic character in particular diseases. Mr. DOWLER, in his ingenious paper, observed, that when inflammation takes place accompanied with effusion, the first substance that escapes is serum,—but if the inflammatory action increases, *fibrin* is effused, and the inflammation still increasing, pus is then formed. Med. and  
Chirurg.  
Trans.

While the blood is in a fluid state, the coagulable

lymph cannot be separated from the serum, but in disease this separation often takes place. Hence coagulable lymph is effused on the surfaces of inflamed membranes, or into cavities, such as those of the pleura and peritoneum; whilst in other diseases, the serum is separated from the blood, and collected in cavities, forming the different dropsies.

The coagulable lymph is found in the greatest quantity in the blood of those afflicted with inflammatory affections of the fibrous textures, particularly in rheumatism.

There is a very considerable difference to be sometimes observed in the quantity of the coagulable lymph in blood taken in different cups from the same patient at the same bleeding. In some instances this difference has been observed nearly one-half. The coagulable lymph of healthy blood is more firm than that of sily blood.

The Buffy  
Coat.

Whilst the blood is coagulating, the process takes place so quickly in healthy blood, that the red globules are diffused throughout the whole of the crassamentum. But this is not the case in some diseases wherein the coagulation occurring more slowly, the red globules, from their greater specific gravity separating from the coagulable lymph, are found disentangled at the bottom of the vessel. In some cases the coagulation takes place when the red globules have scarcely reached below the surface of the crassamentum; and it is this portion, deprived of red globules, which forms what is called the "buffy coat."

The buffy coat or "inflammatory crust," as it is likewise called, is of very different degrees of thickness, and the time required for its production varies from a few minutes to upwards of half an hour.

The appearance of a buffy coat is generally considered as one of the most striking characters of the inflammatory diathesis. A buffy coat, however, is not to be deemed, either as a certain test of inflammation, nor is it a safe index of the propriety of blood-letting. Whilst inflammatory diseases are at their acme, there is often no appearance of the buffy coat in blood taken from a vein; but in the latter stage of inflammatory disease, and when blood can no longer with propriety be abstracted, the buffy coat becomes remarkable. In local inflammation, before the constitution appears much influenced, the blood which is drawn from the larger vessels of the inflamed part, has been found to form a buffy coat, whilst blood drawn from distant vessels does not show the same disposition.

Dr. TWEEDIE once saw the buffy coat in blood taken from the temporal artery of a person labouring under pneumonia, and the great prevalence of the buffy coat in diabetes first led Dr. WATT of Glasgow to treat that disease by frequent bleedings.

In the advanced stages of pregnancy, it has often been observed, that the blood has a peculiar disposition to form a buffy coat.

Dr. HAMILTON has observed, that blood drawn from the arm of the most delicate and debilitated individual, subjected to a course of mercury, exhibits the same buffy coat as blood drawn from a person labouring under pleurisy.

On the  
Use and  
Abuse of  
Mercury.  
Edinb.  
1826.

If a man in health be bled immediately after taking violent exercise, the blood shows a buffy coat.

The first part of the history of the world is the history of the human race. It is a story of struggle and progress, of triumph and defeat. It is a story of the human mind, of its power and its limitations. It is a story of the human heart, of its joys and its sorrows. It is a story of the human spirit, of its hopes and its dreams. It is a story of the human race, of its past and its future.

The second part of the history of the world is the history of the human mind. It is a story of the human intellect, of its power and its limitations. It is a story of the human soul, of its joys and its sorrows. It is a story of the human spirit, of its hopes and its dreams. It is a story of the human race, of its past and its future.

The third part of the history of the world is the history of the human heart. It is a story of the human emotions, of their power and their limitations. It is a story of the human soul, of its joys and its sorrows. It is a story of the human spirit, of its hopes and its dreams. It is a story of the human race, of its past and its future.

The fourth part of the history of the world is the history of the human spirit. It is a story of the human will, of its power and its limitations. It is a story of the human soul, of its joys and its sorrows. It is a story of the human spirit, of its hopes and its dreams. It is a story of the human race, of its past and its future.

The fifth part of the history of the world is the history of the human race. It is a story of the human body, of its power and its limitations. It is a story of the human soul, of its joys and its sorrows. It is a story of the human spirit, of its hopes and its dreams. It is a story of the human race, of its past and its future.

## DISCOURSE II.

## OF THE ABSTRACTION OF BLOOD.

*The Utility of Blood-letting.—Difference in the Effects of abstracting Arterial and Venous Blood.—Of a local Abstraction of Blood.—Effects of Incisions made in inflamed Parts.—Spontaneous Bleedings from Wounds.—Local Bleeding, when to be employed.*

Blood-letting has been employed in the treatment of diseases since an early period of the history of medicine. We are told that the Egyptian physicians were led to make use of it from a curious circumstance in the habits of the Hippopotamus. They observed that prodigious inhabitant of the Nile, on particular occasions, come out of the river and trample his gigantic feet against a sharp point of a broken reed, by which he lacerated the skin in order that a bleeding might ensue, and which he arrested after it had been sufficiently copious by plugging up the wound with mud! Historians also tell us of some savage tribes who, when they are afflicted with feverish disorders, are in the habit of lacerating their skins with the sharp edges of broken shells, so as to produce a flow of blood.

The phenomena of spontaneous hemorrhages—the signal relief which these natural discharges afford—and the serious mischief arising from their suppression, must however have laid the foundation of a rational system for the employment of blood-letting.

The abstraction of blood is usually employed as a remedial means, either for the purpose of diminishing the action of the heart and arteries in inflammatory diseases, or for the removal of a surplus quantity of that fluid, from particular organs wherein there is what has been called “plethora,” or a “congestion” of blood. A quantity of blood may also be abstracted in some diseases where its qualities have become changed ; but whatever explanation be given of the effects of blood-letting, there is no doubt of its beneficial results in the treatment of disease, whether the sanguineous fluid be removed by art, or by a “spontaneous hemorrhage.”

Differences of results in abstracting Arterial and Venous Blood.

Blood may be abstracted either from the *venous* or from the *arterial* system ; I am not however aware, that much attention has been paid to distinguish the difference of the effects which are produced by taking blood from an artery and from a vein, though it can readily be conceived that such difference may be considerable. The chief reason which is usually given for opening an artery in preference to a vein, is that the blood is obtained more directly from the particular part affected,—in larger quantity,—and more promptly, than it would be from opening a vein. But as the temporal artery is almost the only vessel on which arteriotomy has been performed, it must be admitted that we know little of the effects pro-

duced by abstracting arterial blood, except when taken from that vessel. The result of my own experience is unfavourable to arteriotomy; having generally found that the inflammatory symptoms recur much more frequently after a certain quantity of blood has been removed from an artery, than if an equal quantity had been taken from a vein; and I know that this coincides with the experience of others. There are, however, cases where the difficulty or even the impossibility of procuring the requisite quantity of blood from a vein, renders arteriotomy an important and even an indispensable operation for the abstraction of blood.

A little reflection on these two modes of Blood-letting, may to a certain degree explain how this difference of effect is produced.

When blood is abstracted from an artery, there is an immediate diminution in the supply of blood to the part nourished by that artery; but such is the vigour of the anastomosing branches, that the supply of blood which is thus cut off is very quickly restored. This is confirmed by observation. If one of the carotid arteries be tied, almost immediately the temporal and occipital branches of the carotid of the opposite side can be distinguished, through the integuments, dilating themselves, becoming tortuous, and struggling, as it were, to circulate an additional quantity of blood. I was first led to make this remark in the case of a child, on whose carotid artery I had placed a ligature for the cure of a large *nævus* on the cheek. Almost immediately after the operation, I observed the frontal, temporal and occipital arteries of the opposite side

How to be explained.

of the head enlarging, increasing in their action, becoming tortuous, and actively employed in supplying the place of those vessels whose channels had been obstructed. Indeed, it was a knowledge of this function of the anastomosing branches of arteries, when a trunk is obliterated, that led HUNTER to perform the "high operation," for popliteal aneurysm.

The same interesting phenomenon is exhibited in the eye. If an artery on the sclerotic conjunctiva, passing into a speck of the cornea, be cut through, vessels conveying red blood will be immediately perceived, stretching across the cornea from the opposite side, to supply the place of the vessel which had been divided.

Whenever the supply of blood to a part is diminished, the arterial system, by a wise provision of nature, makes an effort to throw blood by another channel to the part which has been deprived of its natural quantity of blood, and thus the action of the heart and arteries must be more or less increased; but the abstraction of blood from a vein is followed by no such increased action of the arterial system,—there is no local diminution in the supply of arterial blood,—no effort made by the arteries to supply the place of the venous blood which has been removed. On the contrary, a diminution in the supply of blood to the heart by the veins will, as I have just observed, have the effect of diminishing the vigour of the heart's action, and consequently that also of all the arterial system.

The effects of opening the temporal artery in puriform ophthalmia, well illustrate the differences between arterial and venous depletion in the treatment

of inflammation. An eye injected with red vessels, will be suddenly relieved by opening the temporal artery, and the conjunctiva will become quite pale, inducing us to suppose, that the inflammation is subdued. I have generally found, however, that sooner or later, even in a few hours, the inflammation returns ; and others have made the same remark : whereas, if a vein in the arm be opened, and blood taken to the full extent, the good effects of such depletion are permanent.

See Veitch  
on Oph-  
thalmia.

There is, therefore, a distinct and important difference between the changes which take place in the action of the vessels of a part, when blood has been taken from an artery or from a vein, and it explains the difference in the effects which I have always found when those two modes of abstracting blood have been employed.

It is also extremely probable, that there will be a variation produced according to the kind of blood which is taken away,—that the removal of a pint of arterial blood will produce a different effect on the system, from the removal of the same quantity of venous blood. What these differences are I cannot pretend to specify, but one proof that the abstraction of venous blood is the more useful in the cure of disease is, that in those natural or “spontaneous hemorrhages” which are so salutary, such as those from the nose and hemorrhoidal vessels, the blood which is discharged appears to be chiefly venous. Where leeches and cupping are had recourse to, they no doubt remove both arterial and venous blood at the same time ; so that the circumstances under which these operations are performed, do not

furnish us with any opportunity of discriminating between the comparative effects of the abstraction of venous and arterial blood.

Another point which ought to be borne in mind, when weighing the advantages of abstracting arterial and venous blood, is, that the temporal arteries as they pass over the zygoma of the temporal bone, can only be once opened at the proper point for the operation. For arteriotomy is not like venesection,—the wound made in the vein when united, leaves the canal of the vessel entire ; whereas when an artery is opened, it is requisite, after taking the necessary quantity of blood, to divide the vessel completely in order to allow it to retract, that the bleeding may be stopped ; for it is improper to attempt this by compression alone. The canal of the artery becomes, therefore, by the operation of arteriotomy, completely obliterated, and as the circulation is afterwards carried on by a greater or less number of enlarged anastomosing branches, neither the original trunk nor a branch of sufficient calibre will be found in the temporal region, on which the operation of arteriotomy can be repeated, should such a measure be ever deemed necessary.

Of the abstraction of blood locally.

There is no question which the practitioner has more frequently to ask himself, when treating particular cases of inflammatory disease, than whether, *general* or *local* bleeding ought to be employed. As far as I know, this most important question has not been explicitly answered, nor have such distinct rules been laid down by any author, as will serve to guide the young practitioner ; though the practice of different judicious men on this, as in most other

practical points, will be found nearly to correspond.

Now it appears to me, that there are certain indications which will, on all occasions, enable us to select, in the most decided manner, the one or the other of these modes of abstracting blood; but before endeavouring to point out what those indications are, it will be necessary to explain what is usually understood by *general* and *local* bleeding.

There are few parts of the body from which blood can be abstracted locally, strictly speaking; for blood taken by leeches, or by cupping from the integuments covering a diseased organ, must often come from vessels which are not ramifications of, and have no direct communication with, the vessels of the diseased organ,—the superficial and deep-seated vessels, both arteries and veins being, in most parts of the body, branches from other trunks. Thus, blood taken from any of the branches of the external carotid, as the temporal arteries, for the treatment of diseases of the head, cannot be considered as a local bleeding, from the distant and circuitous connexion which those vessels have with the internal carotids. Neither, for like reasons, can blood, taken from the parietes of the chest or abdomen, be considered as strictly a local bleeding in affections of the thoracic or abdominal viscera. The opening of a vein in the arm, abstracts blood more directly from the jugular veins, as well as from the superior and inferior cavæ, than leeching or cupping the integuments of the temples, forehead, or those of the thorax or abdomen. What, therefore, has usually been considered as general bleeding, is, a more local mode

Local  
bleeding,  
what.

of taking away blood for the treatment of the various affections of the brain and those of the thoracic and abdominal viscera, than that which is usually resorted to, and commonly considered as a local mode of blood-letting.

Where to  
be accom-  
plished.

Local, or "topical" bleeding, strictly so called, can, indeed, be only employed in a few organs, and in a few parts of the body. In the treatment of diseases within the cranium, topical bleeding can be accomplished by taking blood from the frontal vessels, or from the ethmoidal vessels, both of which come from the encephalon, and are branches of the internal carotid artery. It may be also taken from the vessels which pass through the mastoid foramen of the temporal bone, the veins communicating directly with the lateral sinus, and the artery being a branch of the occipital which goes to the dura mater.

See the  
plate.

Bleeding  
from the  
frontal  
vessels.

As the frontal artery is a ramification of the ophthalmic, and as the ophthalmic artery comes from the internal carotid, and passes through the orbit to reach the forehead, blood taken from that vessel must be a more local bleeding, strictly speaking, in diseases of the head and globe of the eye, than blood taken from the temporal artery, the temporal artery being a branch of the external carotid.

On this account, in diseases of the head, as well as in diseases of the eye, more particularly those affecting the internal parts of the globe, leeches applied on the frontal vessels, give much more relief than is obtained by abstracting an equal quantity of blood from the temporal vessels, by leeches applied on the temples.

Bleeding from the nose, or epistaxis, may be also considered strictly as a local bleeding in congestions of blood within the head. In such hemorrhages the blood comes from the ethmoidal vessels, which are branches of the internal carotids, passing through the cribriform plate of the ethmoid bone, and ramifying on the Schneiderian membrane. I have frequently known affections of the head, which, after resisting general bleeding, and the application of leeches on the head, were instantly relieved by the spontaneous escape of even a few drops of blood from the nose. The effect of losing a small quantity of blood locally, is, indeed, often surprising. Of this I might give some remarkable illustrations. An instance of the kind to which I allude, occurred in a lady, who, after employing local and general bleeding for a disorder in her head, applied to an itinerant doctor, celebrated for curing headaches. He introduced an instrument into the nose, by which he wounded the Schneiderian membrane, and produced a flow of blood; and the evacuation which followed, completely cured the headach. It was in a case of this kind that Galen is said to have acquired much renown, by successfully prognosticating that a patient would have a flow of blood from the nose, by which the affection of the head would be relieved.

I had often thought that some mode might be contrived, by which an artificial flow of blood from the ethmoidal vessels could be produced,—as there are, no doubt, many affections of the head which would be relieved by such an operation,—or that leeches might be safely applied to the interior of the nostril.

Bleeding  
from the  
ethmoidal  
vessels.

Case

by leeches.

- Case. A lady had long suffered from headaches ; I advised her to apply leeches within the nostril. One was accordingly applied on each side of the septum, and her headaches were completely relieved.
- Case. Another lady, after severe mental affliction, complained of uneasiness in the head, for which blood-letting was employed. She had frequent returns of the headache, and was always relieved by depletion, leeches being sometimes applied behind the ear, on the temples, or on the feet. On one occasion, when a sense of fullness continued in the frontal region, after trying the usual modes, I advised her to apply a couple of leeches to the nasal septum, and the bleeding had the happy effect of completely relieving her head. Subsequent to that period, she had occasional returns of headach, and she found that a small bleeding from the nose never failed to give a more decided relief than she had ever obtained from any other mode of blood-letting.

Case communicated to the Author. The practice of applying leeches within the nose is well exemplified in a patient who was under the care of Mr. MILLER of Enfield. "A gentleman, fifty-six years of age, had for several weeks complained of a sense of weight and pain, extending along the forehead, particularly in the region of the frontal sinuses ; purgatives, and leeches to both temples, were resorted to with little benefit, which led me to adopt the practice lately recommended by Mr. WARDROP, of withdrawing blood from the vessels of the Schneiderian membrane. I applied one leech within each nostril, which bled freely, and I had the satisfaction to find the patient, next day, completely cured."

I have now had frequent opportunities of testing the comparative advantages of the different modes of abstracting blood in affections of the head, and I am fully persuaded that the application of a small number of leeches, and these, on the lining membrane of the septum of the nose, is, in many cases, the most preferable mode of blood-letting, more particularly in those where the uneasiness in the head is limited to the frontal region ; and also in cases of chronic inflammation of the eye, and inflammatory affections of the lachrymal sac. In all such cases I have repeatedly recommended patients to apply the leeches alternately on the nasal septum, and on the part adjoining the inflamed organ, and to compare the effects of each ; the result of this has almost invariably been, that they have given a decided preference to the abstraction of blood from the nose.

Utility of  
the prac-  
tice.

Leeches applied behind the ears are well known to relieve affections of the head ; a practical fact, satisfactorily accounted for by that vascular communication between the integuments behind the ear and the encephalon, to which I have already alluded.

Bleeding  
from the  
posterior  
auricular  
vessels.

Immediately behind the mastoid process, and near where the temporal and parietal bones unite, is situated the mastoid foramen, through which passes sometimes an artery, and always a large vein. The artery is a branch of the occipital, and goes to the dura mater, and the vein comes directly from the lateral sinus. It is, therefore, easy to explain how substantial relief should be obtained, in those affections of the encephalon where depletion is necessary, by the application of leeches behind the ears. I

have employed this mode of bleeding very extensively, and I am satisfied that blood abstracted from these vessels is a most important mode of depletion, as well as blood-letting from the ethmoidal arteries, which I have also recommended in those affections of the head where such a system of treatment is proper.

Case.

A gentleman had complained of an uneasy feeling throughout the posterior part of the head, for which he had used a variety of opening and other medicines, during upwards of three weeks. I advised him to apply two leeches behind one ear. They bled profusely, and when I saw him the following day, he expressed his surprize at the complete relief so few leeches had afforded, and he remained permanently well.

Scarifying  
the Eye-  
lids.

Scarifying the palpebral conjunctiva, in the treatment of some forms of Ophthalmia, is also a means of abstracting blood locally, the good effects of which, after other modes of depletion have been unsuccessfully employed, are very striking ; leeches have also been used for a similar purpose.

Leeches applied to inflamed gums give great relief, and so also do leeches applied to the mucous membrane of the vagina in cases of inflammation of the uterine organs.

Bleeding in the jugular veins is likewise a most useful mode of abstracting blood in affections of the head, particularly in children, where leeches applied to the neck are often dangerous, from the difficulty of controuling the bleeding, and where the veins of the arm cannot be easily opened.

I formerly had occasion to remark, that the most powerful means we possess for the treatment of

diseases, produced their good effects by imitating the processes which nature herself employs. In no class of cases is the *vis medicatrix naturæ* more admirably exemplified, nor the propriety of local bleeding more distinctly pointed out, than in the benefit derivable from "spontaneous hemorrhages." Indeed, as I have already said, it is extremely probable that artificial blood-letting was first suggested for the cure of diseases, by the beneficial effects observed to follow from spontaneous hemorrhages.

The effects of local bleeding from the hemorrhoidal vessels is exemplified in the spontaneous hemorrhages from *hemorrhoidal tumours*, many persons being in the habit of losing, and that sometimes too at regular periods, a considerable quantity of blood from those tumours,—a circumstance which seldom fails to relieve some disturbance of the general health arising from congestion in the portal system. Hence the benefit of promoting such a discharge in those who may have been habituated to it, and the dangerous consequences which its suppression has been so often known to produce: it also points out the propriety of local bleeding either when the hemorrhage is not sufficient to remove the symptoms of congestion, or when such symptoms come on, and are not followed by the spontaneous evacuation of blood.

Bleeding  
from the  
hemor-  
rhoidal  
vessels.

Blood is sometimes discharged by the bursting of a varicose vein, which hemorrhage is always efficacious in relieving internal diseases; and PETIT and others have recorded cases where it has taken place to an enormous extent.

From vari-  
cose veins.

Even in *malignant diseases*, such as cancer and

From Malignant tumours. fungus hæmatodes, the occasional hemorrhage to which such tumours are liable, though it may be sometimes too profuse, yet often has a salutary effect, and relieves the fulness of the vessels, and the pain which frequently accompany these diseases. Hence the decided benefit which I have often found from the occasional application of leeches adjacent to schirrus tumours when there was much pain or tension.

From Sloughing ulcers. The same extraordinary relief may be also observed from those hemorrhages which so frequently occur in *sloughing ulcers*, the discharge of blood subduing that violent inflammation which led to the sloughing of the soft parts. It was by observing the effect of hemorrhages in ulcers of this description which first led me to adopt what I have since found a most useful practice in sloughing sores,—that of abstracting blood, not only in order to arrest the local bleeding but to subdue that inflammatory condition of the system which leads to the sloughing process.

Bleeding from Incisions in inflamed parts. The beneficial effects of local bleeding may also be observed when it becomes necessary to make an incision into an inflamed part. It is by no means uncommon to find, that extraordinary relief is produced by the escape of blood from an incision made through the inflamed integuments covering an abscess, and that too under circumstances where the accompanying symptoms would not have indicated the propriety of abstracting blood in any other way.

Case. A remarkable illustration of the good effects of a local bleeding of this description I witnessed in

a medical student who was under the care of Mr. LAWRENCE and Mr. EARLE, and who had a most extensive and severe inflammation of the hand and arm, arising from a poisoned wound of the finger, received when opening a putrid body. He had been bled copiously, until the pulse had completely sunk; but still there was so much swelling, redness and pain, in the arm, that Mr. LAWRENCE was led to adopt a treatment first proposed, and strenuously advocated by Mr. HUTCHINSON in erysipelas. The practice consists in making deep and extensive incisions through the inflamed integuments. This was done in the above case, and several pounds of blood were discharged from the wounds, which in place of weakening the patient, as might have been expected, was followed by rapid abatement of all the severe symptoms, and certainly seemed to be the means of saving life.

See his  
Surgical  
Observations.

The common practice of laying open sinuses while the adjacent parts are in a state of inflammation, owes its good effects entirely to the profuse bleeding which generally follows the incisions.

Similar relief may be observed from the flow of blood which takes place when free incisions are made through the inflamed integuments of a finger affected with whitlow, and by dividing the gums during dentition.

Independent of this relief from the bleeding of incisions, why should we not anticipate as much from the discharge of the serum, or sero-coagulable effusion, which takes place, into the cellular tissue of an inflamed part, as from the discharge of the effusion

Same.

when it has become purulent ? It seems to me a point well worthy of consideration, to determine whether or not in phlegmonous cases it would not be much more advantageous, where there is no rational expectation of preventing suppuration, to make a free incision through the inflamed skin at an early period, and before any pus has been formed. The evacuation of the sero-coagulable fluid effused in the cellular tissue, and deposited there previous to its conversion into a purulent fluid, along with the profuse discharge of blood from an incision made in the integument, would not only produce great relief from pain, but would limit and check the future progress of the inflammation.

Case.

A girl, about ten years of age, had a large inflammatory swelling on the ulnar aspect of the arm, which was extremely hard and painful to the touch, and the integuments were of a bright-scarlet colour. Though I could not distinguish any fluctuation, I was persuaded that by freely dividing the skin, she must be saved a protracted suffering. I therefore made a free incision through the middle of the tumour. It bled most profusely, and I could not detect the escape of any purulent fluid with the blood. A poultice was applied, the inflammation and pain were almost immediately subdued, and the wound granulated and healed quickly.

Secondary  
Bleedings  
from  
Wounds.

In many cases I have witnessed beneficial effects from the local bleeding which often takes place after operations and wounds, though to avert or arrest which care is usually, though injudiciously, taken. I have often had occasion to point out the good effects of the loss of even very considera-

ble quantities of blood during operations in preventing subsequent febrile symptoms and local inflammations. But it may be here noticed, that whatever quantity has been lost during an operation—however carefully the patient has been prepared before the operation—however attentive the surgeon may have been in securing with a ligature every bleeding vessel, yet, more or less, inflammatory action, accompanied by fever, may supervene, and a hemorrhage from the wound take place. Under such circumstances, little need be feared from the bleeding; and, before placing a ligature on any bleeding vessel, it will be wise either to have the wound exposed, and to allow a sufficient oozing in order to check the inflammation and the accompanying febrile symptoms, or even to take some blood from a vein in the arm for the same purpose. On one Case. occasion I removed the greater portion of the lower jaw of a young woman, and she was so deluged in blood that bystanders conceived her recovery to be almost impossible. She remained many hours in a state of syncope; and I avoided giving her any stimulants, in the hope that the fearful wound would be more likely to heal by adhesion. But notwithstanding all precautions, in a few days she became feverish, and blood issued from a corner of the wound. I used no means to arrest it, and it stopped after a few ounces were discharged, completely alleviating all the inflammatory symptoms.

Whenever, therefore, there is any chance of bleeding from a wound, it is of great importance not to be too hasty in applying plasters and bandages, so that if any hemorrhage subsequently take place, all the

pain and alarm of undressing the wound are avoided, and the bleeding vessel can be easily secured.

Local  
Bleedings,  
when to be  
employed.

The observations which have been made are sufficient to point out the advantages to be derived from local bleeding, strictly so called. In the treatment of those diseases wherein blood-letting is to be employed, it is of great consequence to have some rules to enable us on all occasions to decide whether to make choice of a local or of general blood-letting. Now, it is an excellent rule, and one which I will venture to say will seldom lead to error, always to employ general in preference to local blood-letting, in such cases of local disease or injury as are accompanied with, or have created, a disturbance of the general system. Whereas local bleeding, ought to be employed in preference to general bleeding, when only local symptoms exist, or when only local symptoms remain, after the general symptoms have been subdued by previous general blood-letting. A person, for instance, receives a blow upon the head, which creates symptomatic fever. He is bled more or less profusely at the arm, until the febrile symptoms are subdued. A good deal of inflammation of the integuments, however, still continues ; but, to remove which, leeches ought to be applied. The same observation may be made in the treatment of almost every disease as well as injury for which bleeding is necessary ; and perhaps the most frequent error which is committed in the treatment of those diseases which require blood-letting, is, that local bleeding is employed where general bleeding, or venesection, ought to have been substituted. It is seldom that the reverse practice

has been adopted, or that a patient has been copiously bled at the arm, in place of having lost blood by leeches or by cupping. There seems always to be a disposition, in patients as well as in medical men, to economise blood, venesection being commonly considered a more serious operation than cupping, or the application of leeches ; and hence the latter, is generally, though often injudiciously preferred. In many instances of persons who have repeatedly lost blood during an attack of illness, an error has been committed by commencing with local, in place of general, bleeding, the consequence of which is, that the disease is not so soon checked as if a copious general bleeding had been employed in the first instance. Moreover, by the necessity of resorting to a frequent repetition of local or general bleeding, the whole quantity abstracted for the cure of a disease greatly exceeds what would have been required had the treatment commenced with one adequate venesection.

The first part of the book is devoted to a general history of the United States from its discovery to the present time. It is divided into three volumes. The first volume contains the history of the discovery and settlement of the continent, and the establishment of the first colonies. The second volume contains the history of the American Revolution, and the formation of the Constitution. The third volume contains the history of the United States from the adoption of the Constitution to the present time.

The second part of the book is devoted to a general history of the world from its discovery to the present time. It is divided into three volumes. The first volume contains the history of the discovery and settlement of the world, and the establishment of the first colonies. The second volume contains the history of the world from the discovery of America to the present time. The third volume contains the history of the world from the present time to the future.

### DISCOURSE III.

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*General Blood-letting,—Indications for employing it.—Of the Pulse ;—An incompressible Pulse ;—Other Changes in the Pulse ;—Natural Varieties of the Pulse.—Changes in the Heart's Action ;—The Local Pain.—Importance of the first Bleeding ;—Extent to which it ought to be carried.—Effects of Syncope.—Quantity of Blood to be abstracted.*

Having endeavoured to point out the different modes by which blood may be abstracted *locally*, and having also illustrated the salutary effects of local depletion by references to the phenomena of spontaneous hemorrhages,—various local inflammations, and congestions of blood, when they are not accompanied by any constitutional disturbance, we now come to the consideration of the subject of *general* blood-letting, the indications which point out the propriety of employing it, and the quantity of blood which should be removed in the treatment of various diseases.

It was remarked in the last discourse, that whenever any local disease or injury has excited a febrile disturbance throughout the system, general blood-letting or venesection ought to be decidedly preferred to local bleeding, and the indications to which our attention ought to be more especially directed in deciding on the propriety of general blood-letting, are, the state of the heart and arteries, and the character of the local pain.

Qualities  
of the  
Pulse.

The leading symptom by which the constitutional disturbance demanding venesection is indicated, will be found in the *quality of the pulse*; and, in deciding on the propriety of blood-letting, it is not always necessary that we should find the pulse frequent, or tense, or full, or hard, but to be on all occasions satisfied of the propriety of abstracting blood from a vein, whenever, in any complaint of an inflammatory type, or under circumstances such as those which often arise after operations, or from accidents, there is the least deviation in the pulse from the natural standard. No sooner have a few ounces of blood been abstracted in such cases, than the pulse will be observed to "rise," as it is called, and to acquire volume and power; thus indicating the propriety of the measure.

How these  
are varied.

There is nothing more uncertain than trusting to the qualities of the pulse which are usually described as those which alone indicate the propriety of blood-letting; and we ought ever to be aware of the important fact, that, during an attack of inflammation, the pulse varies according to the organ which is affected, and is even different in inflammatory affec-

tions of different textures of the same organ,—except in one particular character, which shall be presently pointed out.

The mere increase in the *frequency* of the pulse is a circumstance of little importance in estimating the propriety of blood-letting, compared with certain changes in its qualities; and, therefore, the usual practice of counting merely the number of pulsations, is apt to lead to an erroneous conclusion. In two patients, in each of whom the pulse beats 120 in a minute, the one may require to be plentifully bled, whilst the other ought to have cordials!

Little difficulty occurs in distinguishing those states of the system which require general bleeding when diseases have made considerable progress, and when their symptoms and character have become distinctly developed. It is before they arrive at this period, and when medical treatment is most available, that their true nature is apt to escape detection, and there are many states of disease where substantial advantage is to be derived from venesection, but where, at the same time, it could not, perhaps, be affirmed, from the presence of any particular symptom, that inflammation did actually exist. “Inflammation in some textures of the body,” observes an intelligent writer, “is so obscure in the beginning, so insidious in its progress, and so rapid in its termination, that in all cases in which the surgeon hesitates respecting the necessity of bleeding, it is a wise plan not to deprive the patient of the benefit of the doubt, but immediately to proceed to venesection.”

Frequency  
of the  
Pulse.

See Mr.  
Bonnar's  
paper in  
the Edinb.  
Med. and  
Ch. Journ.  
1824.

It is certain that there is a period of disease,

when bleeding is not only unnecessary but improper ; and there is likewise a moment when venesection may be had recourse to with more advantage than at any other. To detect this precise period must, therefore, be of great practical importance. In those who have been wounded, or who have met with a severe accident, or on whom an operation has been performed,—in all such cases the action of the heart and arteries, which is at first diminished by the general shock received by the whole system, should be allowed to recover, or reaction should take place before resorting to blood-letting ; and this rule applies generally to all inflammatory diseases. The chill, for instance, which a person receives from the sudden exposure to a change of temperature, and which lays the foundation of an inflammation in some of the internal viscera, produces a collapse of the whole frame, which is not followed, until after a certain period, by those inflammatory symptoms which require blood-letting.

An In-  
compressible  
Pulse.

The peculiar feeling in the pulse to which I have alluded, and which points out, almost universally, the propriety of venesection, is sufficiently well indicated, by the term "incompressibility." An incompressible state of the pulse may, I venture to say, be considered as pathognomic of inflammation, in whatever organ or texture that inflammation exist. I have already remarked, that each of the different textures of an organ, when inflamed, is attended with some peculiarity of the pulse. Inflammation of the dura mater,—of the cerebral pulp,—of the pleura,—of the mucous membrane of the bronchi,—of the pericardium,—of the muscular parietes of the

heart,—of the serous membrane which lines its cavities,—of the peritoneal and mucous coats of the intestinal canal,—are each accompanied by peculiarities of pulse; but in all we can detect an incompressibility. For whether the pulse be full or small, hard or soft, frequent or slow, if with the point of one finger the artery be pressed at the wrist, we shall perceive with another finger applied to the artery beyond, and at the distal side of the first finger, that unless a very considerable degree of pressure be employed, the pulsation of the radial artery will not be entirely destroyed, but the sensation, as if of a fine thread, or hair, will remain.

This incompressible state of the pulse indicative of the propriety of blood-letting, is illustrated in some of the subsequent cases; and we may often observe instances of persons being relieved from internal disease by profuse and spontaneous hemorrhage, and in whom no deviation in the pulse, from its natural state, could be detected, except as regards this feeling of incompressibility.

Is an indication for general blood-letting.

Attention to this quality of pulse I can with confidence assert has scarcely ever failed to guide me, in the use of phlebotomy, even in otherwise doubtful circumstances; and a conviction of the accuracy of the observation has led me to adopt bleeding in many cases, where I could not otherwise have ventured to employ it, and where there were not present any of the ordinary indications of inflammatory action. It was this state of pulse which first pointed out to me the propriety of employing venesection in erysipelas,—in cases of sloughing ulcers,—in exanthematous fevers,—in cases of poisoned wounds,—

in specific diseases,—and in certain stages of several other affections afterwards to be noticed, and where an opposite practice is frequently, nay usually, followed.

In most of the diseases which have now been alluded to, by a superficial examination of the pulse, an impression is generally received that there is a feeble state of the system, and hence, in place of a depletive or antiphlogistic mode of treatment, wine, bark, and stimulating remedies, have been employed. But we can be readily satisfied of the results of these two very opposite modes of treatment in some of those diseases, by observing the practice in the different hospitals of this city, where patients, afflicted with similar ailments, are bled profusely by one practitioner, and by another, get as much bark and wine as their stomachs can receive.

Indicated  
also by  
other  
qualities  
of the  
pulse.

Though I have never observed an incompressible state of the pulse, without having found venesection to be an expedient measure, yet there are other qualities perceptible in the pulse which also indicate the propriety of blood-letting. A hard pulse,—a firm pulse,—a full pulse,—a wiry pulse,—an oppressed pulse, all, in their turn, either taken singly, or combined with other symptoms, more particularly local pain, hot skin, and white tongue, point out the propriety of employing venesection.

Natural  
Varieties  
of the  
Pulse.

No power of discrimination requires more attention and experience than such a knowledge of the pulse as enables us to distinguish its various peculiarities, both in health and in disease. This knowledge entirely depends on the exercise and improvement of the sense of touch. Like that of sight and

hearing, the sense of touch differs exceedingly in acuteness in different persons, but in all it is capable of improvement. We must not expect at first to be able to distinguish these nicer differences in pulses which are palpable to an experienced finger, any more than we could expect at once to be able to perceive the slighter varieties in the shades of colour, so easily discernible by a skilful painter. All the senses require tuition. We ought to practise, by feeling a number of different pulses, both of people in health, and of those with disease, one after another; and by first observing strong contrasts, we ultimately become familiar with lesser differences in the pulse, all of which essentially assist in pointing out particular states of the vascular system.

Know-  
ledge of,  
how ac-  
quired.

Thus we shall learn that there is a great variety in the pulse of different persons in health,—in the number of beats at the different periods of life, and at different hours of the day,—that there is frequently a difference in the pulse of the two arms of the same person,—and, moreover, that the pulsations of the heart and arteries do not always correspond. The pulse, too, is usually found more frequent in women than in men; and in the morning it is slower than in the latter part of the day, its quickness being increased by the various bodily and mental stimuli. To all these differences attention ought to be directed, as points of great practical utility; and some men of observation acquire more perfectly than others the tact of acutely discriminating the varieties in the pulse, and of perceiving its varied changes, whether arising from disease, or from accidental temporary causes.

Causes of  
different  
pulses.

MAGENDIE has given the following scale of the pulse, showing the difference in frequency between that of the infant and the aged,—the quickness of the pulse gradually diminishing with our years.

At birth the pulse is 130 to 140 in a Minute.

One year . . . 120 — 130

Two years . . . 102 — 110

Three years . . . 90 — 100

Seven years . . . 85 — 90

Fourteen years . . . 80 — 85

Adult age . . . 75 — 80

First old age . . . 65 — 75

Confirmed old age. . . 60 — 65

Changes  
in the Ac-  
tion of the  
Heart.

Besides the presence of fever, local pain, and the state of the pulse, changes of the heart's action are important indications, in the use of bleeding, on which sufficient attention has not been generally bestowed.

The pulsations of the arteries and those of the *heart* will be often found not to correspond. I do not mean as to their number, but in their strength and other sensible qualities; and I may venture to assert, that generally in those cases where the pulse at the wrist is contracted and difficult to compress, the heart will be found to beat with increased vigour. Hence this vigorous action of the heart may be regarded as a useful guide in the employment of blood-letting, and when taken into account along with the incompressible state of the pulse, will afford additional confidence in deciding on a depletive system of treatment.

A knowledge of the heart's action can only be acquired, like that of the pulse, by an accurate ex-

amination of it in a number of healthy individuals, as well as those under the influence of disease; and we ought to make ourselves as familiar with all the peculiarities of the actions of the heart as with those of the pulse.

A young lady, who had all the symptoms of cerebral inflammation, for which leeches had been applied to the head, still complained of head-ache, with great depression, hot skin, and other symptoms of fever. Her pulse was small and incompressible though not frequent, and on examining the heart, to which I called the attention of the practitioner in attendance, he was surprised to find its action very tumultuous. Venesection was now employed, and whilst the blood flowed the pulse became more voluminous, and the heart's impulse was subdued. Syncope ensued after a few ounces of blood were abstracted, and the patient recovered without any further depletion. Case.

A lady, in a state of pregnancy, had been greatly debilitated, having vomited every kind of food and drink which she had taken for upwards of twenty days. I saw her at this period. She was emaciated and so feeble that her recovery was, by those around her, considered hopeless. She had a distinct tenderness on pressure in the epigastrium, and her pulse, which gave at first the impression of great languor, on more minute examination was very contracted, feeling like a thread, and incompressible, whilst the heart's action was vigorous. Case.

This state of the vascular system assured me that I should afford her relief by blood-letting, which was immediately resorted to, though with hesitation

by other medical attendants. No sooner had a few ounces of blood flowed from the vein than the pulse began to rise and acquire volume, and upwards of twenty ounces were abstracted before its vigour was subdued. The effect of this treatment was,—that with very small doses of the sulphate of magnesia, repeated at short intervals, the stomach no longer rejected food,—the alimentary canal was unloaded,—the patient's recovery was progressive, and she was delivered of a healthy child at the proper period.

The Local  
Pain.

In almost every case where venesection is necessary, there is present, along with the disturbed action of the arterial system, some local pain, more or less severe. The degree of pain, whatever organ the inflammation may affect, is not however to be considered as a measure of the violence of the accompanying inflammation. On the contrary, persons often suffer severe agony when there is but slight inflammatory action; whereas, when the inflammation has arrived at its acme, the local pain often diminishes in intensity and becomes dull and obtuse.

Whilst it is expedient to have recourse to blood-letting when there is a fixed and unceasing pain, increased by pressure, and accompanied by an alteration in the pulse and in the impulse of the heart, it is of great importance to be aware, that though the local pain is usually alleviated, and the action of the vascular system subdued, by venesection, yet bleeding whether local or general must not be continued, or repeated, as long as the local pain exists. On the contrary, when all febrile excite-

ment has been subdued by blood-letting, the pain which continues may be alleviated by a blister or by opiates, either taken singly, or combined with calomel or antimony.

A gentleman complained of an acute and un-  
ceasing pain in the head accompanied with febrile Case.  
symptoms, for which he had been copiously bled both by cupping and venesection, and the alimentary canal had also been freely evacuated. The pain in the head continuing along with much general inquietude, I was consulted. The pulse was now frequent, very easily compressed, and feeble,—the skin moist and the tongue of a milky white,—he complained of considerable pain throughout the head, great restlessness and no disposition to sleep. I recommended him to take two grains of crude opium, and one grain every hour afterwards until he should be relieved. The first dose of the opium was soon followed by tranquillity, and after a second dose he fell asleep, awaking with the pain in the head and general restlessness quite subdued.

A lady was attacked with severe pains affecting Case.  
the muscular parietes of the chest and abdomen, which had been occasioned by a sudden chill; leeches, cupping, a variety of sudorific and purgative medicines,—calomel and opium, colchicum and blisters, had all been used with only temporary relief, and, after the lapse of some weeks from the commencement of her illness I visited her. The pains in the muscles covering the posterior part of the chest were now excruciating on the least attempt at motion, the pulse was soft and frequent, the urine and alvine evacuations were

natural—the skin was moist, the tongue considerably discoloured, the appetite was not much impaired. It appeared to me that no further benefit would be derived from more depletion, and two grains of crude opium with an equal quantity of the antimonial powder were given at bed time. This had the effect of producing a calm, refreshing sleep, and the medicine was continued for some nights, causing a gradual alleviation of the pain and a rapid restoration of the general system.

Import-  
ance of the  
First  
Bleeding.

There is no maxim of the practical correctness and importance of which I am more fully convinced than that the loss of a certain quantity of blood at the *first bleeding*, is of greater utility in stopping the progress of inflammatory diseases when general bleeding is required, than the abstraction even of a much larger quantity of blood by several successive bleedings. I wish to be understood that, in place of taking a quantity of blood, say sixty ounces, at three successive bleedings of twenty ounces each,—performed within thirty-six hours,—an infinitely greater degree of relief will be derived from taking two-thirds of that quantity at one bleeding. Not only will the progress of the disease be thus more quickly and decidedly checked, but the patient will be saved the loss of twenty ounces of blood.

The good effect of abstracting so large a quantity of blood at the first bleeding might be expected, without adopting any preconceived opinion or theory on the subject; for, as we have been taught by experience, that the great benefit of abstracting blood is derived from the sudden change which such depletion produces on the action of the heart and

arteries, it is evident that such change must be effected in a more decided manner by abstracting a quantity of blood at one bleeding suddenly, than by taking away an equal quantity slowly, and at more or less distant intervals.

In almost all cases where bleeding is employed, there is a disposition on the part both of the patient and bystanders, and often too of the medical attendant, to be as sparing as possible in the evacuation of blood; whereas in the generality of cases an effort, I am convinced, should be made rather to take away as much as the patient can bear, and not to desist until there be rational grounds to expect that a second bleeding will not be necessary.

A useful general guide for judging of the quantity of blood to be abstracted, will be found in the change produced in the action of the heart and arteries. The effect, however, of the abstraction of blood in relieving local pain, whilst the blood is flowing from a vein, is not to be entirely disregarded, though the only unerring criterion, as far as I have been ever able to discriminate, is that of the change produced in the *pulse*. That change in the pulse which marks the propriety of not carrying bleeding any further, is the absence of the "incompressibility" which has been already mentioned. This state of the pulse, however, does not usually subside until fainting or syncope supervene, in which case the pulse ought to be carefully watched after the fainting goes off, when it will be sometimes found that the sensation of incompressibility soon returns. If this takes place, more blood ought to be immediately drawn,

Quantity  
of Blood  
to be ab-  
stracted.

To be re-  
gulated by  
the pulse.

and its abstraction persisted in, until the peculiar feeling of incompressibility is entirely subdued.

Case.

A young athletic officer complained of an intense pain in the head accompanied with such depression that he could with difficulty remain in the erect posture. His pulse was not much altered, but there was a degree of incompressibility in it which pointed out to me the propriety of venesection. Upwards of forty ounces of blood were abstracted before syncope came on. When I visited him two hours afterwards, I found that he had recovered from the state of fainting, but a degree of incompressibility of the pulse still existed. The bandage on the arm was reapplied, and upwards of twenty ounces more blood were abstracted before the fainting state returned. These bleedings were followed by a complete relief of the pain in the head, and after the free use of purgatives, calomel, and antimony, he permanently recovered.

When a large quantity of blood is not taken away at the first bleeding, or at a second depletion quickly succeeding, I have generally found that on all future occasions it is seldom practicable to abstract any considerable quantity, howsoever necessary it may appear; and thus it is, that when copious bleedings are not employed at the commencement of the treatment of inflammatory diseases and if the patient afterwards recover, it has generally been from the employment of a great number of small bleedings.

Case.

A young lady at the commencement of an attack of peritonitis, had been three times bled in small

quantities, and local as well as general bleedings were afterwards repeated whenever pain and febrile symptoms recurred; these were carried, on each occasion, as far as the pulse could bear, and always with relief. Yet she was bled, locally and generally no less than seventeen times, before the progress of the disease was altogether arrested. I have long been of opinion, that it is only those cases where bleeding has been too sparingly used at first, wherein it is ever necessary to carry depletion to a great extent: and moreover it is only such cases wherein the pernicious effects of bleeding are exemplified.

It may also be mentioned that the decided and remarkable advantages to be obtained from the first bleeding, are strikingly illustrated by the practice of many intelligent veterinarians, and I had at an early period of my life, frequent opportunities of observing the treatment of the inflammatory diseases of domestic animals, from which I obtained much confidence in applying similar rules of practice in the treatment of the diseases of the human body.

It has been laid down as a common rule for the treatment of inflammatory diseases, that blood should be abstracted until *syncope* is produced; by which we might be led to suppose that the fainting was either a certain token of the quantity of blood that should be taken away, or that it was the act of *syncope* itself, and not the loss of blood, which was to cure the disease.

Effects of  
Syncope.

Hence we often hear of persons being bled until they fainted, as a proof of the vigour of the prac-

tice which had been employed, without considering whether the fainting had been produced by excessive depletion, or from the particular position of the patient whilst the operation was performed. Suppose two individuals similarly affected, and in every respect in the same state, one of whom is bled in the erect posture until he faints, whereas the other faints from the loss of blood whilst he is recumbent. In the first patient the syncope will probably be produced by losing one-half of the quantity necessary to be removed before the second patient falls into a state of syncope.

Syncope  
an uncer-  
tain guide.

In having recourse to venesection it is, therefore, important to consider whether the purpose of the operation be to abstract a certain quantity of blood from the system, or merely to produce syncope. When it is desirable to make a person faint with the loss of as little blood as possible, as, for instance, for facilitating the reduction of a strangulated hernia, or dislocated bone—then venesection ought to be performed in the erect posture. But for the abstraction of a certain quantity of the sanguineous fluid, in the treatment of diseases requiring depletion, fainting ought not to be considered as an index of the quantity of blood proper to be withdrawn; but the usual means should be taken to avert its occurrence, except when the patient is in a recumbent posture at the time the venesection is performed. Indeed when employing blood-letting for the cure of inflammatory diseases, we ought to be particularly cautioned against placing too much confidence in the idea that, if we have bled a patient *ad deliquium*, we have carried the bleeding

to its full and necessary extent. On the contrary, when, in any case, syncope has followed the abstraction of an unusually small quantity of blood while the patient was in a recumbent position, then we ought, in one or two hours, again to examine the patient, when probably it will be found that the action of the vascular system has renewed its vigour, and the inflammatory symptoms continue, so that if blood be again allowed to flow from the vein, a very copious bleeding will sometimes be requisite to reduce the pulse.

This "premature" state of syncope, as it may be designated, not only arises from the patient's being bled in the erect posture, but is sometimes the effect of a moral influence, and, therefore, when under such circumstances the fainting state goes off, the inflammatory symptoms may soon reappear.

A gentleman was seized with severe pains in the bowels, accompanied by a good deal of tenderness on slight pressure, along with some degree of febrile excitement. On opening a vein in the arm, only a few ounces of blood were removed, when the pulse sunk and he fainted. I visited him about two hours afterwards, and having recovered from the state of fainting, but not having experienced any relief, I again applied the bandage on his arm. Blood flowed freely from the wounded vein, and he did not fall again into a state of syncope, until he had lost about thirty ounces of blood; and this, along with purgatives, was followed with permanent relief.

It is not unusual, particularly in this metropolis, for medical men to give to others instructions to

Quantity  
of Blood  
to be ab-  
stracted.

take a certain quantity of blood from a patient, with the same degree of confidence as they would prescribe a particular dose of some drug. Nothing can be more absurd in principle, and more injurious to the sick, than such a custom. The only indication to direct us in measuring the quantity of blood which ought to be abstracted in individual cases, is the change produced both on the pulse, and in the local pain experienced during the operation. We ought, therefore, never to hazard any preconceived opinion of the quantity of blood which it may be necessary to remove in any particular patient, but sedulously to watch the effects of the evacuation whilst it is proceeding.

How to be regulated.

It often happens, that a pulse in which little deviation from the natural state can be detected, and which deviation, considered singly, might not particularly indicate the necessity of bleeding, begins to rise, and to acquire vigour after a certain quantity of blood has been lost, its force not being subdued until a large quantity, and a quantity much greater than could have possibly been anticipated, is removed. On the other hand, we frequently meet with examples of diseases where the very reverse happens, and where a person, apparently of a full habit, with a strong elastic pulse, becomes quite depressed after losing but a very small quantity of blood. It is, indeed, with bleeding as with purging,—some persons not appearing to be lowered even by the most active purge, while others are greatly depressed, and the whole system apparently deranged, by the operation of a brisk purgative.

It is singular how small a quantity of blood some

persons can lose; even the very impression on the mind that blood is to be abstracted causes sickness, and fainting comes on after a few ounces of blood have been removed. In such cases, however small be the quantity which is evacuated, there is often a decided relief—the syncope sometimes causing even a permanent subsidence of inflammatory symptoms.

If the observations which I have made be correct, surely no one should pretend to specify beforehand the precise quantity of blood which any patient requires to lose. How little, therefore, must that practitioner consider the well-being of the sick, who, instead of performing the operation himself or witnessing its effects, ventures to *prescribe* the loss of any particular quantity of blood! Such conduct calls for the severest animadversion. And if the report be true, that practitioners have allowed their patients to remain several hours in a state of great suffering or even in a fit of apoplexy, rather than themselves perform the operation of venesection, it is only surprising that the legislature has not interfered,—just as the law punishes those whose want of skill or whose neglect is the cause of injury to persons who are placed under their care.

In forming an opinion of the probable extent to which bleeding should be carried in different instances, we ought to be aware that, in general, fat people can lose much less blood than lean persons, and large and robust individuals do not require the same extent of depletion in inflammatory diseases, as those who are thin and appear to be more delicate. So it is with respect to age, the young and

Necessity  
of watch-  
ing the ef-  
fects of  
Blood-  
letting.

plethoric often bear much less bleeding than the old and thin.

To prevent, therefore, being guided by any pre-conceived notions on this point, I am always in the habit of letting the blood flow into a large basin, and, allowing no other circumstances to influence me in estimating the quantity to be removed, than the abatement of the local pain, and the changes in the action of the heart and pulse, to which I have already alluded. With these, I may almost venture to say, guides unerring, and after observations on numerous examples of diseases apparently similar, it is extraordinary to remark the difference in the quantity of blood which it is necessary to remove for the cure of different cases.

## DISCOURSE IV.

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*Quantity of Blood to be abstracted, continued,—How to be estimated.—Syncope,—How beneficial.—Copious natural Hemorrhages often not injurious.—Blood-letting, when to be repeated.—Differences in the Condition of the Blood.*

IN the last Discourse I dwelt more particularly on three points:—the peculiar *incompressible* state of the pulse which, in conjunction with other symptoms, indicates the propriety of general blood-letting;—the importance of the *first bleeding*, and the almost insuperable difficulties which are often to be overcome when this first depletion has been too sparing;—and, lastly, I endeavoured to point out the propriety of abstracting blood until a state of fainting or *syncope* supervened, in all those cases wherein venesection is decidedly preferable to local bleeding.

We are now naturally led to inquire,—What is generally the quantity of blood which it is necessary to abstract at the first bleeding, in order to produce fainting? Such, indeed, is the variety of the constitution of individuals,—such the difference in the severity of disease,—and such the variations in the

Quantity  
of Blood  
necessary  
to be ab-  
stracted.

Various  
quantities  
are requi-  
site.

period when called on to treat particular cases, that whilst in some the pulse sinks after the removal of but a few ounces of blood depletion must in others, be carried to a great extent before syncope is produced.

Causes of  
such vari-  
ations.

When employing venesection, and observing the indications which have already been pointed out in order to regulate its extent, it will be generally found that the quantity of blood which can be removed before fainting comes on, is, in fact, not more than is requisite for the cure of the disease. Hence a person in health usually faints from the loss of a comparatively small quantity of blood, whilst the same individual, after suffering even a few hours from active inflammation, may require to lose an almost incredible quantity, before he falls into a state of syncope,—a quantity, however, essential for the cure of the disease. I have also observed, with regard to *leeches*, that the quantity of blood which flows from their bite, varies according to the degree of congestion in the vessels of the part to which they are applied, and, likewise, according to the necessity or propriety of such a quantity being removed. Hence blood often flows for many hours after the first application of leeches, whilst an equal number applied at a subsequent period, when the disease has been greatly subdued, yield comparatively a very small quantity of blood. This difference must doubtless depend on the different condition of the vessels at the different times the leeches are applied; and so it is with regard to venesection: a large quantity of blood may be taken away at the first bleeding before syncope is produced, whilst at

every succeeding operation, fainting comes on from the loss of a smaller and still smaller quantity.

If we are to be guided in the employment of blood-letting by the principles which I have been endeavouring to inculcate, it will readily be conceived that there must be great differences in the quantities of blood abstracted in different examples even of the same disease ; and whilst, in some instances, we shall be disappointed, with the smallness of the quantity which flows from a vein before syncope supervenes, in others it is surprising to what an extent the depletion may be carried, with the happiest results. Hence the difficulty of attempting to give anything like a precise idea of the quantity of blood which patients require to lose for the treatment of particular diseases. It would be no less absurd to attempt specifying the quantity of purgatives or diaphoretics necessary to complete the cure of a fever ! The best general notions on this point can only be attained by observing the quantity removed in a series of cases wherein blood-letting has been judiciously employed.

Quantity cannot be previously ascertained.

In the army and navy, where inflammatory diseases often assume a very severe type, surgeons are in the habit of abstracting thirty, forty, and sometimes even more than fifty ounces of blood at the first bleeding, and where the treatment is thus energetic even at its commencement, from one to nearly two hundred ounces of blood have frequently been removed before the disease has been subdued. But amongst those classes of the community, where the physical frame is slender, the loss of a comparatively small quantity of blood is found sufficient to relieve and

Practical observations.

check inflammatory diseases. There is an observation which I would here venture to make as the result of my own experience, as well as from the many opportunities I have had of witnessing the practice of others,—that of a considerable number of persons bled for inflammatory diseases, those who have lost the largest quantities of blood, by the fewest operations, have made the most rapid recoveries; whilst those who had been more frequently bled, and had lost even a greater quantity of blood, have recovered much more slowly, and have had, more frequently, some permanent structural change of the affected organ.

Syncope  
not inju-  
rious.

The state of fainting,—which I have already endeavoured to point out as an unerring criterion for estimating the extent to which blood should be removed in those cases where general bleeding is most expedient, such as in inflammatory diseases attended with febrile disturbance, and in congestions affecting the vital organs,—is, by most practitioners, taken as a guide; and though some have argued that a state of syncope thus caused may be pernicious and even dangerous, I have neither met with, nor have I ever heard of, cases where general bleeding judiciously resorted to and carried so far as to produce syncope, was followed by any serious mischief.

In considering this point we ought carefully to discriminate between those cases where the bleeding has been employed as a curative means, and those wherein a profuse hemorrhage has taken place from wounded vessels, as from accidents, or from a partial separation of the placenta. In these hemorrhages the bleeding may not only produce syncope, but such

may be the size of the wounded vessels, that the blood will continue to flow until life is nearly, or even sometimes completely extinguished. But in the operation of taking blood from a vein, its flow can and ought to be arrested whenever syncope takes place ; and surely no surgeon ever attempted to persevere in continuing to abstract blood from a person in this condition. On the other hand, the state of fainting is to be considered as an index of the quantity of blood which is necessary to be removed for the relief of the disease ; and, as I have already said, it will always be found that the quantity is in the ratio of the propriety and necessity of abstracting it.

Though it has been stated that in no case of syncope produced by venesection, have I ever witnessed any subsequent pernicious effects, yet, in some cases it has been carried to the very last extremity, the consecutive symptoms having caused great alarm to the by-standers as well as to the operator. Such cases, however, must be truly rare, for accustomed as we are daily to hear of persons being bled to a great extent, yet such alarming effects seldom happen ; and it ought also to be recollected how many hundreds or even thousands of persons in this community are bled every day, and how few accidents of any description ever occur.

The most alarming effect of syncope from venesection I ever saw, took place in a medical person, who had an attack of inflammation of the brain, and for which he had been repeatedly bled, both by venesection and leeches, but in small quantities and without relief. His condition was characterized by

Syncope  
seldom  
dangerous.

Case.

a dull unceasing pain in the head, which did not influence the intellectual functions, but was attended with great intolerance of light, sound, and motion. The pain becoming more intense, though his pulse was so natural in frequency and apparently so feeble as to discourage his attendant from repeating the bleeding, yet he could himself detect an incompressible feeling in it, which peculiar feeling he considered to be an unerring index of the propriety of venesection. His attendant, contrary to his own opinion, however, again opened a vein, and after a very few ounces of blood were abstracted, the patient became faint, which caused the removal of the bandage. When he recovered from this state, which soon happened, and was able to apply his own finger to the pulse, he could still distinguish its incompressible character, and experiencing the fixed pain in the head, he entreated his friend to replace the bandage. This done, a very large quantity of blood was removed before he again fainted, and the syncope was so complete that he remained insensible upwards of five hours. During this period those around him were in the greatest apprehension, the powers of life being so exhausted,—the pulse could not be distinguished at the wrist, and the respiration could hardly be recognised. Such, however was the effect of this protracted state of syncope on the disease in the head, that when the patient awoke, as it were into life, and was able to articulate, his first expression was, that the pain in his head had vanished, and that his pulse was completely subdued. This patient's subsequent re-

covery was speedy and complete, requiring no further remedial means,—and in about six weeks his health and strength were perfectly restored.

This interesting and no less instructive case demonstrates in the most striking manner how completely inflammatory disease can be not only arrested but subdued, by producing a diminution of the heart's action; and it also shows how, in the treatment of diseases, though a very moderate venesection may diminish the unnatural action of the vascular system, yet when the depletion is pursued to the extent of producing syncope, the longer the duration of that syncope, so much the more completely will the inflammatory action be subdued. The state of collapse, as it is called, which antimonial preparations produce by their influence in diminishing the action of the heart and arteries, subdues inflammatory disease on the same principle as the abstraction of blood.

Utility of  
syncope.

In a few instances I have observed persons recover from inflammatory affections, whose vital powers appeared so reduced as to render their condition apparently hopeless, but which low state ultimately seemed to be the very means of arresting the disease.

A girl, about ten years of age, had suffered severely from hooping-cough and congestion in the brain, for which the depletive system had been adopted; and such was ultimately the state of debility to which she was reduced, that she was apparently lifeless, and surrounded by her parents, bewailing her approaching dissolution! Without a

Case.

shadow of hope I poured a spoonful of wine into her mouth, and instructed the attendants to give beef-tea and wine alternately, and at short intervals. Considering any further professional attendance unnecessary, and calling the following day on the other medical adviser, requesting him to get permission to examine the body, think of my surprise, when with a smile he informed me that the patient was doing well, having recovered every hour after the exhibition of the cordials !

Artificial  
Resuscita-  
tion some-  
times ne-  
cessary.

Cases of this description ought to teach the propriety of never ceasing to lend our assistance, for the purpose of prolonging life, however slender it may appear ; and I am confident it not unfrequently happens that the state of great debility or collapse, in which we may occasionally observe those who have severely suffered from febrile diseases and large depletions, becomes the very means of checking the progress of the disease. Such an effect is most to be anticipated, even when life has been apparently nearly extinguished. In the diseases of children, more particularly when the vital powers have been greatly exhausted, and the child refuses his food, I have frequently known instances of infants in this state, and life despaired of, no endeavours being made by the parents to prolong existence—where the vital powers of the child were resuscitated by forcibly separating the teeth, and forcing cordials into the mouth, taking great care that the fluid was conveyed by the spoon to the root of the tongue. The truth of the common maxim, that “ whilst there is life there is hope,” is here strikingly exemplified.

From a general impression that blood-letting ought not to be employed but in diseases of a serious character, and that it is a remedy from which much mischief may ensue, if carried to too great an extent, or employed in improper cases, it is, I am convinced on many occasions, too tardily resorted to, and too sparingly used,—whilst we every day see medicines, the effects of which may be highly injurious to the constitution, fearlessly and carelessly exhibited. That a dread of blood-letting is not founded on sound observation, is demonstrated by noticing the effects of spontaneous hemorrhages and of profuse bleedings, so often the consequence of injuries—and also in diseases where they accidentally take place.

Copious Hemorrhage often not injurious.

Alarming hemorrhage sometimes ensues during, or after, operations; and it is important to remark that those patients recover most speedily and have much less fever, in whom such a large quantity of blood has been lost.

After and during operations.

In the spontaneous hemorrhage from mucous membranes, as those from the nose and rectum, it is extraordinary what large quantities of blood, often persons lose with no other sensible particular effect, than more or less debility.

From mucous surfaces.

A man was admitted into the Hospital of Surgery with dropsy, which he expected would be relieved by tapping. A few hours after his admission, he was seized with bleeding from the nose, and although his pulse was feeble and his skin cold, having already lost not less than two quarts of blood, I bled him at the arm; after which the bleeding from the nose ceased. But the particular circumstance in

Case.

this case was that, notwithstanding the great loss of blood, his pulse on the following day became firm and wiry, and was accompanied by pain in the abdomen; he was, therefore, again bled at the arm until he became faint. On the second day the pulse rose, and he was bled a third time, after which he was tapped, and got a large dose of calomel and opium. This treatment had the effect of completely mitigating his sufferings. Calomel and squills were then given, until his gums became tender. He left the hospital fourteen days after his admission completely relieved, and a few weeks afterwards I saw him in perfect health.

From  
Hemor-  
rhoids.

The quantity of blood which some persons lose from Hemorrhoids, is also extraordinary. I have known instances of delicate females losing daily from such tumors, on an average, from half a pint to a pint of blood for many months, and even years,—a quantity which, compared with the largest quantities of blood ever removed by artificial means, appears astonishing; and the slight disturbance of the system, which such profuse hemorrhages occasion, seems indeed unaccountable.

From  
varicose  
veins.

Similar effects of the loss of large quantities of blood are exemplified in cases of varicose veins accidentally ruptured, from which immense quantities of blood have sometimes escaped, without any perceptible injurious consequences. *PETIT* particularly mentions such cases.

From  
wounds.

Hemorrhage to an enormous extent sometimes happens on the field of battle, wounded soldiers having been often left apparently lifeless from loss of blood, and, it is important to remark that such

of the wounded recover with unusual rapidity, from the complete check which is given by depletion to any consecutive inflammation.

Very extraordinary, also, is the quantity of blood that females sometimes lose from the partial separation of the Placenta, yet, generally, without any other bad effect than temporary debility. Women under such circumstances have been known to lose several quarts of blood in a few hours !

From the separation of the Placenta.

These facts, taken collectively, prove to what an extent blood may be lost, without being followed by serious consequences. And the practical conclusion to be deduced from such facts is, that blood-letting may when judiciously managed for the cure of disease be extensively employed.

Though, in the generality of cases, much depends on the full quantity of blood being abstracted at the first bleeding, as well as on resorting to blood-letting in the early stages of disease, still there are other instances wherein the complaint can only be cured by the frequent repetition of venesection.

Blood-letting, when to be repeated.

The frequent repetition of blood-letting is rendered necessary by various causes. In some instances it becomes requisite in consequence of a fainting state coming on after only a small quantity of blood has been taken away ; and, in other cases, when the pulse sinks after a very moderate quantity has been removed.

But when, from whatever cause, the quantity of blood abstracted has been small, it ought to lead to the more close watching of any return of the symptoms, and prepare us to repeat the bleeding.

Now it frequently happens, that on the repetition of the venesection, the cause which prevented the first depletion from being made sufficiently copious, no longer exists, so that at the future bleeding any quantity of blood which may be deemed necessary, can be readily abstracted.

But the most frequent cause which renders a repetition of venesection requisite, is that to whatever extent the first bleeding may have been carried, one depletion is seldom sufficient to check the progress of a severe attack of inflammation, particularly in an important or vital organ.

Always bear in mind, that the more complete has been the syncope arising from the first bleeding, and the sooner the second bleeding is performed after the pulse has begun to rise, the less will be the quantity of blood necessary to be taken away at the second bleeding, as well as the aggregate quantity for the completion of the cure. After the first bleeding, therefore, the pulse ought to be closely watched, due attention being also paid to the other symptoms; and whenever the vascular system has begun to recover its vigour, which may take place in three, six, or twelve hours, then replace the bandage on the arm, wipe away the coagulum in the wound of the vein, and allow the blood to flow, until the strength of the heart and arteries be again subdued.

Different  
condi-  
tions of  
the Blood.

There are appearances which the blood presents, both whilst it flows from a vein, and after it has been kept some time and allowed to coagulate, which appearances have been considered as affording

criteria for regulating the quantity of blood to be withdrawn, and also for the repetition of the venesection.

In violent inflammations, the blood usually flows from the wound in the vein with great force; whereas in other conditions of the system the stream is comparatively slow. In the first condition, bleeding ought to be as profuse, as in the latter it should be limited.

The colour of the blood as it flows from the vein, also varies in different examples of disease, being in some very florid, or of a scarlet red, and in others of a crimson red or deep purple colour. The first state of the blood indicates the propriety of bleeding, whilst the latter points out a state of the system where but a very moderate depletion is admissible.

The appearances which blood assumes after it has been allowed to stagnate, are also supposed to afford criteria for the repetition of venesection. The appearance of a buffy coat, and the comparative quantities of crassamentum and serum have especially been considered as an index of the existence of inflammation, and of the propriety of blood-letting.

Whilst all these circumstances are mentioned, I must at the same time repeat what was stated in a former discourse, when explaining the different changes of the blood, that *these* can never be a criterion for estimating the quantity of the sanguineous fluid which it may be proper to remove, whilst the blood is flowing from the vein, neither can any appearance of the blood after its coagulation guide us in repeating the venesection. The appearance

of the buffy coat has been chiefly dwelt on as an important character of the inflammatory diathesis ; but it has been already observed, that the buffy coat is not to be considered either as a certain test of inflammation, or as a safe index of the propriety of blood-letting. There is usually no appearance of the buffy coat in blood removed from persons affected with violent inflammations until the latter stage of the disease, and at the very period when the further abstraction of blood would be pernicious ; in many diseases on the other hand where blood-letting is unnecessary or even hurtful, the buffy coat may be occasionally observed.

## DISCOURSE V.

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*Causes of Failure in Venesection,—how to be remedied.  
—Operation of Venesection.—Different Methods of  
Abstracting Blood; when to be employed;—Vene-  
section,—Cupping,—Leeches,—Scarifications.*

In endeavouring to point out the indications by which the quantity of blood should be regulated, when blood-letting is had recourse to in the treatment of diseases, it has been taken for granted that the surgeon has it always in his power to abstract whatever quantity he may deem necessary. This, however, is not always the case, or at least the requisite quantity of blood is not always obtained without difficulty, and nothing is more common than to hear of patients suffering from not having lost a sufficient quantity of blood, it having been affirmed that it was impossible to bleed them to the desired extent.

I have always considered it a dangerous maxim to admit the possibility of such an occurrence; and have ever contended that any requisite quantity of blood can, by some means or other, be taken from every patient. Should the veins in the arm be inadequate for this purpose, then may the jugular

Causes of  
Failure in  
Venesection.

veins, or the veins of the wrist or those of the feet, be resorted to. Or, in cases of danger, and when no time ought to be lost, why should not an *artery* be opened? The most severe operations are daily performed in order to save human life, and surely a fellow-creature should not be allowed to die for want of losing a quantity of blood! In the *Transactions of the Med. and Chir. Society*, there is narrated a case, wherein the necessary quantity of blood could not be obtained from the veins of the arm, and where the bold and decided practice of opening the *radial artery* was successfully adopted.

I recollect only one instance where I could not obtain, by venesection, the desirable quantity of blood; here, the patient became so extremely cold that scarcely any blood would flow from the wound,—a circumstance which had happened to her on several former occasions.

It ought also to be remembered that when neither venesection nor arteriotomy can be performed, a large quantity of blood may be abstracted by leeches or cupping. The French are in the habit of applying at one time from fifty to a hundred leeches in cases where we would employ venesection.

The operation of Venesection.

It will here be proper to allude to some circumstances which, from a want of due care in performing the operation of venesection, are frequently the cause of failure in procuring the requisite quantity of blood.

The operation of blood-letting, seldom has that degree of attention paid to all its details which it so well merits, and although every one considers himself perfectly capable of performing so simple an

operation, still it cannot be denied that it is often executed by one person much better than by another, being, indeed, after all, seldom perfectly well performed. The incision in the vein is either too small or unnecessarily large, or in too transverse or too longitudinal a direction—the bandage is applied too tightly or too loosely, or there is some circumstance essential to the success of the operation, however trifling it may appear, which has not been duly attended to. The assertion of the late BENJAMIN BELL, does not go too far when he affirms, that, See his System of Surgery. “ Whilst I have frequently seen every other operation well performed, I have seldom seen blood-letting, with the lancet, correctly done.”

I would strongly recommend the study of his writings on this subject, and to take care, when performing the operation of venesection, that strict attention be paid to every step,—that the largest and most superficial vein in either arm be selected—that the bandage when applied be neither so loose as insufficiently to compress the veins, nor so tight as to diminish the flow of blood through the arteries,—and also that the inferior edge of the bandage be close to that part of the vein where the wound is to be made,—that the lancet be perfectly sharp, and the wound in the vein be made sufficiently but not too large and have a proper degree of obliquity,—that the patient be placed in a recumbent posture, having the arm resting upon a common hand-basin, one side of which will support the upper arm, and the other the fore-arm, and thus prevent his being fatigued; by this method of supporting and fixing the arm, the orifices in the skin and vein will

also be kept in accurate correspondence during the operation.

All these circumstances demand attention in performing the common operation of phlebotomy; and as so much depends,—even the life of a patient,—on the prompt and successful manner in which it is executed, we cannot bestow on it too much consideration.

When there is a probability that it will be necessary to repeat the blood-letting, the pain of making a new incision may be saved by simply anointing the lips of the wound,—which prevents their being agglutinated. If this has been neglected, the bandage must be re-applied to the arm, and, when the vein has become fully distended, the agglutinated lips of the wound may be separated with a probe, or the head of a common pin, by which the blood will flow as freely as during the first operation.

Different  
modes of  
abstract-  
ing Blood.

Before our attention is directed to the comparative effects and to the comparative advantages of abstracting blood by each of the several different operations of venesection, arteriotomy, cupping, leeches, and scarifications, it is of importance to recal to mind those states of the system which require the use of this remedy.

I have already mentioned that whenever local inflammation exists to such a degree as to excite fever, venesection is then decidedly preferable to any other mode of abstracting blood. I have also endeavoured to point out what appeared to me to be the disadvantages of arteriotomy, and the few cases and particular circumstances to which that mode of depletion is applicable.

In all cases of local inflammation where the general system is not disturbed, leeches are to be preferred to venesection; whilst the operation of cupping holds as it were a middle place, being applicable in cases where there are no febrile symptoms, and where leeches might be employed;—as in local inflammations and congestions, and also in cases where the action of the vascular system is increased. In all inflammations and congestions about the head, cupping on the back of the neck and between the shoulders is a most useful mode of abstracting blood, and this operation is also particularly applicable for the removal of blood from the parietes of the chest and abdomen in diseases of their internal viscera. Its use, however, is only admissible when it can be employed without exciting pain, and irritating the diseased organ. In such cases I have often seen cupping do mischief. For the same reasons cupping inflamed joints, or parts accompanied by external tenderness, is often injurious, so that in such cases leeches are decidedly preferable. Cupping is preferable in those cases where the application of leeches is followed by severe erysipelas of the skin, except in those cases where a counter irritation is desirable. The very circumstance of the cupping-glasses irritating the tender parts, and drawing blood to the place where they are applied, renders cupping an eligible mode of abstracting blood in cases of congestion, more particularly of the brain, the operation being, in such cases, performed at the nape of the neck. Cupping, however, is the least preferable mode of abstracting blood when the application of the glasses

excites pain, and increases the influx of blood to the diseased part. Although, therefore, the operation of cupping may be, under many circumstances, an useful and even the most preferable mode of abstracting blood, yet it cannot be denied that there are no cases where cupping can be useful in which all the essential benefits of abstracting blood by that operation might not be obtained either by venesection, or by leeches, or by a combination of both those methods. I have often remarked, that in this metropolis, where there are so many dexterous performers of this operation, patients, more particularly those subject to congestion in the head, are apt to indulge in a luxurious system of living, the bad effects of which they can always have readily but temporarily removed by cupping.

By  
Leeches.

Leeches are by far the most eligible mode of *local* blood-letting in the generality of cases, not only because they procure the necessary quantity of blood from parts where the application of the cupping-glasses would cause pain and irritation, but also because, from the dexterity required to perform the operation of cupping, it is seldom well done, and cannot be commanded in situations and at times when leeches may easily be procured.

In the application of leeches, it is important to be aware that the bleeding from their wounds is never in the ratio of the number applied; and it is often surprising to find three or four leeches bleed as much on one occasion, as at least double the number on another. Usually, when a large number is applied, the blood flows most freely from a limited number of wounds, which continue to bleed long

after the bites of the others have ceased. This probably depends on the principal vessels supplying the part on which the leeches are applied being wounded, and on those wounds which happen to be made nearest the heart bleeding more than those in the more remote branches. The bleeding too from leeches varies much in quantity, not only according to the state of the circulating system generally, but also according to the degree of inflammation or congestion in the part where they are applied; and very remarkable is the difference in the bleeding from the same number of leeches on the same part at different times, the quantity diminishing as the fulness of the vessels is diminished. This fact coincides with the observations I made on the quantity of blood necessary to produce syncope in inflammatory diseases, which I remarked was always in proportion to the quantity necessary for remedying the disease.

I was consulted in the case of an old lady who Case. had all the symptoms of hypertrophy of the heart, the impulse of which organ had become extremely vigorous, with excessive embarrassment in breathing. In place of venesection, I recommended the application of four leeches on the region of the heart. The leech-bites continued to bleed freely during fifteen hours, subduing both the unnatural vigour of the pulse and the action of the heart. Two days afterwards the same number of leeches were again applied, and, to the astonishment both of the patient and her other medical attendant, but a very small quantity of blood came away.

Leech-bites, moreover bleed very differently at different seasons and in different states of the atmosphere,—over which we have no control. It is also of importance to keep in mind, when comparing the effects of cupping and leeches, that advantages are derived from the long-continued fomentation of the affected parts to which the leeches have been applied, as also to the soothing influence of a poultice, which ought always to be used after the fomentations.

Disadvantages of leeches.

One disadvantage of the use of leeches is the difficulty of regulating the extent of the bleeding, but I have already observed, that the discharge from their bites usually depends on the degree of congestion of the vessels of the part to which they are applied, and that they seldom bleed more than is requisite. When it becomes from any cause desirable to put a stop to the bleeding, this can in most cases be readily effected by simply exposing the surface of the part to the external air, and allowing the blood in the orifices to coagulate. The usual practice of applying compresses and bandages, and heaping them on in proportion to the activity of the bleeding, tends to promote instead of checking, the flow of blood.

Case.

I was sent for early one morning to visit a lady who had violently sprained her wrist on the preceding day, and for which she had been advised to apply leeches. They had bled freely all the evening, and so profusely during the night, that a variety of styptics, compresses, and bandages, were used, but without arresting the hemorrhage. The injury having been

severe, and the pulse not being altogether subdued, I told her that she had not lost too much blood, and that the constant oozing from the leech-bites had been the means of preventing the accession of inflammation. The patient being alarmed, however, I thought it expedient to arrest the bleeding, and scarcely had the bandages and thick compresses been removed, all of which were soaked in blood, and the hand and arm exposed to the cool air, than the flow of blood began to diminish, and in a few minutes it had completely ceased.

When this simple means is not sufficient to stop the bleeding from a leech-bite, a small compress is to be applied not larger than a finger-nail, consisting of several folds of lint, directly upon the bleeding orifice, on which such a degree of pressure is to be made with the point of only one finger as shall be found sufficient to stop the bleeding; this pressure is to be steadily continued until all tendency to bleeding has completely ceased. I have never known a failure of this practice, except in a few cases where the hemorrhage arose from the blood wanting its usual coagulating power, and in some children, where from the leeches having been applied to the neck, and more particularly where the leeches were of a large size, the necessary degree of pressure could not be employed. In the first class of cases, touching the orifice with the nitrate of quicksilver produces an immediate coagulation of the blood, with which it mixes, and thus plugs up the wound. Caustic may be in like manner employed in hemorrhages from leech-bites in children, and Sir CHARLES BELL, has, in troublesome cases of this kind, stitched the

Mode of  
stopping  
the bleed-  
ing from  
leeches.

lips of the wound together with a fine needle and thread ; or the needle may be allowed to remain for some hours in the wound, its thread twisted round it, as is done in making the twisted suture, a firm and unyielding compress being thence formed on the wound.

Their use  
in injuries

Besides being a most powerful remedial means in the treatment of local inflammation, leeches are in a more especial manner preferable to general blood-letting in all cases of local injury previous to the accession of fever,—or after the febrile symptoms have been subdued by general bleeding. When a part is bruised, the whole frame receives a shock in proportion to the severity of the accident, and no sooner does the system recover, and reaction take place, than the bruised part becomes more or less tense and painful ;—these symptoms indicate the commencement of inflammation. If, in this condition, a sufficient number of leeches be applied to the parts, the inflammation will be immediately subdued, and if they be again and again applied, without delay, and in numbers proportionable to the severity of the symptoms or whenever there is any return of pain and swelling, we can thus completely check and subdue every inflammatory symptom, and avert all the evils of the accident.

Case.

A gentleman fell from his horse, and severely bruised the elbow-joint and surrounding soft parts. Leeches were employed immediately after he recovered from the shock occasioned by the injury, which, along with fomentations and poultices, afforded great relief ; but cessation of the bleeding

was always followed by a return of the pain and tension. More leeches were then applied, and so on,—one or two dozen being repeated whenever the bleeding from the former wounds ceased and the pain returned, so that in four days one hundred and eighteen leeches were applied. The effect of this practice was, that in eight days this patient had completely regained the use of his arm, and, except the debility, from which he recovered in a few weeks, no bad effects ensued. In this manner, and on this principle, have I, by the repeated application of leeches, kept up a constant oozing of blood from injured parts, until every inflammatory symptom has been completely checked and subdued.

When this system of treatment is not employed early,—almost immediately after the effects of the shock have passed away, and when time is given to the inflammatory symptoms and a febrile disturbance of the system to supervene, then the treatment must commence with general bleeding, conducted on the principles which I have already endeavoured to establish.

General bleeding may also be requisite.

Local bleeding, however, when employed even without unnecessary delay; after the receipt of an injury, is not however always sufficient to prevent the accession of febrile symptoms, more particularly when the injury has been severe, and the injured parts have an important function to perform in the animal economy. Hence it will be found a useful practical rule that, whenever in any case of injury, local bleeding is not sufficient to check the accession of fever, general blood-letting ought to be unhesitatingly adopted.

Case.

In no instance did I ever witness the good effects of this rule more strikingly exemplified than in that of a medical gentleman who received an injury of the knee-joint of unusual severity. Whilst walking through a wood at a place where the branches were so numerous that he was compelled to stretch both his arms in order to hold up the gun with which he was shooting, one of his feet became entangled with a twig, and not being able to receive any assistance from his arms, he made a powerful exertion of his leg to prevent his falling. In making this effort and being of an athletic form, the right knee-joint was wrenched so violently that he fell down, and it was not until the lapse of a considerable time that assistance could be procured and that he could be liberated from this situation, and conveyed home with great suffering, a distance of thirty miles. When I saw him twenty-four hours after the accident the whole knee was then greatly swelled, tense, extremely painful, and accompanied with violent spasmodic twitchings of the limb. But in place of any febrile excitement his skin was cold and his pulse was below the natural standard,—and he appeared not to have recovered the severe shock of the injury. Leeches were accordingly applied to the joint, which with fomentations and a poultice afforded no substantial relief. In ten hours I again visited him. The pain and spasmodic twitchings of the limb had now become agonising,—the skin hot,—and though the pulse was not increased in frequency, yet it had a contracted feel,—there was a difficulty in compressing it, which decided me in opening a vein in the arm. The blood

flowed in a very profuse stream, the pulse gradually acquiring vigour, and I determined to let blood escape until the pulse should be quite subdued; being impressed with the opinion that such was the extent and severity of the injury of the joint in this patient, that unless the most energetic means were at once adopted to prevent the accession of inflammation, the limb would be placed in a state of great danger, and even the patient's life would not be altogether safe.

No less than seventy-four ounces of blood, by measurement, were abstracted before the pulse faded, and even then complete syncope did not supervene, but the patient remained for many hours in a condition which approached to fainting. In this state of prostration, and with the vigour of the organs of circulation quite subdued did he remain four days,—every attempt to raise himself causing giddiness and a disposition to vomit. From the period of the venesection, however, the pain was alleviated, the swelling and tension of the joint gradually diminished and no febrile symptoms ever recurred, and, excepting a few leeches which were applied to those parts of the knee which continued particularly tender with a poultice, no further remedial means were required. The subsidence of the swelling though slow was progressive, and except some portion of the parts around the joint which were torn, the patient got well; so rapidly indeed did he recover the effects of the enormous depletion, that in three or four weeks the prostration caused by the blood-letting, and the shock which the whole system received from this severe accident were

completely overcome, and never afterwards was there any circumstance attending his recovery which could be attributed to the loss of such an unusual quantity of blood.

Advantage of Hemorrhage from an injured part. If, besides a bruise, there be a wound of the soft parts, the subsequent hemorrhage often effects much in checking the approach of inflammation; and hence, when wounds have bled freely, and when they have not been irritated by dressings and bandages, it is seldom that any inflammatory symptoms ensue, nor does any local or general bleeding become necessary.

Opening veins a substitute for leeches. When leeches cannot be procured, the requisite quantity of blood may be obtained by opening with a lancet one or more of the veins contiguous to the injured parts; and this mode of blood-letting is particularly applicable in injuries of the extremities, where there are so many veins sufficiently large and accessible. The advantages of applying leeches, which have been enumerated, are also to be derived from this method, in all local affections where the parts from which the blood is to be withdrawn are tender to the touch, and where any other mode of local blood-letting is inadmissible.

Leeches produce a revulsion. Leeches are also employed on a principal of *revulsion* as well as *derivation*, and hence they have been applied to the feet in affections of the head, chest, and abdomen. Whatever explanation be given, the good effect of using leeches at a distance from the affected organ in certain states of disease is indisputable, and this practice is particularly applicable in all congestions of blood. In affections of the head and thoracic viscera, where repeated

small depletions are indicated. I have in many instances recommended patients to apply leeches on the head or chest, and on the feet alternately, and, when it has afterwards been requisite to repeat the bleeding, to make choice of that place for re-applying them which from experience was then ascertained to be the most beneficial. Almost universally, I may venture to say, a decided preference has been given to their feet. How often indeed do we see diseases in the head, relieved by the discharge of even a few drops of blood from the hæmorrhoidal vessels!

A lady had suffered during several months from Case. violent cough accompanied with difficulty of breathing, for which she had applied leeches on the chest and used a variety of remedies without effect. When she consulted me I recommended besides other means the repetition of the leeches, but advised her to apply them to the feet. Accordingly, four leeches were applied to each foot, and the relief was so speedy and complete that she required very little further treatment. The leech-bites cause sometimes too much irritation and are followed by such severe erysipelatous inflammation of the skin, that in many instances the disease for which the blood-letting has been employed, seems to be as much subdued by the counter-irritation caused by the leech-bites, as by the sanguineous depletion, —provided only that they have been applied at a distance from the diseased organ

The powerful effects of applying leeches to the Case. feet in relieving congestion in the chest, was remarkably exemplified in the case of a gentleman who had been long subject to what was considered

as an *asthmatic* cough, and which was particularly aggravated during the winter months. On one occasion he caught cold and his breathing became much oppressed, accompanied with slight febrile symptoms. I advised him to apply four leeches on one foot. They bled freely, violent erysipelas supervened, which extended up the leg, and on the following day his chest was more relieved from a feeling of oppression than it had been for many months, and the cough was greatly mitigated.

Case. A lady had long been subject to inflammatory attacks of the liver. I saw her with an excited pulse, great headache and pain in the side, dry and hot skin. Four leeches applied to one foot bled little, but were followed by a violent erysipelas of the foot and leg. In twelve hours the pain in the side and violent headache were quite subdued, and afterwards one grain of calomel given every six hours for a couple of days relieved all the symptoms.

By Scarifications. There is no class of diseases where the effects of the local abstraction of blood are so well exemplified as in some of those of the Eye, in which a quantity of blood may be taken from the conjunctiva by the operation of scarifying. The beneficial effects of applying leeches to the orifices of the different mucous canals, when depletion is required, are well established, and the operations of scarifying the conjunctiva, lancing the gums and tonsils, puncturing hemorrhoidal tumours, and making incisions in inflamed parts, all give relief on the same principle.

Scarifying the conjunctiva. *Scarifying the conjunctiva* is a most useful opera-

tion, and one of the few methods we possess of abstracting blood locally, strictly so speaking. Simple as may be its performance, there are still several circumstances requiring nicety in the operation, and which are necessary for its success; and in the mode of its execution commonly adopted, instead of doing good, it often irritates and produces mischief. This operation was known to the Arabians, who performed it by inserting the serrated edge of the beard of the common barley into the conjunctiva, the wounds thus made bleeding more or less freely. But the most safe and efficient mode of performing the operation is with a wedge-shaped scarificator now in common use. The lancet is a very unfit instrument for this purpose.

The principle of this operation is, by wounding the conjunctiva, to get as much blood as possible. The wounds should only be made on the palpebral, and never on the sclerotic, conjunctiva; for when the vessels on the ball of the eye are divided, the operation invariably excites much more irritation than the loss of blood does good. The wounds, therefore, should be limited to the conjunctiva lining the eyelids, and it is only on the inferior lid that the scarification can be properly accomplished. The wounds or scratches should be made on that part of the membrane which is reflected over the cartilaginous tarsus,—all its other portions are loose and unresisting, whereas on the tarsus the membrane is kept stretched, and the cartilage affords a resistance sufficiently firm to admit of the ready division of the blood-vessels.

The Ope-  
ration.

Before using the scarificator, we should completely evert the lower eyelid by the fore and middle finger of the left-hand, underneath the points of which is placed a thick dossil of lint,—and this assists in keeping the lid everted, and in absorbing the blood, and, by compressing the lid on the lower edge of the orbit, the blood is made to flow much more freely.

The edge of the scarificator is to be held perpendicular to the surface of the conjunctiva, and the weight of the instrument is of itself sufficient to make the wound deep enough. One scratch—for it ought not to be an *incision*—along the tarsus, generally answers the purpose, but several are sometimes necessary, and you can, easily comprehend how one division of the same vessel should bleed as much as several. By retaining the compress pressed moderately on the everted lid, it is often surprising, what a quantity of blood is discharged, and the relief and benefit of the operation are generally in proportion to that quantity,—just as was observed when speaking of the blood taken by leeches being in proportion to the turgescence of the vessels where they are applied!

When  
useful.

It is worthy of remark, that the abstraction of blood by scarifying is never useful until the acute stage of the inflammation has passed. It is in the sub-acute,—chronic,—or passive stage, wherein such local depletions appear so decidedly useful. When the eye is suffering from an acute inflammation, the vessels of the palpebral conjunctiva are not much increased in number, appear chiefly

arterial, and when divided yield scarcely any blood. But when the second stage of the inflammation ensues, there is a great increase in the number, and change in the colour, of the vessels,—the arterial capillaries being diminished in number, while the venous are increased, so that the bright red colour of acute inflammation becomes of a more purple hue : in this state blood flows copiously when the vessels are divided by the scarificator.

I may here remark, that the practice of applying leeches to the conjunctiva is one, the bad effects of which I have so often observed in the practice of others that I have never adopted it,—they frequently create irritation and there is an erysipelatous redness which sometimes follows the leech-bite which is very injurious.

The first part of the book is devoted to a general history of the United States from its discovery to the present time. It is divided into three volumes. The first volume covers the period from the discovery of the continent to the establishment of the first colonies. The second volume covers the period from the establishment of the first colonies to the Declaration of Independence. The third volume covers the period from the Declaration of Independence to the present time.

The second part of the book is devoted to a detailed history of the United States from its discovery to the present time. It is divided into three volumes. The first volume covers the period from the discovery of the continent to the establishment of the first colonies. The second volume covers the period from the establishment of the first colonies to the Declaration of Independence. The third volume covers the period from the Declaration of Independence to the present time.

## DISCOURSE VI.

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*Injurious effects of Blood-letting,—Immediately after Injuries;—During an Apoplectic Fit;—In particular Cases of Inflammation;—In irregular distributions of Blood;—In Specific Diseases.*

Allusion has hitherto been made only to those diseases wherein blood-letting may be employed as the chief curative means; but there also is a class of cases wherein this energetic remedy ought to be used with much caution, and to these our attention ought always to be directed when contemplating the use of blood-letting.

There is one class of cases in which blood-letting is often very unnecessarily, and sometimes perniciously employed. I allude to the common practice of bleeding persons immediately after an accident, or during an apoplectic or convulsive fit. In many accidents, more particularly where the head suffers, the first effects of the injury are a diminution or collapse of the vital powers; and, if under such circumstances blood be abstracted, a still further diminution of these powers is produced. Hence it is not until the powers of life have revived, or a *reaction* has taken place, that we should, after severe injuries, employ blood-letting.

The servant of a medical society fell from a chair at the time of one of the meetings, and whilst still

Injurious  
Effects of  
Bleeding.

Imme-  
diately  
after an  
Injury.

Case.

in a state of insensibility, surrounded with medical students she was bled. It was at least fifteen months after that bleeding, although it was very moderate in quantity, before she recovered her natural strength. Many have suffered, from a too early use of the lancet after accidents.

During an  
Apoplec-  
tic Fit.

In cases of *apoplexy*, I believe that blood-letting has frequently been carried to a very unwarrantable, and even fatal extent.

In proportion to the violence of an apoplectic shock, so are the powers of life diminished; and hence, if the quantity of blood abstracted be regulated by the *severity* of the symptoms, in like proportion will the practice be hurtful by still farther diminishing the vital powers. When a person is in a state of insensibility from an apoplectic fit, those around are too apt to urge the necessity of bleeding, conceiving that the loss of blood will relieve the disease in the head.

It is therefore proper in all cases to allow the *shock* to pass over and the circulation to revive before abstracting blood—and the quantity which is taken away ought always to depend on the vigour of the heart's action.

Case.

A surgeon was sent for to see a patient, who had fallen down suddenly in an apoplectic fit; he immediately opened a vein, and after abstracting only a few ounces of blood, the pulse sank. When he visited this patient, several hours afterwards, he found the powers of life so feeble that he ordered him cordials, by which the action of the heart, and arteries began to revive. Soon after this, however,

a physician was consulted, and he *prescribed* a copious venesection, after which the patient sank rapidly, and in a few hours expired!

In cases where there are organic changes in the brain's structure, and when the sudden apoplectic attack is caused by some vessel of the *diseased part* giving way and pouring out blood, blood-letting is of no avail, and when had recourse to when the pulse is feeble, and the vital powers already much diminished from the shock, it never fails to hasten the patient's death: therefore under such circumstances blood-letting ought to be resorted to with great caution.

When there are organic changes in the brain.

A lady considerably advanced in life was found during the night lying on the floor,—her servant, who was in an adjoining apartment, having been awoke by the noise of her mistress falling out of bed. She was found perfectly insensible, and the pulse so languid, that the surgeon who was sent for ventured to take only a few ounces of blood by cupping; her pulse never revived, and in four hours she expired. It was found that her death was occasioned by an effusion of blood into the ventricles, the heart and aorta being also diseased.

Case.

It is in cases of this description that blood-letting, even to a small extent, must, by diminishing the powers of life, prove injurious, and, if carried beyond certain limits, inevitably hasten dissolution.

Fatal consequences.

A patient who had long suffered from an affection of the heart and who had for many years complained of a fixed pain in the occipital region, suddenly tumbled down senseless, and when he endeavoured to rise the left arm and leg had become

Case.

quite motionless. On visiting him a few hours after this attack, I found his pulse so feeble and the powers of life so depressed that in place of a depletive system of treatment, I recommended the use of ammonia, and camphor,—and what was remarkable in this case was that the paralyzed limbs gradually acquired their natural power, and in four days the paralytic affection was completely removed. Four months after this illness he was again suddenly attacked, and his condition being considered apoplectic, he was freely bled and purged, and in about twenty hours he expired!

On opening the head a large clot of extravasated blood was found in the substance of the left hemisphere of the brain,—and in the right hemisphere, there was a large cavity which contained a small quantity of a dark coloured sanguineous fluid, not sufficient to fill it, and which no doubt was the remainder of the effusion which had taken place during the first attack. The arteries at the base of the brain were much dilated and their coats considerably thickened. There was dilatation of the left ventricle, its muscular parietes were thickened, and some portions of the semilunar valves were ossified.

Utility of.      It ought however to be kept in mind that there are cases of simple congestion in the brain, producing a sudden loss of the intellectual powers and convulsions, in which too much blood can scarcely be removed to save life; but in such cases the pulse usually acquires vigour or rises whilst the blood is flowing from the vein.

Case.      A general officer, of a full plethoric habit and

who had suffered occasionally from *gout* took, in consequence of a slight pain in the great-toe, a brisk purgative, and whilst walking on the following day, which happened to be unusually cold, he felt a chill, suddenly became giddy, and fell down in the street, senseless and motionless. I saw him in this state, but his pulse, though strong, was little changed. I immediately opened a vein in the arm, and the blood flowed freely through a large orifice; at first the pulse gradually acquired strength, and increased in frequency, but was not subdued until upwards of forty ounces of blood, were abstracted, when he immediately became sensible to things around him. In this state he was removed to his own house, and in a very few hours the vigour of the heart and arteries revived, accompanied by uneasy feelings in the head, when about the same quantity of blood was taken away as on the former occasion. These depletions, along with an antiphlogistic regimen, were the means of producing permanent relief.

There are also individuals in whom the loss even of a very small quantity of blood produces great exhaustion and depression, and where it is impossible to carry depletion to the ordinary extent, even when such persons are labouring under inflammatory diseases. But we cannot possibly be aware of such constitutional peculiarities or idiosyncrasies, unless by previous observation on the patient.

In particular inflammatory affections.

A lady about the middle period of life, who had suffered much from bad health, was suddenly at-

Case.

tacked by all the usual symptoms of peritoneal inflammation. I found her in great agony, with a fixed pain in the abdomen, great tenderness to the touch, a very rapid pulse, and other symptoms of fever. Having taken repeated doses of opium without relief, I opened a vein in her arm, and before five ounces of blood were abstracted, the pulse sunk and she fainted. When I visited her two hours afterwards, she had recovered from the state of syncope, her pulse had revived, but was very rapid and easily compressed. The local pain not having abated, the bandage was replaced on the arm, and scarcely had a couple of ounces of blood escaped when the pulse sank, and she again became faint. The pain in the abdomen not being relieved, after having recovered from the state of syncope produced by the second bleeding, I gave her a grain of opium with five of calomel every few hours, by which means the pain and other symptoms were rapidly subdued.

Another nice point to determine in the employment of blood-letting, occurs in those cases of inflammation where the powers of life are already so much exhausted from the duration of the disease, that though there may be a probability of the inflammation being subdued by a repetition of the bleeding, yet the exhaustion produced by any further depletion may of itself destroy life. Under such circumstances, in place of blood-letting, recourse should be had to those other means which art possesses to control the action of the heart and arteries. I allude particularly to the use of large and frequent

doses of the tartrate of antimony,—to mercury combined with opiates,—and to colchicum.

It also happens, that in cases where bleeding has been employed, the local pains accompanying the disease do not subside, and symptoms continue, or succeed, just as severe as those which preceded the venesection.

In such cases it is a difficult point to determine how far bleeding is to be carried; and there are some men of experience and observation very acute in perceiving those symptoms which can only be relieved by blood-letting, and those which may be removed by blisters, anodynes, mercury and opium, colchicum, and such-like remedies.

Bleeding will also be found more or less injurious when employed in cases where there is merely an irregular distribution of the blood—or where there is an undue quantity in a particular part, without any increase in the quantity of the whole mass. Such cases are quite different in their pathological characters, both from those of congestion and of inflammation, and these *three* different conditions ought to be accurately distinguished.

In Irregular Distributions of Blood.

In *congestion*, the quantity of the sanguineous fluid is increased, or the vessels are in a state of plethora, but in an *inflamed part*, there is a change of structure going on, so that if an organ in a state of congestion be compared with one which is inflamed, and each macerated in water, the blood of the first is washed away, leaving the natural structure unchanged; whilst in the inflamed organ, besides an increased quantity of blood, there is a change in the structure of the organ, more

particularly an effusion of a sero-albuminous or puriform fluid, into the cellular membrane. Where there is an *irregular distribution of the blood*, and an undue quantity sent to a particular part, such as the head or chest, there is a corresponding diminution of blood in some other parts, as the legs and feet, and it is in such cases where the abstraction of blood is useless and sometimes injurious.

We have frequently examples of irregular distributions of blood in affections of the head and chest. Persons suffering from bilious and aguish headaches, as they are usually called, often have a flushed countenance, and an increased action of some of the branches of the external carotid artery; but they are not accompanied by any of those changes in the pulse which indicate the use of blood-letting, and are marked by symptoms showing a diminution of blood in some other parts of the body, and more particularly in the limbs, by a painful sense of coldness in the legs and feet.

Persons who have often suffered from bilious headaches, accompanied with a flushed face, and for which bleeding has been ineffectually resorted to, may, however, have also feelings of uneasiness in the head which are of a different character, and of that description wherein bleeding is highly beneficial. I have known several serious errors committed from the practitioner not being aware of this circumstance, and treating a headache where there was a congestion of blood like an ordinary sympathetic headach; and patients themselves, subject to headaches from derangement in the digestive organs, are apt to attribute every uneasiness

which they may at any time experience in the head to the same cause.

The late Dr. Baillie frequently suffered from Case. headaches connected with chylopoietic derangement; and on several occasions they were so severe, that he had been induced to try the effect of cupping, but from which, he never experienced the smallest benefit. Perceiving one day some spectra or images floating before his eyes, accompanied by uneasy feelings in the head, he asked my opinion; and considering that these symptoms were of a plethoric character, and indicated congestion within the head, I recommended the abstraction of some blood. To this he at first objected, not having found relief from former bleedings; but on representing to him the difference in the character of the present symptoms, he consented to have a few leeches applied behind the ear, which gave such relief as to induce him to repeat their application on the following day. By this treatment the spectra disappeared, and he was perfectly relieved from all uneasy feelings in the head.

A gentleman, who had often suffered from what Case. he called "blind headaches" during forty years of his life, consulted the practitioner who lived in his vicinity, relative to some feelings in the head. Considering these symptoms to be unconnected with the "blind headaches," he advised him to be bled at the arm, which advice, however, was not followed. He consulted another physician, who recommended to him the use of the sulphate of iron; and a third, whom he afterwards consulted,

recommended tonics, wine, and a generous diet! Having pursued this plan, and while he was on a visit to London some weeks afterwards, I was hastily sent for to visit him, and found that the left side had become paralytic, with symptoms of congestion in the brain, for the treatment of which he required repeated blood-letting.

Blood-letting in Specific Diseases. In those diseases usually called *specific*, such as syphilis, cancer, scrofula, gout and rheumatism, blood-letting is often injurious, though it is useful when employed under certain circumstances and within certain limits.

Whatever organ is affected with acute rheumatism, there are always present symptoms of an inflammatory type. Yet it is well established that persons suffering from this disease cannot bear very copious bleedings, and their too frequent repetition has certainly, in many instances, laid the foundation of chronic affections of the joints.

The same observation applies to gouty inflammation in any organ. We find that, in some cases, a certain extent of depletion will mitigate the inflammatory symptoms attending gout, but if the depletion be carried beyond certain limits, it no longer alleviates the pain; the whole system seems to suffer, and the local disease is apt, as in rheumatism, to assume a chronic and unyielding form.

With regard to the use of blood-letting in specific diseases, I may here observe that there generally is not only the *specific* disease to contend with, but there is also more or less common or *idiopathic* inflammation accompanying the specific disease.

It is only this *idiopathic* inflammation which ought to be treated by blood-letting—the bleeding has no influence in subduing the specific disease.

It is not uncommon to observe a specific inflammation, once excited, thus cause an accompanying idiopathic inflammation. In *sypphilis*, for example we find that besides the primary ulcer, a great degree of inflammation of the adjacent parts sometimes supervenes, which inflammation is relieved by bleeding, and would be aggravated by the use of mercury. It is after this idiopathic inflammation is removed, that we can proceed to the cure of the specific disease by exhibiting mercury.

In Syphilis.

So it is in the treatment of *cancerous affections*; the tension and swelling accompanying a scirrhus tumour can often be relieved by general and local blood-lettings, and in proof that such bleedings are proper under certain circumstances, may be mentioned the *spontaneous* hemorrhages to which such diseased parts are subject, and the effects of blood-letting in relieving certain states of plethora and congestion of the adjacent viscera.

In Cancer.

The same remarks apply to the treatment of *gout*. When gout affects any part of the body, the inflammatory swelling and pyrexia, which often accompany it, are relieved by bleeding, but the bleeding has no influence on the specific affection, and hence the usual practice in the treatment of gout, is first to subdue any local inflammation and febrile symptoms by depletion, and then, and not till then, to administer the specific remedies for the cure of gout.

In Gout.

In the treatment of *scrofulous* affections, blood-

In Scrofula.

letting will often be found essentially useful in relieving any accompanying idiopathic or common inflammation,—though it has no effect as I have observed of syphilis, cancer, and gout, in subduing the specific disease. Hence, when the lymphatic glands, the joints, or the lungs are affected with scrofula, the inflammation which accompanies that disease will be mitigated by blood-letting ; and hence too when such accompanying inflammation is subdued, the progress of the scrofulous disease is checked. But on the other hand if blood-letting be pushed further than merely subduing inflammation, then, in proportion as the system is debilitated by the bleeding, so will the progress of the specific disease be advanced.

In Pul-  
monary  
phthisis.

When the lungs become the seat of scrofulous tubercles, there is another source of relief derived from blood-letting, besides that of mitigating accompanying inflammation, and which ought to be kept in mind in the administration of this remedy. In proportion as the circulation in the pulmonary vessels is obstructed by the tubercular masses, so will the heart be liable to congestion, and hence the greater the extent of disease in the lungs, the greater will be the congestion of blood in the heart, and therefore there will be increased frequency of its action in order to remove its undue quantity of blood. By abstracting blood under such circumstance the congestion is relieved, which quells the increased frequency of the heart and embarrassment in the respiration.

Case  
communicated by  
Mr. Braine.

“ A female reduced to a hopeless condition with pulmonary phthisis, complained of a most distressing

difficulty in breathing and the action of the heart was so violently affected, that although not the most remote hope could be entertained of her living more than a few days, yet in this state she was bled at the arm and after a few ounces of blood had been taken away, such was the degree of comfort she experienced that in a few days afterwards, and almost immediately before she expired she urgently solicited that blood-letting should be repeated."

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## DISCOURSE VII.

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*Curative Effects of Abstracting Blood in Fevers;—in Eruptive Fevers;—in Scarlet Fever;—Small Pox;—Erysipelas;—in acute Inflammations;—in Subacute Inflammations;—in Congestions;—in Wounds;—in Suppurated Parts;—in Sloughing;—Ulcers;—in Ulcers of the Legs;—Some Anomalous Effects of Blood-letting.—Conclusion.*

Having in the foregoing Discourses, endeavoured to explain most of the important circumstances connected with the subject of blood-letting—particularly the differences in the effects of abstracting blood from the arterial and venous systems,—the differences in the effects of local and general bleeding,—the indications for employing each of these modes of abstracting blood,—the extent to which blood-letting ought to be carried, and also the injurious effects of abstracting blood, I propose before concluding this interesting subject, to make a few observations on the curative effects of blood-letting, and glance over those various classes of diseases to which our attention ought to be particularly directed in the employment of this powerful remedy.

In febrile diseases (the class "pyrexiaë" of CULLEN), blood-letting, as a general remedy, must be considered one of the most essential, whether we contemplate its effects in the treatment of "fevers" properly so called,—in the "phlegmasiæ," where there is an inflammation of some particular organ,—or in the order of "exanthemata, or eruptive, fevers."

Blood-  
letting in  
Fevers.

In the treatment of *fever* there has been much controversy on the propriety of blood-letting, and like most other discrepancies in medical opinions, I believe these are to be chiefly attributed to the observations of different writers not having been made under the same circumstances, and to there being no class of diseases that assumes a greater variety of type than fevers,—not only in different countries and in different classes of the community, but even in different years and seasons in the same place. That fever which at one period, and in one class of persons, is mild, may, in a short time, assume the greatest severity; whilst that which at another time appears in a severe and inflammatory form, demanding most energetic depletion, may at no very distant period, commence with typhoid symptoms, and require a perfectly opposite system of treatment. Hence all histories of febrile diseases, made at different periods, and at different places, present an unaccountable variety of character; and therefore, in the treatment of this class of diseases, all that we ought to attempt is to establish such *general* principles as shall be applicable to the different forms or types in which the fever may present itself; and here again we

must trust to a judicious discrimination, and an experienced eye, for detecting the peculiarities of each case; as even in the same family and under similar circumstances, instances will occur of a fever assuming an inflammatory character in one of its members, and in another a typhoid form.

The practice of avoiding the use of all depletive means in the treatment of fevers, has been, until late years, very generally followed. Dr. HAMILTON first pointed out the essential benefit to be derived from the free use of *purgative* medicines, and our army and navy surgeons had many opportunities, during the last war, of establishing the advantages to be derived from a judicious employment of blood-letting, both general and local, in those fevers which, in different parts of the globe, had usually been considered as requiring an opposite system of treatment.

See his work on the use of purgatives.

The objections to the use of blood-letting in fever were founded merely on hypotheses, and on the erroneous notion that such diseases had to run through a certain course—to have a certain duration which could not be shortened, whence it became necessary to husband the resources of the system, in place of abstracting blood, or of adopting any mode of treatment which would cause a further exhaustion of the vital powers.

Objections to ill-founded.

I had an opportunity of witnessing the fallacy of this doctrine in the case of a youth who was attacked with fever, and whom I accidentally saw just when he was brought from school, at the commencement of the disease.

Case.

He complained of a violent headach, had a flushed

countenance, a typhoid tongue, a hot and dry skin, and a rapid pulse. I immediately bled him at the arm, when in the supine posture, until he fainted, ordering him a dose of James's powder and calomel every four hours, alternately with a purgative. The physician who attended the family was afterwards sent for and in a few hours he visited the patient. When he heard the history of the case, and observed the character of the tongue, he expressed his decided opinion that the depletive system of treatment would be injurious, that the patient had all the symptoms of typhus fever, which would endure twenty-one days, and that it would be followed by such a train of symptoms of exhaustion and debility, that in place of blood-letting, the very opposite system of treatment ought to have been pursued. Contrary, however, to this prediction, the bleeding completely and permanently relieved the head, the skin and alimentary canal were powerfully operated upon by the antimony and calomel, and so early as the ninth day the febrile symptoms abated.

Utility of  
Local  
Bleeding  
in Fever.

There are many cases of fever in which general blood-letting is quite inadmissible, but wherein the application of a very few *leeches* is of the greatest utility. Such local depletion is advisable in cases of fever whenever there is any fixed local pain or congestion in any particular region, such as that of the head, chest, or abdomen. Whilst the general assemblage of symptoms do not point out the necessity, or indeed, where they rather indicate the impropriety of *general* blood-letting, the application of a few leeches is generally under such circumstances quite sufficient to afford relief; and in

adopting this treatment we are strictly imitating the mode which nature herself, in similar cases, adopts,—for whilst she endeavours by acting on the skin and alimentary canal to relieve the symptoms of the first stage of fever, she subdues congestion or chronic inflammation of particular organs by a “spontaneous hemorrhage.”

The abstraction of blood, whether generally or locally will be found in some cases a powerful remedy in *eruptive fevers*; and, as I have noticed in regard to fevers, it is not many years since blood-letting was first employed in the treatment of exanthematous diseases,—from an impression that they also had to “run their course,” and that from the great exhaustion created by the disease, all the resources and powers of the system were required to support the patient, in place of rendering any further debility by depletion admissible.

In Eruptive Fevers.

Numerous facts have proved the fallacy, indeed the absurdity, of such a doctrine. There is no febrile disease, even of a specific character, such as small-pox, measles, scarlet fever, or hooping-cough, wherein blood-letting may not be advantageously employed under certain circumstances, particularly during the early stages of these maladies.

When noticing the injurious effects of blood-letting in *specific* diseases, I observed, that in syphilis and gout, besides the specific inflammation which forms the essential character of those complaints, there are often symptoms of another character,—symptoms which arise from an *idiopathic* or common inflammation being present at the same

time, and which inflammation is to be subdued by blood-letting. Now this observation is applicable to the phenomena observed in the "eruptive fevers," and you will find that these diseases are sometimes accompanied by inflammatory symptoms, or with an idiopathic inflammation in a particular organ, which requires a separate system of treatment.

In Scarlet  
Fever.

Blood-letting may also be resorted to in the early stages of *scarlet fever*, particularly when there is a determination of blood to any particular part, as the chest or head. Sometimes the inflammation of the throat, the characteristic feature in this disease, is so severe, that much relief is obtained by local bleeding, more or less profuse; but when any of the vital organs are affected, then venesection is preferable.

There is in this disease, as in erysipelas and other of the exanthemata, a notion with many, that patients cannot endure a depletive system, or that such is unnecessary for their treatment. It cannot be denied that, like most other diseases, the scarlet fever in many cases passes through a very mild course, having scarcely a symptom requiring any particular treatment; and there are other examples wherein the pulse from the very commencement of the disease is feeble, and the powers of life sink rapidly. We ought also to be aware, that cases of scarlatina do occur, where severe inflammatory symptoms come on, and of that degree wherein blood-letting is highly to be recommended. The additional vigour which the pulse acquires whilst

the blood flows from the vein, will be an unerring guide for estimating the propriety of the measure, and the extent to which it should be carried.

A gentleman between fifty and sixty years of age Case. was seized with shivering, succeeded by hot skin and other febrile symptoms. On the evening of the same day I visited him. His mind was restless and a good deal excited; his skin hot and burning, his tongue white and loaded, the pulse frequent, and he had a tumultuous action of the heart. His countenance was flushed, the tint of which, along with a slight redness of his throat, made me suspicious that he had an attack of scarlet fever. He was immediately bled from the arm; at first the pulse rose, and a considerable quantity of blood was abstracted before he became faint. Calomel, combined with antimony, and a purgative medicine, were then given alternately every two hours. Next morning the febrile symptoms were much subdued, but his throat had become very painful. Twenty-four leeches were now applied to the external fauces, with relief. In a few hours afterwards he was again bled at the arm, a slight return of head-ach, with fever, having come on. These symptoms never returned; a fetid slough separated from the tonsils, and he afterwards recovered daily, and was very rapidly restored to health.

From the treatment which was adopted in this case, and its decided success, doubts were entertained of its having been really a case of scarlet fever; but those doubts vanished when that disease made its appearance a few days afterwards in two children of his family.

In Small-  
pox.

The benefit of blood-letting, when the febrile symptoms accompanying *small-pox* are severe, or when inflammation affects any particular organ, is equally great. An intelligent army-surgeon made it a general rule, from which he experienced the greatest benefit, always to bleed soldiers on the commencement of the fever preceding the eruption.

Case.

A lady was attacked with severe febrile symptoms, for which she was profusely bled, and with great relief. On the following morning it appeared that she was afflicted with small-pox, and her medical attendant at first expressed his regret at having had recourse to venesection. Such, however, was the mild progress of the disease, when viewed in comparison with that of many who were affected in the same town, that all were convinced the blood-letting had been highly beneficial, and had mitigated the febrile symptoms.

In Erysi-  
peias.

When considering the effects of local bleeding, I remarked that its benefits were exemplified very strikingly in cases of *erysipelas*, from the relief derived by the profuse hemorrhage which followed incisions made into the inflamed integuments. Such a practice, will, however, I am persuaded, be seldom found necessary, if blood-letting be had recourse to in the early stage of that disease.

From a supposed *typhoid* character of erysipelas, it was, and with some still is, the general practice never to deplete or pursue an antiphlogistic plan of treatment; and I well remember visiting a lady who was suffering from a very severe attack of erysipelas in the face, and finding at her bed-side a large tumbler of wine-and-water, and that she was

taking as much bark as her stomach could receive. By bleeding her, freely at the arm repeating the operation three times successively at short intervals, along with purging and antimonial medicines, she rapidly recovered; and another medical attendant expressed his surprise at the treatment I had employed, remarking that during a long attendance at a public hospital, he had never known blood-letting employed in erysipelas,—adding, that nearly all the cases which he had seen of that disease affecting the face and head had terminated fatally.

In erysipelas there is usually a peculiar feeling in the pulse, which is apt to dissuade the practitioner from the employment of blood-letting. The pulse though small, will however be found more or less *incompressible*, and whilst blood is flowing from a vein, it acquires more and more volume, and often a very considerable quantity is abstracted before a fainting state supervenes.

Whenever the abstraction of blood is necessary in the treatment of erysipelas, *general* is to be preferred to *local* blood-letting, and chiefly for this reason—that the leech-bites often act, in such states of the system as additional exciting causes, and therefore the local irritation created by them ought to be avoided, which can be done by adopting venesection. Besides, we seldom see erysipelas so severe as to require blood-letting without there being more or less disturbance of the whole system, and this is a further reason for preferring general to local depletion in the treatment of this disease.

In the treatment of all *inflammations* (the “*phlegmasiæ*” of Cullen) the abstraction of blood is a most

In Acute  
Inflamma-  
tions.

powerful curative means, and, as I have already noticed when considering the subject of general blood-letting, whenever an organ is inflamed, and that inflammation is accompanied by febrile excitement, the abstraction of blood should be unhesitatingly employed. Under such circumstances, the blood should be abstracted from the arm whilst the patient is in the recumbent position until syncope be produced, and the operation should be repeated whenever the pulse rises, and until the febrile symptoms are subdued.

Even after the feverish symptoms have been mitigated, there may still exist some determination to a particular organ, such as the head, chest, or abdomen, in which case local bleeding should be resorted to. By general blood-letting the increased action of the whole vascular system is diminished, but local bleedings are subsequently necessary to check the undue action of the capillaries of the inflamed part. It is always of importance, however, in the treatment of inflammation, that the general, should precede the local, bleeding. Every day we meet with cases wherein local bleeding has been employed without benefit, and in which, when general bleeding is afterwards adopted, the symptoms at once subside.

Case.

“ A young officer suffered severely from pain in the head, along with ophthalmia and general fever. He was repeatedly bled by leeches, and the temporal artery was opened without affording him any relief. A vein in the arm was now opened, the effect of which was to produce not only an immediate removal of the uneasy feelings in the head, but to

check the future progress of all inflammatory symptoms."

There are many sub-acute inflammatory affections which will be found to yield to a similar system of treatment. Indeed there appears to be produced by small and frequent bleedings, in such cases, an effect very different to that arising from larger depletions; and in adopting the practice there is little difficulty in regulating either the number of leeches necessary to be applied, or the frequency of their application. At first the bites may bleed very profusely, whilst their future applications will yield comparatively little blood, but their use should be repeated as long as the blood they draw affords decided relief.

I need scarcely remark, that whilst this system of local bleeding is pursued, it is not meant that the use of other auxiliary remedies should be precluded. On the contrary, it is always to be remembered that blood-letting is here supposed to be employed in conjunction with other curative means, that state of the system requiring the abstraction of blood being always accompanied by more or less disturbance of some of the other functions.

When inflammation assumes a chronic, or passive, or *sub-acute* form, the abstraction of blood is a remedy as useful as when the disease is in its acute stage. The above terms have each been employed to denote the state of an inflamed part wherein there is no longer any febrile excitement,—no disturbance in the action of the heart, but where there is a change merely in the functions of the capillary

In Sub-acute Inflammations.

system of a particular organ, and hence, as I have already remarked, it is in this stage of inflammation that local is usually preferable to general blood-letting.

In all such cases I have been in the habit of recommending the frequent repetition of *small* bleedings in place of one or more large depletions, and I have often been both surprised and gratified with the benefit of this practice. A person afflicted with some chronic inflammation, and whose strength cannot support anything like a sudden depletive system, will often gain vigour and health by the daily use of two or three leeches in the vicinity of a diseased part.

Case.

A young lady, of feeble constitution, had one of the glands in the neck rapidly enlarged. It was tender to the touch, but she had no febrile symptoms. I advised her to apply leeches daily, beginning with four, and diminishing the number as the swelling abated. This treatment, along with fomentations and poultices, greatly relieved her, and the swelling gradually diminished. But the leeches were employed no less than seventeen times before all tenderness went off; and what surprised her relatives was, that at the termination of this treatment her general health and strength had improved, and she had regained flesh.

Case.

A girl, about six years of age, had a scrofulous affection of the second joint of the thumb, a considerable enlargement of the soft parts having taken place, with slight discoloration and tenderness. Two leeches were daily applied for one week,—one each day—during the subsequent week, and one every second or third day afterwards, until the

swelling completely vanished; after which treatment her general health was greatly improved.

This mode of treating sub-acute or chronic inflammation is applicable to all organs, and though in general medical men are aware of its importance in inflammatory diseases of the vital organs, there are many similar affections of parts less important in the animal economy, to which a depletive system of treatment, though not generally employed, will be found equally beneficial.

Ophthalmia, also, presents itself in numerous forms wherein this system of small but frequently repeated local depletions are very beneficial, and I might quote numerous cases to show how inflammations of the eye that have existed long, and for which a variety of local as well as general remedies had been employed without success, were afterwards completely subdued by omitting all local applications and merely applying daily one or two leeches behind the ears alternately, as long as the symptoms continued to yield to the treatment.

A girl six years of age had the cornea of both eyes so dim that vision was nearly destroyed, and there was a pale redness of the whole sclerotic accompanied by an intolerance of light. She was sallow, feeble, and emaciated, the circulation hurried and the digestive organs considerably disordered. I recommended two leeches to be applied behind one ear every day—one grain of calomel to be given every morning, and, after a week, every second morning for a few times. Some of the liquor of potass combined with rhubarb was given

twice a day. Such was the manifest benefit derived from the leeches in this patient, that they were daily continued for two months, and afterwards one was applied daily for another month. The result of this treatment was that a perceptible amendment continued to take place daily in her condition. The redness of the eyes gradually subsided, the corneæ regained their transparence, the digestive organs improved and she accumulated health and strength, so that at the end of the third month she required no further treatment, and no local remedy was ever applied to the eyes.

The patient was brought to me upwards of a year after this illness, with a very extensive inflammatory swelling of the soft parts covering one of the tibiæ. I pursued the same system of treatment, and it was not until several weeks had elapsed and that besides the use of calomel she had applied leeches daily, that the swelling was subdued.

There are many other organs, particularly the mamma and genito-urinary organs of both sexes liable to chronic inflammations, which may be subdued by this system of small but frequent local depletions.

In Con-  
gestions.

The observations I have hitherto made on the curative effects of blood-letting apply chiefly to the employment of it in the treatment of diseases of an inflammatory character. But there is another class of cases wherein the abstraction of blood is an equally powerful remedy, and in which the propriety and extent of the depletion are indicated by a different assemblage of symptoms. I allude to

*congestion*, or plethora, of a particular organ or region of the body.

This state of congestion, as I have already endeavoured to point out, is very different from inflammation; in congestion the vascular system, more particularly the veins of the affected part, being preternaturally distended with blood, whilst in an organ which is inflamed, there is a change in the condition of the arterial capillaries. A mere congestion of blood can be artificially produced in the arm by tying a ligature around it, and thus distending the veins. There is no alteration in structure thus produced, but merely an increase in the quantity of blood, which, if we could suppose the limb was removed from the body and immersed in water, would be washed away. Congestion, I have also observed, ought to be discriminated from an irregular distribution of blood, examples of which we have in flushings of the cheek,—the effects of friction on the skin,—the presence of a mote in the eye,—and in many of those headaches which are usually called “nervous.” Now in cases of congestion, bleeding should not be generally carried to the same extent as in inflammations, and the blood is to be removed either from the vessels immediately connected with the diseased organ, or remote from it. Leeches on the frontal vessels, or on the ethmoidal vessels ramified on the septum of the nose, or applied behind the ears,—for the reasons already explained, or cupping the nape of the neck, are the modes best adapted for relieving congestion within the head.

See page  
109.

Leeches or cupping may, in like manner, be employed on the parietes of the thorax and abdomen in congestion of the viscera; and leeches on the verge of the anus are particularly beneficial in abdominal congestions, from the circumstance formerly stated, of the connexion between the hemorrhoidal veins and the portal system.

Leeches  
on the  
feet.

Whatever theory or explanation may be given, I have already observed, there cannot be a doubt of the fact, that many diseases of the thoracic, chylipoietic, and uterine systems, are essentially relieved by the application of leeches to the feet; and this practice of removing blood from a distant part is equally remarkable in disorders of the head, these being often relieved by the escape of even a few drops of blood from the hemorrhoidal vessels.

But there are cases of congestion in which blood-letting must be carried to a great extent, more particularly where the brain or chest is the seat of the disease, life then being often in more or less danger, and the only mode of preserving it being the abstraction of such a quantity of blood as to produce syncope.

Case.

A gentleman, about sixty years of age, and of a sanguineous temperament, was suddenly seized with giddiness, at which he was alarmed, and I visited him immediately. There was so little deviation from the natural state of his pulse, that I even hesitated whether to take some blood by venesection or by cupping. The former mode being determined on, he was placed in a reclining posture on a sofa, a wash-hand basin put underneath his arm, into

which the blood flowed freely ; his pulse soon began to rise, and an incompressible feeling remained in it, until a large quantity of blood was abstracted ; at last it began to sink, but not until such a quantity of blood had escaped as I would not have ventured to take away, had not the character of the pulse and the plethoric appearance of the patient given me confidence. Except purgatives given sufficiently freely to open the bowels, he took no other medicines. On the following day he felt so little the effect of the depletion, that he dined at a club, and on the following evening he was so well as to be able to attend his duty in the House of Commons. The blood he lost was accurately weighed, and amounted to no less than fifty-two ounces—a quantity many practitioners may have removed in cases of great urgency ; yet, what was remarkable in this case was that none of those debilitating effects were produced which might reasonably have been anticipated from so large a depletion, and what was most satisfactory, this patient continued several years after in most perfect health.

I have already remarked, when speaking of the *injurious* effects of blood-letting in paralytic affections arising from effusion of blood in the brain, that blood-letting cannot be carried far in proportion to the severity of the symptoms ; for, on the contrary, in proportion as the shock is severe, a lesser quantity of blood only can be removed with safety. That is, a person who has an attack of palsy, destroying at once the power of the upper and lower extremities of one side, and also that of speech, cannot spare so much blood as the same

person could have done, and ought to have lost, *previous* to the attack, had its approach been observed.

In proportion to the severity of the injury sustained by the brain, so does the system suffer from the shock; and hence in the degree in which the powers of life are diminished, so will the system be the less able to support the abstraction of a large quantity of blood.

Case.

A man forty-five years of age, whose habits were extremely dissipated, and who drank frequently to intoxication, lost suddenly the power of speech, and the whole of his left side became motionless. In this state I opened a vein in his arm, and after a very few ounces of blood escaped, his pulse sank; and on repeating the operation a few hours afterwards, his pulse again faded, after a very small quantity was removed. Having freely evacuated the bowels, and taking calomel every few hours, the mercury at last affected his gums, and a sharp ptyalism supervened, which was followed by a gradual restoration of the powers of speech, as well as of the use of the paralysed extremities. A seton was afterwards introduced into the nape of the neck; and I saw this patient upwards of four years after this attack, having recovered his speech, and that of the use of his side so perfectly, as to enable him to be employed in his business as a watch-maker.

When, on the other hand, the approach of a paralytic attack is foreseen, or even after the symptoms have slightly commenced, it is astonishing to what an extent blood-letting must sometimes be

carried, in order to check the progress of the malady.

A patient called on me, complaining of a numb-  
ness in the muscles of the right arm, and a tingling  
sensation in the fingers, which symptoms he had  
first perceived on shaving himself that morning.  
His pulse did not appear much changed, but it was  
not easily compressed. The action of the heart  
was unnaturally vigorous; his countenance had a  
tumid appearance and a leaden colour, but he had  
no uneasy feelings in his head, though he had walked  
a considerable distance to my house. I advised  
him to return home in a coach, and to be imme-  
diately bled in the horizontal posture. Forty-four  
ounces of blood were abstracted before syncope  
came on. The pulse soon began to rise, and he  
was largely bled a second time twelve hours after  
the first bleeding, and the blood was again allowed  
to flow until he fainted. In forty-eight hours after  
the first bleeding, the action of the heart and arte-  
ries had greatly increased, accompanied with feelings  
of stupor and giddiness, notwithstanding his bowels  
had been very freely evacuated; he was therefore  
again bled at the arm till syncope came on, having  
lost in the three bleedings no less than a hundred  
and six ounces of blood! A few doses of calomel,  
which had been given along with strong purgatives,  
in a few days affected his gums, and created a good  
deal of mercurial fever, but after this went off, his  
strength rapidly recovered, and in a few weeks all  
numbness left his arm, its motions being at the  
same time so completely restored, that he could use  
a pen as well as previous to his illness.

Case.

In restoring the menstrual flux.

Blood-letting may often be most successfully employed in restoring the *menstrual flux*—when that periodical discharge has been suppressed. For this purpose, the bleeding should be employed the day previous to its approach, the abstraction of a small quantity of blood at that period relieving the system of more or less disturbance, and thus permitting the natural functions to be more perfectly performed. In such cases the application of leeches to the feet is the best mode of abstracting the blood.

Blood-letting is also not less useful in regulating the quantity and quality of the menstrual flux and in alleviating the pain, and distressing symptoms which often accompany a diminished menstruation.

Case communicated by Mr. Braine.

“An unmarried lady about twenty-two years of age, had for several years suffered from painful menstruation. I advised her to apply from two to four leeches every night for three nights previous to the accession of the menstrual discharge, and to use at the same time the pediluvium. This plan of treatment had the effect of diminishing the pain accompanying each succeeding period, and after the fourth month the menstrual flux took place without pain, since which time the period has been quite natural and free from pain,—and her general health so much improved that she has since enjoyed better health than she had previously for several years.”

In wounds and injuries.

The abstraction of a quantity of blood ought to be had recourse to, before and after most surgical operations. When operations prove unsuccessful, I have always remarked that in by far the majority of cases, the patients die of inflammation of some internal organ. Bleeding therefore will, when early

resorted to, and carried to a proper extent, have the effect of always checking any inflammatory disposition, and it will also be the means of securing the healing of the wound by adhesion, when such is desirable.

The modes of abstracting blood for such purposes consist, either in taking away a quantity before the operation,—in allowing the divided vessels to bleed during the operation—or in employing venesection after the operation. Now all these *three* methods ought to be adopted separately or conjointly in particular cases.

When an operation is to be performed on a plethoric subject, and an operation where little blood can be lost—more particularly in operations for *cataract*, in which no blood-vessel is ever divided,—then it is very judicious to bleed the patient on the morning of the operation; any future bleeding, of course, depending on the subsequent symptoms.

When there is any chance of dividing, during an operation, blood-vessels of such a size as to admit of the wished-for quantity of blood to flow from the wound, then I have usually been in the habit of *not* bleeding the patient previous to the operation, but of allowing such a quantity to escape from the divided vessels as appeared expedient.

Advantages are in most cases derived from a plentiful sanguineous depletion during operations, and a complete check being thus offered to the accession of the febrile symptoms, and to the danger of inflammation in the wounded parts. Strongly am I impressed with the utility of this practice, from

having generally remarked that all those patients who have lost much blood during operations from the wound, seldom require any subsequent bleeding, and the wounds usually heal by adhesion.

When, under any circumstances,—whether the patient have lost blood previous to or during an operation,—febrile symptoms do supervene, attended by more or less *local* pain, then blood should be freely abstracted, and be repeated until such symptoms are completely subdued.

If a wound be not forcibly closed and tightly bandaged, and vessels of any considerable size have not been tied with ligatures, then whenever the slightest inflammatory disposition supervenes, a hemorrhagic effort takes place, and there ensues a bleeding from the wound, which never fails to relieve the inflammatory state of the parts. From observing this phenomenon, I was led not to dress wounds and close them up in the usual manner; and, whenever any bleeding from them did take place, never to use any local means to suppress it, but to leave the vessels as it were unmolested, to pour out such a quantity of blood as may be requisite to relieve the inflammatory state of the wounded parts. This system of management generally secures the closure of the greater portion of a wound by adhesion, when its edges are in contact, and when the wound is not of such a nature as to render it impossible. As I have already remarked, it so moderates the subsequent local inflammation, that the suppurative process is always diminished both in severity and in extent. The same general remarks apply to wounds accidentally

inflicted, and to all kinds of injuries. Some observations on these points I have in part anticipated.

It is usually considered that when an inflamed part has advanced to suppuration, the future treatment ought to be altogether directed to the healing of the abscess, for which poultices and free incisions are frequently employed.

In sup-  
purated  
parts.

It is true, that usually when the contents of an abscess are discharged, the accompanying pain as well as inflammation abates, but this is not the case on all occasions; and it is in such cases, and under such circumstances, that I have found local blood-letting essentially useful.

In most cases of cellular as well as glandular inflammation, the purulent fluid which is collected and forms the abscess, does not make its escape if left to nature until all the circumjacent swelling and inflammation have abated. But if the matter has been artificially evacuated, and the surrounding swelling and inflammation are unsubdued, then the daily application of leeches to the inflamed integuments will be found most useful; and whilst the inflammatory symptoms are thus subdued, the suppurative process will be observed in like proportions to diminish.

A youth, when bathing, trod upon a broken bottle, which cut the sole of the foot deeply. I saw him about four months after the accident. There were considerable tumefaction and tenderness of the soft parts around the wound; almost the whole extent of the cut remained open, and there was a copious puriform discharge, which appeared to ooze from

Case.

a cavity corresponding in extent with the hardened and swollen soft parts. Four leeches were daily applied, and, with a common poultice and perfect rest, in eight days the wound was closed; the repetition of the leeches a few times, at more distant intervals, completely removing all swelling and tenderness.

When a succession of abscesses has formed in any part, and when sinuses have been extending, as it were, step by step, the inflammation of the surrounding soft parts can in such cases be completely checked by local bleeding; and in this manner have I often been able, by the almost daily application of leeches, completely to conquer the inflammation, and thus check the formation of new abscesses and the extension of sinuses. I have long thought that it is by the bleeding from the incisions made for laying open sinuses that the good effects of that practice are chiefly derived.

It is surprising to what an extent bleeding can be employed, or rather how often a small number of leeches can in such patients be applied with the most decided benefit; and in place of patients being reduced by such a practice, the effect of the depletion, by alleviating disease, seldom fails to improve the general health.

In Burns. The inflammation which is caused by a *burn* or scald, may be alleviated by the same plan of treatment as is so successfully resorted to for the relief of inflammation caused by any other injury.

Case. Whilst a youth about ten years of age was amusing himself with gunpowder, a large quantity ignited and severely scorched his face. When I saw him

a few hours after the accident, I found the whole face much swelled and scorched, and the eyes closed from the swollen state of the palpebræ; he had great pain, and the pulse though not frequent was firm and unyielding. He was immediately bled at the arm until he became faint, which had the effect of alleviating the pain and diminishing the swelling. Leeches were applied behind each ear alternately whenever pain returned, and these were repeated morning and evening until the inflammation of the integuments was completely subdued—and whilst this treatment was employed the bowels were at the same time fully evacuated, the patient kept on the antiphlogistic regimen, and the common liniment of lime-water and linseed-oil applied to the burn.

Whenever an ulcer, whether it be the consequence of a wound, or be caused by some specific virus, such as that of syphilis, assumes a disposition to slough, it has been usual to employ stimulants, both as internal and as external remedies. Now there are many cases of this description wherein an opposite or depletive system of treatment may be advantageously employed. I first observed the extraordinary effect of depletion in a case of sloughing chancre, from which a profuse hemorrhage took place.

In Sloughing  
Ulcers.

Early one morning I was sent for to visit a gentleman who had lost a great quantity of blood during the night from a sloughing chancre, which had extended into one of the corpora cavernosa. To arrest this hemorrhage I immediately bled him

Case.

at the arm till he fainted; after which the hemorrhage from the sore did not return, but a change took place in its character, which I little anticipated. The sloughing process was completely checked, the slough separated, and the wound granulated and cicatrised in the most healthy manner.

Reflecting on the effect of depletion in such cases, we find incontrovertible proof that sloughing sores are at least not always to be attributed to a diminished vigour or typhoid state of the system, nor to an increased virulence of the specific virus, but to an excess of inflammation arising from the peculiar state of the system or constitution of the patient. This inflammatory state is to be subdued by an antiphlogistic system of treatment, independent of any subsequent treatment which may be necessary for the cure of the specific disease. Hence, as is well known, in cases where the syphilitic sore shows a disposition to inflame much, or to slough, the exhibition of mercury is prejudicial, and never ought to be administered until all local as well as constitutional excitement be subdued. In the class of cases to which I allude, besides blood-letting, opium ought to be freely given, and one or more grains may be taken every few hours, until the symptoms be relieved.

The same observations which I have now made on the curative effects of blood-letting in sloughing syphilitic sores, apply to those wounds where it is not unusual to see the soft parts slough or mortify from the violence of the inflammation consequent on the injury. In such cases there is a period when

the best effects will result from local or general blood-letting, and that too where from the sloughing appearance of the wound depletion is not commonly employed.

This useful effect of abstracting blood has been established in the most satisfactory manner in the treatment of *hospital gangrene* by Dr. BOGGIE, an intelligent army surgeon, who in the military hospitals during the Spanish campaigns, met with many examples of that formidable disease for which he found venesection the most powerful remedy.

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burgh  
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A lady about seventy years of age and of a corpulent form, received a sharp blow on the edge of the tibia. Ten days after the injury, when I was consulted, a portion of the integuments which had been bruised had become of a dark livid colour, and an erysipelatous inflammation had extended over a considerable portion of the adjacent skin. She was restless, the skin hot, the tongue white and loaded, and her pulse small, contracted and frequent; with a view to arrest the gangrenous character of the integuments, she had been ordered wine-bark and a generous diet. I advised her to be bled at the arm, and she lost about eighteen ounces of blood when in the horizontal posture, before she became faint. The bowels were freely opened, a strict antiphlogistic treatment was pursued, and on the following day the inflammatory symptoms of the injured integuments were greatly subdued. One grain of calomel and antimonial powder was given every few hours until the febrile symptoms subsided, and leeches were daily applied to the limb on

Case.

the parts adjacent to those which were inflamed until the discoloration and redness disappeared, and in a few days she got quite well.

In Ulcers  
of the  
Legs.

This plan of treatment is equally applicable to the inflamed integuments around an ulcer. I am constantly in the habit of applying repeatedly a small number of leeches, and with the best effects, in the immediate vicinity of ulcerated surfaces, and where general bleeding is not indicated.

I may, however, here mention, that there are many ulcers of the lower limbs, which though not accompanied by those febrile symptoms which point out the propriety of general blood-letting, are manifestly benefited by the abstraction of a moderate quantity of blood by venesection. I was first led to adopt this practice by having remarked a decided relief in some ulcers from the rupture of a varicose vein accompanying them, and from the benefit derived by bleeding animals afflicted with any ulceration, or "humour," as it is commonly designated; and also, from such ulcers being usually the effect of some constitutional disturbances, which would have been relieved by venesection.

By adopting the practice of bleeding patients with ulcerated legs, whenever they were admitted into the hospital, and pursuing an antiphlogistic regimen, with no other local treatment than a cold-water poultice, and the horizontal posture, I have been much surprised at the rapidity of their amendment; especially when compared with that resulting from the tedious and troublesome application of plasters and bandages.

A young man had the posterior part of the skin Case. around the leg at the bend of the foot discoloured, many parts of it were excoriated and the veins were very turgid. This commenced three years ago in a small spot which gradually increased and became the source of great irritation and itching. Four leeches were applied to the skin contiguous to the diseased part, and he took calomel and colocinth morning and evening, the redness and irritation was much relieved the following day. Leeches were again applied and on the fourth day the inflammation was much subdued—itching gone—excoriations dried up—and the skin disquamating—some uneasy feelings, also, particularly a dullness and muddiness within the head accompanied with restlessness were relieved.

Hitherto great attention has been directed to the Effects of neglecting to bleed. useful and curative effects of blood-letting, but it is natural that we should inquire what are the consequences when such bleeding is not resorted to under all the various circumstances which I have pointed out as indicating the propriety of such treatment. We daily meet with opportunities of noticing the changes of structure which take place in every organ of the body, in consequence of inflammations being allowed to advance,—inflammations which, had they been early detected and treated by depletion, might have, in all probability, been subdued, whilst any permanent change of structure of the inflamed part would have been completely arrested.

There are, no doubt, many examples of inflammatory diseases, which have been relieved without blood-letting, some of them, when left to nature,

running through a particular course, and leaving the affected organ unchanged; and there are others which are checked by the exhibition of those internal and other remedies which influence and subdue the action of the arterial system. But there are many affections where the propriety of blood-letting has been indicated, though not adopted; and where, in consequence, has been laid the foundation of some substantial structural disease. I am indeed convinced, that in almost all those diseases which are, at their commencement, attended by a disturbed action of the vascular system, a much more rapid and efficient abatement of the symptoms would result from venesection, pursued even to a very moderate extent, and the whole system would suffer a much less subsequent debility, than by a free use of purgatives and diaphoretics, and a long continued perseverance in such antiphlogistic treatment.

Anoma-  
lous  
Effects of  
Blood-  
letting.

There is a curious effect of bleeding which was remarked to me, by Professor RUSSELL, of Edinburgh, and occurred in the following instance.

A lady of a plethoric habit was very liable to sudden and severe congestions of blood in different parts of the body, most frequently in the lungs; to relieve which the abstraction of a quantity of blood was indispensable. The moment a vein was opened she not only began to experience relief, but felt an instantaneous exhilaration of spirits, like one intoxicated. Mr. RUSSELL repeatedly witnessed this very singular effect in this patient, and a medical friend of his observed a result somewhat similar in another person.

Bleeding, too, not only increases the action of the bowels, but it promotes the mercurial action. Dr. FORDYCE used to say that in some cases of constipated bowels, we ought to open them with a lancet; and the late Mr. GIBSON of Manchester was in the habit of bleeding largely when he was anxious to influence the system rapidly with mercury and I have repeatedly observed how quickly affected was the system of those who at the same time were bled.

It is not an unusual, though it is a very erroneous notion that, if a person repeatedly loses blood, it becomes *a habit*, and he requires ever afterwards to be occasionally bled. But surely if a patient be affected with an inflammatory disease, his sufferings should be alleviated by blood-letting, when it is perhaps the only certain remedy.

With some people it is a practice to lose blood *periodically*, generally in the spring and autumn, and here, indeed, it is by no means improbable that, if these periodical bleedings were in such persons neglected, some injurious consequences might follow.

In concluding these observations on the subject of Blood-letting, I have endeavoured not to omit the consideration of any very important point, whilst I have avoided entering on speculative discussions. The materials of these Discourses I have been employed in collecting and revising many years, and during that time have embraced every opportunity of applying to the doctrines here inculcated the test of experience,—of communicating them to

Conclud-  
ing Obser-  
vations.

professional men,—and of comparing my opinion with those founded on the experience of others. Almost every observation which has been here made on the curative effect of blood-letting and the rules given for employing it, accord I am convinced with the results of the generality of practical men. In this, however, I must be understood as alluding to those only who themselves have been in the habit of performing the operations necessary for abstracting blood,—for I contend, that it is perfectly impossible for such persons as do not use their own judgement in regulating the extent of the bleeding by the effects produced whilst the blood is flowing from the vein—it is impossible for them to form correct and just notions on the use of blood-letting, and he who is in the habit of *prescribing* the abstraction of particular quantities of blood, in like manner as he may be accustomed to write the prescription for a dose of medicine, must possess a very incompetent knowledge of all the advantages which are to be derived from the judicious employment of this most useful and no less powerful remedy.