health, and reduces the patient to a state of great debility, which I believe would destroy her, unless proper means are resorted to, to arrest the disease. The first case of the kind which fell under my care, was that of a lady who had been confined three months, and was much exhausted by pain and constant discharge. The breast, which was naturally full and fleshy, was not much increased in size, but had an unhealthy appearance, with several openings leading to deep sinuses, communicating with each other in various directions. At this time, I was not aware of the obstinate nature of the disease, and endeavoured to heal these by injections of sulphate of zinc, stimulating frictions, and pressure evenly applied with plaster and bandage; but all my efforts were ineffectual, and I was under the necessity of dividing all the sinuses, which ran through the whole substance of the breast, so that it was literally cut into strips. The operation was a serious one, and attended with considerable hæmorrhage, but the good effects were presently apparent, for as soon as my patient had recovered from the immediate shock of the operation, the wounds assumed a healthy aspect; she rapidly got better, and recovered perfectly in six weeks. At her next confinement she came from a considerable distance to place herself under my care, and as there was no hope of her ever being able to furnish milk again from that breast, I covered it carefully with a diachylon plaster as soon as she was delivered, which completely suspended the secretion of milk in that breast, although she was able to nurse as well as usual in the other, and she passed through her confinement without the least inconvenience. Since that time she has had several other children, and uniformly adopted the same course with the like success. I have met with three other cases which were treated in the same manner, with the same result. I was consulted on another case, in which the patient refused to submit to the plan proposed, and tried various remedies under different practitioners, but was at last obliged to have the same operation performed. If I saw one of these cases in an early stage, I should not hesitate to make a free opening the instant the formation of matter could be ascertained, in the hope of preventing so painful and severe an operation.

Bridgewater, August, 1841.

ON THE
PHYSICAL ALTERATIONS OF THE BLOOD
AND
ANIMAL FLUIDS IN DISEASE.

By M. ANDRAL.

No. VIII.

Alterations of the blood in fever and inflammation.

BEFORE we proceed to investigate the condition of the blood in fever, it may be well to observe, that fevers are divided into idiopathic and symptomatic; the latter consist in certain febrile symptoms connected with inflammation, congestion, and severe pain; idiopathic fever may exist,—1st, without any lesion of the solids; 2nd, with an evident

lesion, but one which is not the cause of the disease; thus carbuncles and bubo in the plague, and ulceration of the intestinal glands in typhoid fever, are the effects of some cause with which I am unacquainted. Let us now turn our attention to the state of the blood in symptomatic and idiopathic fever.

1st. If the fever be symptomatic of inflammation, the quantity of fibrin is augmented; but this increase does not depend on the fever, for there are several fevers, just as intense and long continued as the inflammatory, in which we observe no increase of fibrin; the cause of the increased quantity of fibrin is not easily discovered, and to assign any particular one, in the present state of our knowledge, would be hasty.

2nd. When the fever does not depend on inflammation, we have no augmentation of fibrin, be it ever so severe or prolonged.

3rd. Should simple fever become complicated, during its course, with any inflammatory affection, then the fibrin increases.

4th. Fever and inflammation may co-exist, the latter being an essential element of the former, as inflammation of the skin in small-pox, measles, scarlatina, &c.; these affections of the skin, which perhaps should not be ranged under inflammations, are unattended with the characteristic increase of fibrin; the same remark applies to ulceration of the intestines in typhoid fever; however tenaciously some physicians may adhere to the inflammatory doctrine of typhoid fever, it is certain that the ulcerations of the intestinal glands are not accompanied by that increase of fibrin which attends other inflammatory diseases. Hence, whenever fever co-exists with inflammation, and together with it constitutes one of the elements of the disease, the fibrin of the blood is not increased; for example, small-pox, typhoid fever, &c. But it is far different when inflammation springs up during the course of the fever, or is one of its effects.

In a certain class of fevers, the chief cause seems to be the excessive richness of the blood. Inflammatory fevers, of a few days duration, depend upon this cause; the ancients considered this as an idiopathic fever, but it is really a symptomatic one. But we may ask, does the cause of the disease reside in the solids, or in the fluids? To excessive richness of the blood, as just mentioned, the disease has been attributed, but this richness consists in an increase of the globules, not of the fibrin. When Pinel published his nosography, the humours were altogether neglected, yet he located inflammatory fever in the blood-vessels; at a later period, it was connected with gastritis and enteritis; afterwards with inflammation of the heart and arteries; Tomasini still adheres to the latter opinion. It has also been denominated plethoric or hypertæmic fever, in conformity with the ideas of humoral pathology.

However, this is not the only fever in which the globules are augmented; the same increase occurs at the commencement of typhoid fever, measles, and scarlatina. We do not find this augmentation of globules in inflammation; it exists in the middle period of fevers.

In continued fevers, the febrile movement persists even when the globules have fallen to their normal standard, or below it; as a remarkable illustration, M. Andral cites chlorosis, in which

the quickness of the pulse augments in proportion to the diminution of the globules and progress of the disease; febrile symptoms now appear, the skin gets hot, the pulse excessively frequent, and the patient dies. After death, we find no very evident traces of disease in the viscera.

Fever may exist with every possible condition of the globules, (normal state, increase, diminution;) we may admit, although we cannot prove it clearly, that some fevers depend on increased richness of the blood; others, again, exist with a remarkable diminution of the globules; in a third class the fever persists, although the globules have been diminished by bleeding and abstinence.

If we now examine, in a comparative way, the condition of the various elements of the blood during fever, we shall find that the simple presence of fever never determines an increase in the quantity of fibrin; that fever may exist; 1st, when both fibrin and globules are in normal quantity; 2nd, when the globules alone are increased, the fibrin remaining unchanged. The quantity of fibrin may fall, during typhoid fever, even so low as 0.9; at an early stage of the disease, or when it is mild, the fibrin remains unchanged, but falls as the fever is aggravated; when it assumes an ataxic character, and symptoms of prostration ensue about the fifteenth day, the fibrin also falls, and hence we might be inclined to think that its diminution depended on the duration of the disease; but this is not the case, for in acute inflammation the quantity of fibrin is increased, even at an advanced period, and in spite of bleeding and abstinence from food; in fact, the condition of the blood in typhoid fever is exactly the reverse of that in inflammation; in the former, while the globules and fibrin are undergoing a diminution, the quantity of serum is increasing; hence, this is a disease in which the blood is remarkably impoverished.

PHYSICAL PROPERTIES OF THE BLOOD IN FEVER.—During fever, the separation of the blood into serum and clot is imperfect, because the latter is soft and retains the serum. The serum, again, is frequently of a reddish colour, from an admixture of globules, and the clot is large; this latter condition may depend—1st. On the increased quantity of globules which frequently attends the development of fever. 2nd. On the quantity of serum retained by the clot. 3rd. On the diminution of fibrin, and consequent want of contractility in the clot. The coagulum may, in many cases, preserve its usual degree of firmness, but the latter is never increased; more frequently it is diminished; or the clot may be quite soft and diffuent; a perfect buffy coat never forms during fever, unless there be inflammation; in typhoid fever and small-pox we find a thin, greenish layer, which is a mere rudiment of buff.

CONNEXION BETWEEN THE STATE OF THE BLOOD AND THE VARIOUS SYMPTOMS OF FEVER.—Fever may run through its different stages without presenting any complication, but in other cases we have a series of phenomena, which are, in some measure, connected with the febrile disorder, though not actually produced by it; these are inflammation, congestion, hæmorrhage, and gangrene.

Some inflammations occur accidentally, during the course of fever, and are not attended with any change in the state of the blood; other febrile disorders, small-pox, measles, &c. are always accompanied by certain lesions which are commonly re-

garded as inflammatory; but in these also, the blood undergoes no change; finally, in other fevers we have inflammation and its characteristic effects on the blood.

Congestion is a frequent complication of fever, and if we endeavour to trace a connexion between this congestion and the state of the blood, we are led to conclude that the former depends on a loss of equilibrium between the fibrin and globules. The spleen and other parenchymatous organs are very often the seat of congestion in typhoid and typhus fever, and in small-pox; now the alteration of the blood observed in patients labouring under those diseases, is a diminution in the quantity of fibrin as compared with the globules.

Hæmorrhage, also, is a frequent complication of fever, while it rarely occurs in inflammation; if we compare typhoid fever and pneumonia together, this fact will at once strike us; the severity of the hæmorrhage, likewise, seems to follow the violence of the fever, as exemplified in typhus fever, plague, and yellow fever.

Gangrene occurs less frequently than hæmorrhage, congestion, or inflammation, but often occurs in typhus fever and plague; we may also remark, that diseases accompanied by carbuncle, acute glanders, and the fever of purulent absorption, are general febrile disorders which probably depend on alterations of the blood. The ancients admitted morbid conditions of the blood under the circumstances just alluded to; they denominated "putrid" that state of the system in which the vital force seemed to sink under the influence of physical changes and the decomposition of the blood. Bordeu taught that typhoid fever was connected with a general state of the system, which he calls *acute scurvy*; and this expression is, in some measure, correct, so far as the state of the blood is concerned. A diminution in the quantity of coagulable matter of the blood is a general character of all fevers; in fevers from miasma we have, first, absorption of the poison; and next, diminution of fibrin, the only striking change which the observant physician can discover. The same character exists in typhoid fever, but we cannot assert that it is the cause of the disease, since it is developed with it, and becomes more evident only as the symptoms increase.

From the preceding observations, we may deduce some very serious objections to the different modes of treatment of typhoid fever. Were we to consider the state of the blood only, we should reason in the following manner: in inflammatory fever there is an augmentation of the globules, and as blood-letting is the best mode of reducing the quantity of globules, we should bleed the patient. In typhoid fever we have a similar increase of globules, and should therefore apply the same remedy; but we must never forget in typhoid fever the general derangement of the economy which precedes the alteration in the blood, and we cannot say what effect blood-letting may have on this unknown element of the disease; hence we conclude, that the treatment of typhoid fever can only be established by clinical experience.

STATE OF THE BLOOD IN INFLAMMATION.—The condition of the blood in inflammation differs according as the latter is acute, subacute, or chronic.

Fibrin.—The fibrin is always increased during inflammation; it may vary from 4 to 10.

Globules.—These are not necessarily augmented; generally speaking, they retain their normal standard; in rare cases are increased; in others diminished. As the inflammation advances the globules may fall, but this is the effect of blood-letting and abstinence. We have already seen that plethoric persons are not more disposed than others to inflammation.

Solid contents of serum.—The albumen may be increased, but not necessarily, and the inflammation may attain a very high degree of intensity, without augmentation of the serum.

Physical Properties.—The clot is generally very firm and tenacious, because the fibrin has expelled a great portion of the serum; in fever, on the contrary, the serum is retained, and renders the clot soft and voluminous. In inflammation the clot is small; for as it contains a large proportion of fibrin, the globules are firmly pressed together by the contraction of the coagulating part of the blood.

PHENOMENA OF INFLAMMATION EXPLAINED.

Whenever inflammation terminates in suppuration, the quantity of fibrin increases; hence, the formation of pus and augmentation of fibrin accompany one another; we might, indeed, add another phenomenon, viz. the formation of false membranes. The fibrin is also augmented in cases where the serum is turbid and mixed with flocci; on analysing false membranes they are found to be composed of fibrin, and this is confirmed by a comparison of false membranes with the buffy coat of the blood, to which they bear a perfect resemblance.

Pus is a compound fluid, the composition of which is not yet accurately known; we are unable to assert that it is formed of fibrin, but in certain kinds of pus we find a white substance analogous to fibrin. We may now ask, how does the composition of the blood throw any light on the formation of false membranes? In the first place, we are never able to detect any increase in the quantity of fibrin until the symptoms of inflammation are quite patent; perhaps the increase is too small in the beginning to be appreciated. In some cases we cannot discover the exciting cause of inflammation, in others we can, as a blister, for example; here we find no antecedent change in the blood; hence we may conclude that inflammation arises independently of any precedent modification of the blood; the same occurs in cases of burns.

Fever exercises no influence on the changes which take place in the composition of the blood. According to Tomasini, inflammation cannot arise unless the constitution has first undergone some change; every local disease is preceded by some general condition, which the Italian physician calls diathesis.

REMEDIES EMPLOYED IN INFLAMMATION.

Our task would be incompletely executed, did we not examine how far the state of the blood may throw some light on the treatment of inflammation; but we must consult experience first, and then theory. Were we to depend on the latter, we should conclude that blood-letting is less indicated in inflammation than in fever, because its effect is to diminish the quantity of globules, and

not the fibrin; but, again, we would observe the value of bleeding must be decided by experience. Medical opinions are much divided on the efficacy of revulsives in inflammation; some assert that it is increased by blisters; this idea is principally supposed by Tomasini; others think, on the contrary, that blisters act beneficially, by determining an irritation of the skin; others, finally, would limit the use of blisters to certain periods of inflammation. Experience, in fact, shows that blisters aggravate inflammation, if applied at an early period: even in chronic inflammation they are injurious when unseasonably employed. Reasoning on the facts derived from humoral pathology, we should say that large blisters must increase the quantity of fibrin, since they excite local inflammation, occasionally accompanied by fever; but independent of this first effect, we have another, consisting in the abstraction of fibrin from the circulation; but this second effect is never sufficiently great to counteract the former one.

Boiling water, tartar emetic, &c. act in the same way as blisters; sometimes nothing but serum is removed from the blood; in other cases serum and fibrin. The dermis acts as a kind of filter, and prevents the globules from passing through. Some remedies have the effect of determining perspiration to the skin; others determine to the intestines. Aloes produce copious liquid stools, composed chiefly of serum coloured by the bile; other purgatives excite the secretion of mucus, or merely of bile; it is difficult to say what effects such remedies produce on the blood. Some physicians regard the preparations of mercury as antiphlogistic. Granting this to be the case, can we explain their action? Mercury, it is said, renders the blood less coagulable, in other words, diminishes the quantity of fibrin; but this is mere hypothesis. In the next article will be examined the state of the blood in congestion and hæmorrhage.

CASE OF NON-MALIGNANT FIBROUS TUMOR OF THE SUPERIOR MAXILLA.

REMOVED BY EXCISION.

By CHARLES LINGEN, Esq.

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(Read before the York Meeting of the Provincial Medical and Surgical Association.)

ON April 29, 1841, Eliza Roberts of Newton, æt. thirty, married, and having several children, was admitted into the Hereford Infirmary, under my care, with an indurated fibrous tumor, embedded in the left superior maxilla, and apparently having its origin about the roots of the two lateral incisors. Her general health is not bad though delicate, and has been better since marriage.

The tumor has now attained the size of a hen's egg; its base occupies the site of the two left lateral incisors, which have fallen out two or three months since, but has greatly extended that space by pressure, so that the teeth, right and left of the tumor, are now separated by $1\frac{1}{2}$ in. or thereabouts, and the tumor extends itself to the right beyond the septum of the nose, and, to the left, overlaps as it were, the first bicuspid; within the cavity of the mouth it protrudes, but not deeply, half-way along