

120 by humor: But the spontaneous separation goes further, and the cruet goes into two separate masses. The one retains much of the nature of the cruet. Above it is spontaneously separated a yellowish white mass more firm than either the whole cruet, or that which is below. This is called the inflammatory crust. Till of late it was mistaken for a morbid part of the blood, and it is only within this 100 years that this separation even as morbid has been taken notice of. But we know that it is common and is a constituent part of the mass. Put blood in a porous cloth and pour a quantity of water upon it; the water will carry the red part through

and the will remain a part, in every respect like the spontaneous separation called morbid. In 999 times of 1000 we can show this matter present in the blood of man and I believe, of all other animals. Hence since who of foreigners, first pointed it out, calls it coagulable lymph. Gaubius styles it *fibræ sanguinis*; When the cruet is let fall into very warm or cool water a portion of this separates into solid. They supposed it a constituent part, and the mathematicians could hardly convince them that the passage of such a mass thro' the canals of the human body could not take place. We want a proper term for this ^{new} substance; the term *coagulable lymph* is a

192 long word and ambiguous as if there
was a lymph not coagulable; we shall
speak of this under the title of lymph.
If the serum is exposed to the coagulable
heat it concretizes into a firm gelatinous
mass, and when cut down into small
portions, it shows a thin watery part ex-
suding from it which is not of the same
concreting nature. The whole of serum
universally is of a saline taste, and more
and more so as the water is separated from
it, it also resembles the coagulable lymph.
Further this fluid exhales with a gentle
heat, and if applied to the concreted, serum
the portion exhaling becomes ^{ins}considerable,
and the other becomes firmer and firmer.

In this too the coagulable lymph resum. 193
ble it, and by the same sort of drying may
be brought to the same horny substance.
Now both the one and the other collected in
proper vessels have, the same sensible &
chemical qualities. Whether the halitus has
not more air I shall say by and by; it is
to be considered as the volatile part.
Hence three parts of the blood, the red glo-
bules, the coagulable lymph, and the sero-
sity. These are the constituent parts of our
common mass. There are ^{also} other parts,
but whether they are constant and make
a natural part of the whole, we shall in-
quire hereafter. These three last menti-
oned we shall consider as the principal,

124 They are kept very uniformly blended together. When blood is taken from a large orifice, and received in a vessel that can be closed, and is kept in the heat of the human body, it preserves the same fluidity as in the body, and no separation of its parts takes place; this we impute to heat and diffusion. I conclude heat to be a means of fluidity, because let the circumstances be the same, and only cold supervene, there is a proportional concretion as the vessel becomes cooler. Concretion is therefore merely from a diminution of heat, but it does not take place unless in a separation of the mass. If the blood is received in a close vessel, or one with

a very small orifice, there is a concretion, but no separation. And this happens because the halitus has not escaped; for when the blood is taken into a vessel with a pretty large surface, there is always a separation, and the other circumstances mentioned. The fluidity depends upon heat and mixture, separating every where, the parts disposed to concreate. And bodies united merely by the attraction of cohesion seem to require time to separate, as we see in the superficial cohesion of water and oil, and this will be various as the adhesion is stronger or weaker. The concretion will also be prevented more probably, as there is more of the fluid that does not concreate, interposed between the

126 concretions fluids. Suppose the lymph reduced to its smallest particles, and to be surrounded with serosity, with which it has not such an adhesion, as its particles to one another, they may be long kept thus separate. If a few particles are moved up and down, they must constantly accrete. By insinuating a body that attracts the Lymph more strongly than the serosity does, we will accrete on a serosity, as by putting in a stick the stick unites with the lymph and we extract almost the whole of it from the serosity. This was Haingles experiment. He by beating with a rod, brought out filaments more or less of a membranous

appearance. And in that way if a quantity of blood was mixed into a stopper, the cool, a spontaneous separation did not take place. Now the effects of heat, of diffusion, and of the application of other bodies being considered, we can see how the separation in various circumstances, takes place, more or less. The blood is disposed to separate into three distinct parts; by stirring we prevent the diffusion, till the whole concretes, and becomes uniform. If the blood trickles down the arm, that is a degree of agitation that prevents concretion. If you destroy the fluidity before time is given for the separation to take place, and so if you ^{rather}

184 blood into a cold vessel, with a flat surface and allow the it to trickle down the arm, much more if you receive it in to a number of small vessels, you will have no separation of coagulable lymph. We consider the separation of lymph as a mark of the inflammatory state of the blood. But you see the absence of it gives no proof of the absence of the inflammatory state, unless you shall have guarded against all the above circumstances in taking the blood. We are ready to say that the blood is more dense or more fluid as there is more or less of serum, but if you judge so abstracting from the size of the orifice, the manner of its flowing, its being

received into a cold or warm vessel, or more or less as there is more or less accidental stasis, & more or less time given for a separation, such a judgement of the state of the blood must be very fallacious, as it must vary more or less according to these circumstances. And there are extremely few instances in which we can form any judgement of its state while it flowed in the vessels. We judge of the density by trying the crust, and we take a knife to make the trial. But suppose we should, with Brian Robinson, take a glass tube and load it with quicksilver, and examine the weight that would break through it, still the fallacy lies in the circumstances

129 mentioned above. As it is more or less detached from cruer or serosity, the form of its concretion will be very different. When coagulable lymph separates spontaneously it puts on two appearances; first when it makes a thin layer on the surface of the cruer, it shows more contractility and is drawn in like a purse, forming the cruer round it: and there is in that case a greater proportion of serum in the blood. The other case is that the coagulable lymph forms a much thicker layer on the surface, is expanded and takes the form of the vessel, and the quantity of serum is greatly less. These two appearances I have not yet connected with particular states in diseases nor with exter-

130
nal circumstances. But it depends upon circumstances, such as separate serum from coagulable lymph. There is also a means of enlarging the serosity in the coagulable lymph, more or less, but we know not what it imports in the state of the blood. —

— Lect. LXVI. Feb. 24 —

I took notice of the various external circumstances that influenced the spontaneous separation which is ordinarily into cruer and serum; and at other times the cruer goes into two parts, the serosity, & coagulable lymph. I said they all influenced the mode of concretion; and that the judge-

131 ments of physicians were on a very uncertain foundation, on this subject. I advised that the particular state of diffusion which they had while in the vessels, and the immersion or contact of a dry and solid body influences the separation. This may take place within the vessels, if they have constantly a fluid exuded upon their surface, and which prevents the accretion of the lymph, with the dry and solid parts. Polypus happen in the vessels; in any one portion of the arteries, but especially in the cavity of the heart. [&] If any portion of the vessels becomes dry, a polypus takes place. If the edge of the lacerated membrane is prevented from closing by the blood,

it is not defended by any excretion, and 132 therefore an accretion of coagulable lymph will be formed round the orifice; and this it is that causes the thrombus, in the case of the wound of a vessel (see Haller)

The Nature of the constituent parts of the blood. — Red Globules. —

The red globules have, till very late, from the time of Luenhoek, been considered as not differing as mixts, from the nature of the blood, and only by mechanical composition or aggregation; that they are the same with the serum, but that a certain number of these will form a red mass. Luenhoek imagined that each red globule was composed of six others, each of which

133 composing the red globules were made up of
six parts; ⁸ he resolved the second order into
six others perfectly pelucid; this opinion,
however begins to be deserted; it is a ques-
tion in fact that does not admit of reason-
ing. It is enough to say that hardly any
other microscopical observer has confirmed
this opinion; and many other physiologists,
among whom are D.^r Senac & Haller, can
see nothing like his composition. Gaubius
advances doubts that he has met with no con-
firmation of. But if they are not a different
matter why do they appear in a different
form. One solution is to suppose them of this
quality, that they are not properly mix-
ed with the other parts, as oil and water

the particles of which, as the water, can be dis- 134
tinguished, and always appear of a globular
form. Gaubius enters so far into this that
he finds these globules properly oily, while
the greatest part of our fluids are of a sca-
tery nature. But we can not admit them
to be oily as they are Diffusible in water,
and Diffusible to a greater degree, in our com-
mon mass of Blood. Their separating by them-
selves is not enough to ^{say} they are oily, nor yet
their being inflammable when they are dry. There
may be oil in them to account for these pro-
perties, as we see in the case of many sub-
stances. I think they are not to be ranked
among pure oil; they are always of a de-
termined size. In that there is no mystery.

135 If it is diffused in water under a given degree of agitation, the particles shall always be of one determined figure, because it depends upon the degree of ~~adhesion~~ cohesion, and that upon the adhesion in the diffused matter, & on the degree of breaking down. They are specifically heavier than the other parts, and occupy the lower part. Several have supposed that they have in themselves very little cohesion: but that is very difficult to determine as they have an adhesion to coagulable lymph which we can never entirely separate; it would appear however that they have very little cohesion; for it is manifestly less and less as we separate the lymph. We know of no mixture of any portion of animal fluid

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that brings them to the same colour; nor is there any thing in the nature of these globules that has any connection with a given colour. But the various changes that we perceive it to undergo in the different parts of the system we perhaps understand better. So Senac says, as they are accumulated & laid upon one another, they become ruder; I think upon this we can account for the variety of colours in our snaps of blood, which we discover by the complexion. The ordinary colour is in consequence of the other parts being diffused and dividing the red globules to a certain degree. All blood is more florid when drawn out of the vessels than when the serum is separated: and the colour is

137 Dashed in proportion to the separation
of the serum. And when the lymph is se-
parated they still become darker. When the
serum is separated, we find the cruer more
florid above, where it is contiguous to the
air, and darker at the bottom. When the
separation has taken place, after the mass
of cruer is so intire that you can take it
from the surrounding serum, if you in-
vert it, the florid surface now at the bot-
tom will take on a darker tinge, and that
which was at the bottom, now at the top
will become florid. The cruer is no more
than a porous mass, and the thinner ve-
nous parts make their way to the top &
dilute the cruer. The experiment is more

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less perfect according to the density of the
serum, and some times it will take to the
sides and shew florid spots. You produce an
afflux of serum in wounded parts and more
florid colour; & the same thing explains
the difference between arterial and venous
blood. Haller is very fond of denying this
diversity of colour in the venous & arterial
blood. P. 156 "

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" Diversitatem". We could shew
that it is difficult to shew the proper expe-
riments. With regard to colour "

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" videtur". I can however
venture to suppose the venous and arterial
blood differ in colour. The arterial blood,