

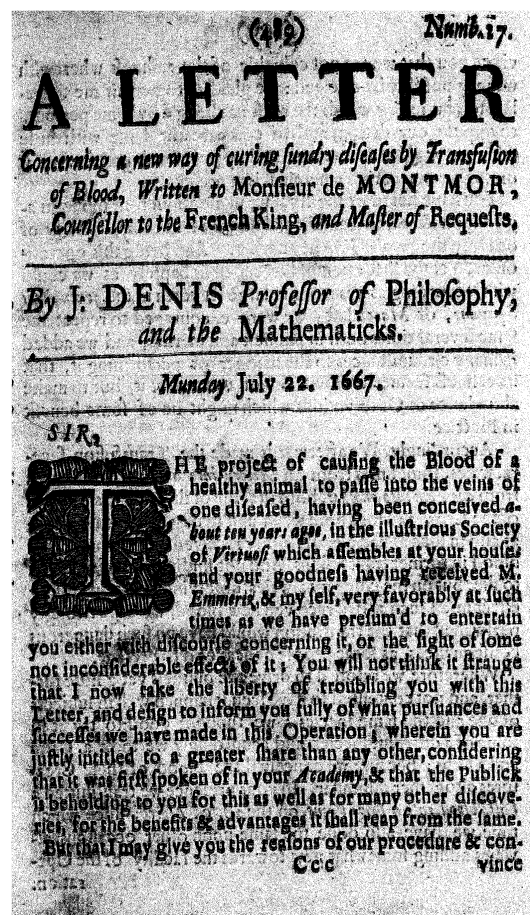
THE LETTER WRITTEN BY JEAN DENIS TO MONSIEUR DE MONTMOR
ON 25 JUNE 1667

A TRANSLATION COMPARISON BY PHIL LEAROYD

On the 23rd September 1667 a translation of a letter was published in the *Philosophical Transactions of the Royal Society* (Vol. 2, Issue 27, p. 489-504) that had been written on the 25th June 1667 by Jean Denis to Herbert de Montmor, titled 'A letter concerning a new way of curing sundry diseases by transfusion of blood, written to Monsieur de Montmor, Councillor to the French King, and Master of Requests.' A copy of this letter can be viewed or downloaded from the following websites:

<https://royalsocietypublishing.org/toc/rstl/1667/2/27>

<https://babel.hathitrust.org/cgi/pt?id=ucm.5324351302&view=1up&seq=99>



First page of 'A Letter concerning a new way of curing sundry diseases ... by J. Denis
(*Philosophical Transactions of the Royal Society*, 23 September 1667)
(Image credit: royalsocietypublishing.org)

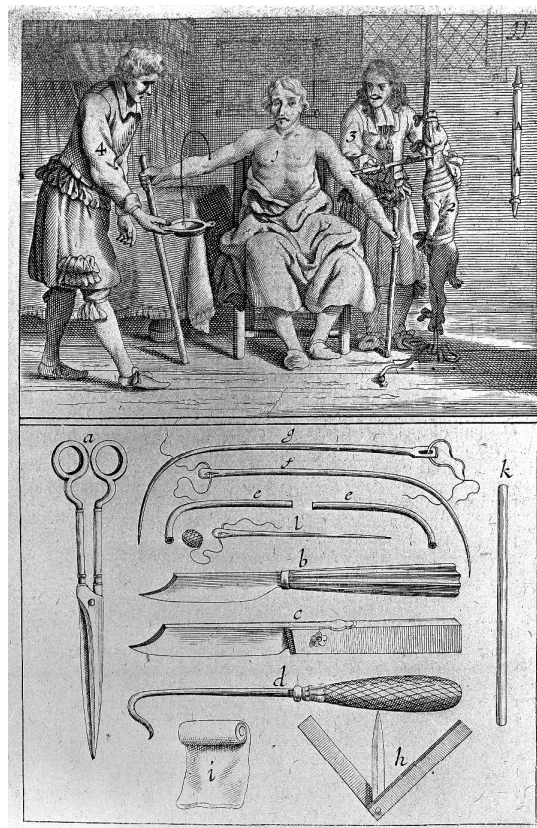
Note: Although identified at the end of the letter that it was written on the 25th June 1667, the title page of the letter published in the *Philosophical Transactions* gives a date of the 22nd July 1667, which may be the date that it was received by the journal.

The French version of this letter written by Jean Denis titled: 'Lettre escrete à Monsieur de Montmor, Conseiller du Roy en ses Conseils, et premier Maistre des Requests par J. Denis, Professeur de Philosophie et de Mathématique. Touchant une nouvelle manière de guarir plusieurs maladies, par la transfusion du sang, confirmée par deux experiences faites sur des homes.' [i.e.: A letter written to Mr. Montmor, Advisor to the King in his Councils and First Master of Requests by J. Denis, Professor of Philosophy and Mathematics concerning a new way of curing several diseases, by transfusion of blood, confirmed by two experiments carried out on men.] This was published as a fifteen page monograph by Jean Cusson, Paris. [i.e. the same person who printed / published the *Journal des sçavans* in 1667]. The letter is stated to have been written on the 25th June 1667. A copy of this letter can be viewed or downloaded from the following websites:

https://books.google.co.uk/books/about/Copie_d_vne_lettre_escrete_%C3%A0_Monsieur_d.html?id=XcRjAAAACAAJ&redir_esc=y

<https://gallica.bnf.fr/ark:/12148/bpt6k326277d/f2.item>

NOTE: The monograph available from the Gallica website has, between pages 4 and 5, a reproduction of an image of a dog-to-man transfusion that is not reproduced in that version available from the Google website. This is an interesting inclusion in that this is the same image as the one believed to have been originally included in the appendix of a 1671 translated edition of the surgical manual *Armamentarium Chirurgicum* by Johannes Schultheiss (1595-1645) [Latinised as Johannes Scultetus] published in Amsterdam, i.e. approximately four years after the date of the letter written by Jean Denis.



Blood Transfusion (Scultetus, 1671)
(Image credit: Wellcome Collection)

Although other letters and extracts of letters from Jean Denis to Monsieur de Montmor were published in the *Journal de sçavans*, a copy of this monograph was not.

Note: There is a letter from Jean Denis that includes information regarding the blood transfusion of these two men was published in the 28th June 1667 edition of the *Journal de sçavans*, i.e.: Denis, J-B. (1667) Lettre de M. Denis, Professeur de Philosophie et de Mathematique, à M. de Montmor premier Maitre des Requestes touchant deux experiences de la transfusion faites sur des hommes. *Journal des Sçavans*, 28th June 1667, 11, 134-136.

<https://gallica.bnf.fr/ark:/12148/bpt6k58122h/f136.image>

There are some difficulties in reading the versions of this document available from the two websites listed above, due to the clarity of some of some of the print, as well as the fact that there are missing letters/words due to the edges of some pages having been incompletely scanned. In addition, there are variations in the script with regard to the different spelling of printed French words in the 17th century, i.e. related to substituting the letter f which was used to represent the letter s, as well as the use of the letter u instead of v, i for j, etc., as well as the inclusion of different types of words that were in use at that time.

The letter provides interesting reading regarding the 'beliefs of the day' with respect to the origins, roles and functions of blood and its supposed importance, many of which masked the true problems that lay behind the blood transfusions performed on both animals and humans at that time. This can be illustrated by Denis's use of such terms as 'temper the heat of the blood when it boils in the veins' as well as other references to 'hot' and 'cold' blood and the belief, because there is no reason to suspect otherwise, that blood transfusions in humans using blood from animals are expected to have the same 'success' as those performed between animals.

The letter describes some of the animal transfusion experiments performed by Denis and Emmerez but more importantly also outlines (rather than describes) the transfusions performed on the first two human recipients, i.e. on a 15-16 year old boy on the 15th June 1667 and a healthy man, the date of which is not stated but must have obviously been before the 25th June 1667, the date of Denis's letter in Monsieur de Montmor.

As far as I am aware, the translation published in the *Philosophical Transactions* has always been accepted as a true reflection of the original letter's complete content. I therefore thought that it would be of interest to show that this is in fact the case by producing an independent translation of the letter from its original French. This translation (see below) does in fact identify that the English version published in the *Philosophical Transactions* is indeed a true reflection of its complete content. I have placed this original published translation and my own translation of Jean Denis's letter together for comparison purposes. Apart from the obvious differences in interpretation / wording, which is understandable given that they have been produced over 350 years apart, the only difference is in the paragraph settings of the published translation (which I have modified below to maintain the comparison parity) – the essential information is the same.

LETTER PUBLISHED IN THE PHILOSOPHICAL TRANSACTIONS

A LETTER Concerning a new way of curing sundry diseases by Transfusion of Blood, written to Monsieur de MONTMOR, Counsellor to the French King, and Master of Requests.

By: J. DENIS Professor of Philosophy and the Mathematics.
Monday July 22, 1667.

Sir,

The project of causing the blood of a healthy animal to pass into the veins of one diseased, having been conceived about ten years ago, in the illustrious Society of Virtuosi which assembles at your house; and your goodness having received Mr. Emmeriz and myself, very favourably at such times as we have presumed to entertain you either with discourse concerning it, or the sight of some not inconsiderable effect of it. You will not think it strange that I now take the liberty of troubling you with this letter, and design to inform you fully of what persuances and successes we have made in this operation; wherein you are justly entitled to a greater share than any other, considering that it was first spoken of in your Academy, and that the public is beholding to you for this as well as for many other discoveries, for the benefits & advantages it shall reap from the same.

But that I may give you the reasons of our procedure and convince you that we are not culpable of the rashness wherewith we may possibly be charged: be pleased to permit me to relate to you in few words the reasons alleged by some persons, to oppose our design, and to compare the same with those which engaged us to execute, and by certain degrees carry it on to that perfection wherein it is at present.

You have heard of the trial we made about four months ago upon dogs, to transmit the blood of the crural artery of one into the jugular vein of another.

TRANSLATION OF THE LETTER PUBLISHED IN FRENCH

Copy of a letter written to
MONSIEUR DE MONTMOR
Adviser of the King in his Councils, and First Master of the Requests.

By J. Denis Professor of Philosophy & Mathematics.

Affecting a new way of curing several diseases by blood transfusion, confirmed by two experiments made on men.

Sir,

The thought of passing the blood of a healthy animal through the veins of a sick person, having been formed about ten years ago in the illustrious Compagnie des Sçavans that you assembled in your home, and your kindness in having received Mr. Emmerez and myself very favourably, which we have used to tell you about it, and show you some rather considerable effects. You will not find it strange that I still take the liberty of disturbing you with this letter today, and that I propose to inform you plainly of the consequences and the success that we had in an operation, to which you must take more part than anyone else, since it was in your Academy that we spoke about it for the first time, and that the public is dreadful to you, as in many other inventions, benefits and uses that they will be able to receive.

But in order to give you the reasons for our conduct and to show you that we are not guilty of the temerity of which we could be accused; allow me, please, to report to you in a few words the reasons we used to oppose our design, and compare them with those who engaged us to carry it out, and to carry it through certain degrees to the perfection where it is now.

You have heard of the test that we did about four months ago on dogs to pass blood from the crural artery of one into the jugular vein of the other.

And being this operation even at the first attempt succeeded as happily as we could wish, according as it is more at large set forth in the *Journal des Sçavans* of March last, we were encouraged to repeat the same several times both in public and private, and we added so many circumstances to the manner of performing it, that its easiness seemed to invite us not to neglect it, but to make abundance of observations which might be of some benefit in practice.

Accordingly, we afterwards made the transfusion several ways, sometimes from an artery into a vein, sometimes from one vein into another, both in those of the neck, and those of the leg; in dogs both weak and strong, great and small; as also in such as had already either received or communicated blood in former transfusions. And not finding one of nineteen to die, but on the contrary always observing some surprising effect in all such as had received new blood, we were strongly persuaded that the transfusion would have no such dangerous consequences, as some people endeavoured to presage.

Wherefore we resolved to drive the business yet a little further, and not contented to have seen it happen well in subjects of one and the same species, we thought good to try it in some of a different species, and accordingly we took a calf and a dog; because we conceived the blood of these creatures altogether dissimilar. In your presence we transmitted a calf's blood into a dog's veins on the 28 of March since which time we have also done the same upon other occasions, always adding somewhat new towards the facility of the operation. Yet in all these experiments we never could observe any indisposition in the dogs which received the blood; whence we became confirmed in the opinion, that there was more ground to hope effects rather advantageous than hurtful to mankind, from this discovery of transfusion of blood.

Nevertheless, that we might vent nothing unadvisedly, we published these experiments, and were well pleased to understand the judgment of the ablest philosophers and physicians, upon the matter we examined, whether any of them had reasons weighty enough to dissuade us from carrying on

And like this operation we succeed for the first time with all the good luck possible, as it has been reported at length in the *Journal des Sçavans* of March 14th last, we were encouraged to repeat it several times, both in public and in private, and we added so many things to the way of doing it, that it seemed to us that its ease should have led us not to neglect it, but to make a number of observations which could have some usefulness in practice.

Indeed, we have since passed the transfusion in so many ways; that is to say sometimes from artery to vein, and sometimes from vein to vein, from the carotid as well as of the crural, on weak and vigorous dogs, on large and small, on others finally which had received or communicated blood in previous transfusions. And nineteen not having died, but on the contrary having always noticed something surprising in all those who had received new blood, we were strongly persuaded that the transfusion would not have such dangerous consequences, which some individuals strive to make believe on all occasions.

We therefore wanted to push the thing a little further, and not content ourselves with having wished it to succeed on subjects of the same kind, we proposed to try it on a few of different species, and for that we first chose a calf with a dog, because it seemed to us that the blood of these animals was quite different. We made the blood of a calf pass in the veins of a dog in your presence on March 28, and since then we have done it again in other meetings, always adding something new to facilitate the operation. And all these experiences never having pointed out to us any indisposition in the dogs which had received foreign blood, we confirmed ourselves in the same thought that there should be more grounds for hoping from transfusion beneficial effects for men than disastrous events.

Nevertheless, in order not to advance anything temporarily, we published these experiences, and we were very happy to hear the feelings on this subject of the most skilful philosophers and doctors. We examined whether some of them did not have strong reasons to dissuade us from

our trials even in man; and I beseech you permit me to sum up the principal here which are come to my knowledge, and judge yourself whether they ought to have stopped us, and whether we deserve praise or blame for having proceeded farther.

Some have attacked this design by decrying it as commercial and impossible. 1. Because the diversity of complexions (which is founded in the blood) supposes so great a diversity in the several bloods of different animals, that it is impossible but one must be poison and venom in respect of another. 2. Because blood entravasated or removed out of its natural place, must necessarily corrupt, according to the dictate of Hippocrates. 3. Because the blood issuing out of its proper vessels, and being to pass through inanimate conveyances, such as are the pipes or tubes employed in the transfusion; it must infallibly coagulate, and so coagulated descending to the heart must cause there a palpitation, whereof death will be the speedy consequent.

These reasons have not appeared to us of great importance. For as to the first, we acknowledge that there are as many different complexions and various qualities in the blood, as there are individuals in every species: but we believe it not conclusive from thence, that the blood of one must be poison in respect of others; no more than it follows, that all the meats wherewith we are nourished, and whereof our blood is only an elixir or quintessence, must corrupt and poison the same, because they are endued with qualities differing from those of the blood. On the contrary, as it is certain that cooling meats or medicaments serve to temper the heat of the blood when it boils in the veins, and hot food or physick excite new vigour in such blood, as old age or a disease has rendered torpid and coagulated in the vessels; so it is as reasonable to infer, that great advantages will follow upon the mixture of different bloods, provided the fame be directed and managed by the ordinary prudence of able physicians; and that if a hot blood can re-infuse new strength into that which languishes with coldness, such blood as hath colder qualities, may also check the ebullitions and tumults of that which is overmuch chased.

pushing our experiments to man; and I beg you to find it good that I pick up here the main ones that have come to me, and to judge for yourself whether they must have stopped us, and whether we deserve praise or blame to have passed excesses

Some have attacked this matter, saying that the thing is commercial and impossible. 1. Because the diversity of complexions which is founded on the blood, supposes that there is so much diversity in the bloods of different animals that it is impossible for one not to be venom and poison with respect to the other. 2. Because the extravasated blood, or which leaves its natural place, must necessarily corrupt following the feeling of Hippocrates. 3. Because the blood coming out of its vessels, and having to pass through inanimate conduits, as are the tubes which one uses in the transfusion, it coagulates infallibly, being coagulated and descended into the heart, it causes a palpitation there which must soon be followed by death.

All these reasons did not seem of great importance to us. For as to the first, we remain in agreement that there are as many different complexions and different qualities in the blood, as there are individuals in each species: But we do not believe that we can infer from this that the blood of one must be venom with regard to the other; nor can anyone claim that the meats on which we feed ourselves, and on which our blood is only an elixir, should be corrupted and poisoned, because they have very different qualities from theirs. On the contrary, as we want fresh meats or medicines to be used to temper the ardour of a blood which drinks in the veins, and as hot ones to excite a new vigour in that which stagnates and freezes in the vessels of a man attenuated by old age or by disease: Let us also say that the diversity of the bloods must make us hope for great advantages from their mixture, provided that it is ordered and led by the ordinary proof of skilful doctors, and that if a warm blood can restore some strength to that which languishes with coldness; the one which has colder qualities can also stop the boiling and the transports of the one which is too heated.

As for the authority of Hippocrates who says that extravasated blood corrupts, it is no wise repugnant to our pretensions. For to save the honour of that great person, his meaning must be rightly expounded, which is no more but this; that the blood necessarily corrupts when it is out of the vessels, which preserve its heat, and which permit it a natural motion and free circulation, whereby it purifies itself continually. For example, being extracted into a dish, wherein all its parts are stopped and coagulated, it must in a little time alter its constitution, as experience witnesses. Nor does this hinder but that it is also corrupted sometimes in its own place, contrary to that aphorism, *Quic quid corrumpitur, in loco alieno corrumpitur*: for if its motion be interrupted in the veins either by some obstruction formed therein, or some division occasioned by a wound or contusion, it corrupts in a short space and degenerates into purulent matter. But in this experiment of transfusion, the blood is communicated in such manner, and passes out of one animal into another that it is impossible its natural motion should be interrupted. It is true it passes through unnatural conduits, but these being once warmed and admitting no air into their cavities, they cause no more alteration in the blood than the arteries and veins themselves do.

Moreover, such as conceive that the blood transfused must needs coagulate by the way and afterwards cause some mortal palpitation; they foresee an accident which never happened to us, and against which I desire no other security than the experience we have had of all the animals hitherto employed by us, which are still living.

Others who have either been witnesses of some of our transfusions or have understood the same from credible relaters, dispute not the possibility of the thing but yet not to authorize appears new, they say; that whatsoever care and caution be used in the transfusion, it can never be practiced upon man with success; and these are their principal reasons.

First, the blood of a sound, and the blood of a diseased body having

As for the authority of Hippocrates, who says that extravasated blood gets corrupted; it is in no way contrary to our claims. Because to save the honour of this great man, it is necessary to explain his thoughts well, and say that it is true that the blood is necessarily corrupted, when it finds itself outside the vessels which conserve its heat, and which allow it a natural movement and a free circulation by which it is continuously purified: For example, being drawn into a dish where all its parts stop and coagulate, it must change its constitution in a short time, as experience shows. And this does not prevent him from corrupting himself sometimes in his own place, against this aphorism, *quic quid corrumpitur, in loco alieno corrumpitur* because if his movement was likewise interrupted in the veins, either by some obstruction which would have formed there, or by some division which an injury would have inflicted on it, it would be corrupted in a short time, degenerate into pus, and produce abscesses & apostumes. Now in transfusion, the blood is communicated in such a way and passes from one animal to another, that it is impossible for its natural movement to be interrupted; it passes to the truth through foreign pipes, but which, being once warmed, and not admitting any air into their cavities, does not alter the blood any more which the arteries themselves and the veins would make.

Finally, when we say that the blood we want to communicate must coagulate on the way, and then cause some fatal palpitation; we anticipate an accident which has never happened to us, and of which I do not want any other assurance, than the very experience of all the animals that have served us there, and which are still alive.

Other people who have witnessed some transfusions that we have given, or who have learned them from worthy people who would have liked them, did not want to argue the possibility of the thing; but in order not to also authorize something which appeared new to them, they said that some precautions that one brought in transfusion, it could never be practiced on the man with success, and these are their main reasons.

Firstly, the blood of a healthy body and of a patient having very different

qualities very different, the one being pure, the other impure, a perfect mixture thereof cannot be effected; they are two contraries, which will be at perpetual feud, the issue whereof can be no other but the ruin and destruction of the subject on whom the experiment is attempted.

I with those that discourse thus, first understood but what they endeavour to persuade others of; and that they would explain to us what artifice they fancy in the veins and arteries, to give passage to one sort of blood and exclude another at the same time. For my part I confess I cannot comprehend why the continual circulation and rarefaction made in the heart by the heat of its ventricles, are not more than sufficient to make a perfect mixture there of these two sorts of blood, and the difficulty seems the greater in regard experience appears to flatter me into a contrary opinion. For having a few days ago syringed about a quarter of a pint of milk into the veins of an animal, and having opened the same some time after, we found the milk so perfectly mixed with the whole substance of the blood, that there was not any place wherein appeared the least footstep of the whiteness or milk, and all the blood was generally more liquid and less apt to coagulate.

The second objection of the same author is, that should the pure blood mingle with the impure, yet it would not long preserve its purity and temperament; in regard that upon its arrival at the liver (which is the grand Organ of Sanguification wherein the blood receives all its qualities) would infallibly lose all its goodness and in an instant become like the whole mass, which we suppose corrupted; and consequently can produce no benefit therein by its mixture.

But this objection is ill enough grounded, since it supposes the blood to be made in the liver, and is contrary to experience which demonstrates most evidently, both the existence of blood in animals before the formation of the liver, and also the arrival of the chyle, and at the heart, and conversion of the same into blood there, before it enters into the veins which carry it to the liver: wherefore I dismiss this reason and proceed to another, which seems stronger and is offered by persons more judicious.

qualities, and one being pure, the other impure, it cannot be made a perfect mixture; these are two opposites that will be in a continual combat, the outcome of which could only be the ruin and destruction of that where it would take place.

I would like those who speak thus, are the first to hear what they try to persuade others and that they explain to us what artifice they conceive in the veins and in the arteries, to give passage to a certain blood, and in exclude another at the same time. For myself I assure that I cannot understand how the continual circulation, and the rarefaction which takes place in the heart by the heat of its ventricles, are not more than sufficient to make there a perfect mixture of these two kinds of blood; and I find it all the more difficult, as the experience seems to flatter me more in a contrary thought. Because having syringed these days passed leaking a half-seventh of milk in the veins of an animal, and having opened it some time later, we found it so perfectly mixed with all the substance of its blood, that there was no place where there appeared the least vestige of the whiteness of the milk, and all the blood was generally more liquid and more difficult to coagulate.

The second objection of the same author, is, that when the pure blood mixed with the impure, it would not retain its purity and its temperament for long, because as soon as it arrived at the heart, which is the great worker which forms blood, and which gives it all its qualities, it would infallibly lose all its goodness there, and would in an instant be like all the rest that we suppose corrupted, and consequently could not bring any usefulness to it by its mixture.

But this objection is rather ill-founded, since it supposes that the blood takes place in the liver, and that it is contrary to the experiments which show us very clearly that there is blood in animals as long as the liver is there is formed, and that the chyle arrives in the heart and is converted there in blood before entering in the veins which carry it to the liver. This is why I abandon this reason to examine another which seems stronger, and which has been proposed to us by more sensible minds.

It is not contested in this objection in what place sanguification is performed, because it is held to be done in several parts of the body, namely by reiterated circulations in the heart, veins and arteries. But it is like with maintained that all these parts come either by sickness or age, to a certain degree of intemperature and malignity, from which there is no possibility to recover them; and that in this state they have power to communicate their evil qualities to whatsoever approaches them; whence consequently in a little time they corrupt the laudable blood, wherewith they are newly irrigated. Proof of this is afforded both by example and experience. The example is taken from a hogshead of vinegar, which being once thoroughly imbued with that liquor, is no longer fit to contain any other, but every thing poured there-into is immediately infected with sourness by contagion of the cask. The experience consists in that which was lately published by an English doctor, who transfusing the blood of a mangy dog into a sound one, to try whether the mange would be communicated with the blood, found die mangy dog cured, and the other who had received his blood not to become mangy.

Now to answer to all this in order, I say in the first place, that such a great intemperature, from whence it is laid the blood can never recover, is either rare or very common. If very rare, it requires not much consideration, and if the mixture of laudable blood suffices not to restore it to its due temperament, I would gladly learn other means to do it. But if such intemperature be ordinary in all diseases and in all declining old ages, I demand to what end serve the aliments which physick allows, or the medicaments it prescribes in these occasions? Can these things enter into the body without mingling with the blood within an hour? And if by so mingling they contract the ill temperament of the blood, and impart not to the same any of their good qualities, is it not loss of time to study physick, and to reduce into practice what we are taught touching the choice of all those things? For my part, I am so far from having such a thought, that I doubt not but the strength and goodness of the meats and drinks we take, is able to correct the ill temperament of the blood and render it better. If

We do not bother in this one to determine the place where the blood is made, we want it to be done in different places of the body, that is to say, that it is developed and perfected by repeating several circulations in the heart, veins and arteries; but it is claimed that all these parts come little by little, either by disease or by old age, to a certain degree of bad temper and malignancy, that it is finally impossible to remove them; and that in this state they have the strength to communicate their bad qualities to everything that approaches them, and thus they would in a short time corrupt a laudable blood of which we pretended to water them. This is confirmed even by example and by experience. The example is taken of a barrel of vinegar, which being vinegared once, and containing wine of the last bitterness, no longer capable of containing the best, but that everything that is poured into it is wasted at the same time and turns sour. The experience consists of the fact that an English doctor who recently helped to pass the blood of a mangy dog through the veins of another who was not, to try if the mange would spread through the blood, the mangy dog was healed, and the other who had received his blood, was not at all mangy.

To respond in order to all this, I say in the first place that this great badness from which we want blood not to be able to receive, is either rare, or very common; if it is very rare, it does not take much trouble, and if the mixture of doable blood is not capable of bringing temperament to it, I would like to be shown other ways to do it. That if this badness is ordinary in all illnesses and in all obsolete old age, I ask to be supplied with the food that medicine allows, or the drugs that it orders on these occasions? Can all of these things be maintained in the body without mingling one hour after the blood? And if by intermingling with it they contract its badness and do not communicate to it any of their good qualities; is it not a waste of time to study medicine, and to reduce in practice what it teaches us concerning the choice of all these things? For me, I am very far from having such a thought, I have no doubt that the strength and the goodness of the meats and the drinks that we take are capable of correcting the badness of the blood and make it better, and if there was something that

there be any impediment of this effect, I should not so much look for it in the blood itself or in the parts which elaborate the same, as in those through which the aliments pass before they arrive at the heart. For it is sufficiently manifest that if there be any irregularity in the stomach, if the digestion be not well made, if the juices of the gall and pancreas (which serve for dissolvents in the intestines) be not well tempered, if there be any obstruction or abscess in the glandules of the mesentery which strain the purer portion of the chyle; the best and most excellent things become so transformed before their mixture with the blood, that no good nourishment or refreshment to the sick can with reason be expected from them.

Now in this way of transfusion all those inconveniences are avoided; the blood communicated is not made to pass through those many turnings and windings, where the least corruption of a part destroys in an instant whatever good the soundness of the rest can produce. The good blood enters immediately into the veins of the receiving animal, and there mixing and circulating with the rest, carries good nourishment to the principal parts, which are not ordinarily indisposed in sickness and old age, but by the vitiosity and saltiness of the blood which humecteth them.

This is an opinion which I see many physicians embrace, and were anything capable to make me renounce it, the barrel of vinegar, above mentioned must not be it. For if sourness be the last quality which wine assumes, and (as I may say) its death, since it is never recoverable from the same; I do not believe that a like quality is to be found in the blood; that is to say, which corrupts the blood in such manner that it can never be purified, unless perhaps in some diseases accounted incurable, which are not pertinent to the question, But if comparisons be currant, let us rather consider wine with all sorts of other qualities but sourness, and then our comparisons will in my opinion, fall more just. For as the roughest wine may be sweetened, the foulest clarified, the weakest become stronger the oily rid itself of its fatness; in a word, that which is decayed maybe amended by mixture of certain liquors, known to those that have the secrets of them, and practice the same every day. In like manner, it is reasonable to conceive that blood too thick may be refined and subtilised,

could prevent it, I would not look for it so much in the blood itself, or in the parts that do it, as in those through which the food passes before reaching the heart: Because it is quite clear that if there is some discomfort in the stomach, if the digestion is not going well there, if the juices of the bile and the pancreas, which are dissolved in the intestines, are not well tempered, if there is some obstruction or some abscess formed in the glandules of the mesentery which sift the purest portion of the chyle, the best things and the most pious things will be altered so much so that they get mixed up with the blood, that there will be no appearance of expecting any good nourishment from it, no relief for the patient.

However, transfusion is not subject to all these inconveniences, the blood that is communicated there must not pass through all these detours, where the slightest corruption of one part destroys in an instant all that the overweight of the others. could have produced; a commendable blood enters immediately into the veins of whoever receives it, and there mingling and circulating with the other, it can carry good nourishment to the principal parts which are ordinarily weakened in disease and in old age, only by the vice and the surge of blood which moistens them.

This is a thought into which I see several doctors enter, and if there was something capable of making me abandon it, it would not be the example of a barrel of vinegar reported above. Because if bitterness is the last quality through which wine passes, and so to speak its death, then it never returns; I do not believe that one finds such a quality in the blood, that is to say which corrupts it in such a way that it could never be purified, except in some diseases which pass for incurable, and of which there is no question here. But if we want to use comparisons, let us consider more the wine with all kinds of qualities other than sourness, and for then our comparisons will be found, in my opinion, more correct. Because as too hard a wine can be softened, the cloudiness can be clarified, the weak can be made more vigorous, the fat can be degreased, in a word, that which is tasted can be corrected by the mixture of certain liquors, which are known to those who have the secrets, and who practice them every day: let us say in the same way, that a too coarse blood could be softened and

that too subtle be fixed and incassated, that too hot be tempered, that too cold be heated; and all this by the mixture of other sorts of blood, the particular qualities whereof are known to the physician who prescribes the transfusion.

As for the experiment of the dog, which is said to have received the corrupted blood of another mangy one without contracting his disease; many things of sufficient importance may be said to it. 1. Is there any assurance that the blood of the mangy dog was putrefied, and corrupted in his veins? On the contrary might it not have been purified before, by discharging its impurities through the pores of the flesh, where the same was converted into mange upon the skin. That which confirms me the more in this particular, is, that very frequently scabs divert a greater malady; since if those impurities which cause the same, issued not out at the surface of the body, they would remain mixed with the substance of the blood, and falling upon some noble part, produce very dangerous effects therein.

2. Supposing the blood of the mangy dog wholly corrupted in his veins, is it necessary it should produce the mange in him that receives it? Is it not possible that vitrious blood may be purified when it becomes mixed with better, and that the great heat which caused the extravasation in the one in order to production of the mange, may be allayed by the coolness of the other wherewith it is mixed and consequently not produce the same effects.

Lastly, is there any assurance that the mangy dog's blood has not produced some evil effects in the body of him who received it? He should have been opened some days after, and perhaps the corruption which rendered not itself apparent outwards, might have been visible within.

Hitherto therefore I find not either reasons or experiments sufficient from the opinion I have conceived of benefit of transfusion; and in the discord I observe of physicians, whereof some approve the invention, and maintain that it may with prudence be prescribed for the care of divers diseases, others respect it as a very useless novelty; and lastly, others keep

become more subtle, a too subtle one could fix and thicken, a too hot could be tempered, a too cold could be raised, and all this by the mixture of certain bloods, whose particular qualities will be perfectly known by the doctors who will order them.

As for this dog who is said to have received the corrupted blood of another who was mangy, without having contracted mange, there are several things to be said which are of sufficient consequence. 1. Are we sure that the blood of this mangy dog was rotten and corrupted in his veins; could it not on the contrary be purified beforehand, by getting rid of its impurities through the pores of the flesh, and by converting to mange on the skin. And what confirms me even more in this doubt, is that more often the mange saves a greater disease, because if these impurities which cause it did not come out on the surface of the body, they would remain mixed with the substance of the blood and settling on some noble part, could only produce very dangerous effects.

2. When the blood of this mangy dog would have been completely corrupted in his veins; is it a necessity that he must produce mange in the person who receives it? Can it not happen that a living blood is purified when it finds itself mixed with the best, and that the great heat which made it extrude in one to form gall, is tempered by the freshness of the other with which it mixes, and thus does not produce the same effects there?

Finally, are we sure that the blood of this mangy dog did not produce bad effects in the body of the one who received it? It had been opened a few days later, and perhaps we would have found the corruption within, which has not appeared on the outside.

So far I do not find any reasons, no experiences, which are capable of dissuade me from the thought that I have of the usefulness of transfusion, and in the partiality where I see the doctors, there are many who approve of this operation, and who maintain that it could be ordered with caution for the cure of several diseases, others rejecting it as a very useless novelty,

themselves undetermined, expecting what success the experiment will produce; I willingly join with the first, and resign myself to the ensuing reasons, until somebody shall produce others to the contrary of greater weight.

1. The transfusion of the blood of one animal into another is sufficiently taught us by nature itself, and it must be granted that if we ever practice the same, we shall do no more but imitate her; since whilst she cannot yet administer nourishment to the foetus by the mouth, and his stomach is not fit for digestion, she makes a continual transfusion of the maternal blood into the umbilical vein of the infant, therewith to nourish, vivify and increase all the parts of the same. Nor is it to be answered here, that the mother and child are in this state to be considered, but as one and the same body and substance. For it happens frequently enough, that the paternal seed predominating above that of the mother, the constitution of the foetus is very different from hers that bears it, although nourished by the transfusion of her blood.

2. The transfusion of blood is but a very compendious way of the continual transfusion of our aliments, which is also taught us by nature after our birth. For, whereas the meats which we eat for the reparation of our strength, and refreshment of the heated parts, have very many impurities mixed with their good juices, which must be concocted by the heat, and digested by the acid liquor of the stomach; which done, the purer portion of the same digested juices is converted into chyle, that chyle impelled into the veins to be mingled with the blood, conveyed therewith to the heart, and there receive its utmost perfection. The transfusion of blood is made more speedily, and with much more effect, since thereby, in a very small time, a most elaborated liquor is emitted immediately into the veins, where it instantly renders such defects as it finds in the internal parts, when they are distempered.

3. Physicians cannot deny, that the greatest part of our diseases are but results of the distemper and corruption of the blood, since the speediest and commonest remedy they have in practice, is, to evacuate the same by

and finally others remain indifferent, waiting for the success that experience will produce; I would gladly take the first party, and I would indulge myself go to the following reasons, unless somebody suggested others who were contrary to them, and which had more weight.

1. The transfusion of the blood of one animal into another is sufficiently taught to us by nature itself, and we must remain in agreement if we ever practice it, in this we will only imitate it, then that when she cannot yet administer food to a foetus by mouth, and its stomach is not ready for digestion, it gives a continuous transfusion of the mother's blood into the umbilical vein of the child, in order to nourish by this means all its parts, to strengthen them, and even to increase them. And we must not answer that the mother and the child are considered in this state as the same body and the same substance. Because it happens quite often that the paternal seed dominates more than that of the mother, the constitution of the foetus is very different from that which carries it in its womb, which it does not leave to be nourished by the transfusion of its blood.

2. Blood transfusion is but a very shortened route to the continual transfusion of food, which is still taught to us by nature after our birth. Because instead repairing our forces and refreshing the parts that are heated, we take meats which have a lot of impurities mixed with the good juices they contain, that the heat of the stomach must cook them, that the waters which distil there continuously digest them, that of these juices will digest, the purest portion is converted in chyle, and that this chyle be pushed into the veins to be mixed with the blood, and descend into the heart, which must give it the last perfection; The transfusion of the blood is done much more quickly and with more safety, since by its means one insinuates in a very short time a very elaborate liquor, which entering immediately into the veins, can compensate for the defect of the bowels when they are altered.

3. Doctors cannot deny that most of our illnesses are the result of bad weather and blood corruption, then that the most prompt and common remedy they have in practice is to draw by the bleeding, or to refresh it with

phlebotomy, or else refresh and cool it by juleps. But they must also confess that whilst they endeavour to draw out the corruption, they at the same time diminish the strength and vigour; and that great fevers by this means are oftentimes followed by faintnesses and dropsies. On which consideration, some physicians spare bleeding as much as possibly they can. Moreover, it must be acknowledged, that drinks passing through the stomach and intestines, before it arrive at the veins and arteries, to be mingled there with the blood, they may be altered a thousand ways by the ferments occurring in the passage, or else they may cause some alteration in those parts by ferments accompanying them and so leave weaknesses and dangerous crudities behind them. But in transfusion all these things are avoided, and all physicians brought to agreement within a short time. They who are for blood-letting, find the same practised in this operation, the old and corrupt being first evacuated, to make room for new and pure. And those also that decry bleeding, as that which too much weakens the sick, will have no reason to complain, since the new blood conduces to strengthen them more.

Lastly, everyone knows that many persons die through loss of blood, and haemorrhages not to be stopped, many are emaciated by them, and others precipitated into untimely old age, by defect of blood and vital heat. Now who doubts but the transfusion of a mild and laudable blood may preserve the one, and prolong the life of the others. A man may foresee some benefits and advantages from this operation in pleurisies, the small pox, leprosy, cancers, ulcers, St Anthony's fire, madness, dotage, and other maladies arising from the malignity of the blood. But the success is rather to be expected in experiments, which will be made within a little time. In the interim, give me leave to acquaint you with my judgment concerning the election of the animal that is to communicate its blood.

Many have conceived that if ever the transfusion of blood should come to be practised upon men, it ought to be done with blood of the same species; and consequently, that it would be a very barbarous operation, to prolong the life of some, by abridging that of others. But for my part, I am far from

beverages. But they must also realize that in wanting to extract corruption, they simultaneously diminish vigour and strength, and that the great fevers by this means are quite often followed by languor or dropsy; this means that some of them even spare bloodletting as much as possible. They must also grant that the beverages having to pass through the stomach and the intestines, as well as to arrive in the veins and in the arteries to mix with the blood, can be altered in a thousand ways by the ferments which meet there, or else can alter these parts by the ferments which they carry there, and thus leave weaknesses and unbearable crudities. However, in transfusion, all these things are removed and all the doctors agree in a short time. Those who are in favour of the bloodletting find it practiced in this operation, then that one does not pretend to give any new one, except by eliminating the old and the corrupt beforehand; and those also who oppose bloodletting, because it debilitates patients too much, will have nothing to complain about, since the new blood will be able to strengthen them further.

Finally, everyone knows that many people die from losses of blood and haemorrhages that cannot be stopped, that there are many who are emaciated, and whose old age begins sooner than it should be due to shortage of blood and vital heat. Now who doubts that the transfusion of soft and reliable blood cannot escape some and prolong the life of others? We could even anticipate some benefits and some advantages of this operation in pleurisy, smallpox, leprosy, cancers, ulcers, skin infections, rages, madness, and other diseases leading to malignancy of the blood: But we must wait for success in the experiments that will be able to be done in a short time. However, allow me to tell you again my thoughts concerning the choice that one could make of the animal which must communicate its blood.

Most of them believed that if the transfusion of blood were ever to be practiced on men, it would be necessary to use blood of the same species, and thus it would be a very barbaric operation to prolong the life of some, by shortening that of others. But for me I am very far from having this

that opinion, and I am persuaded that it will be much more expedient to make use of the blood of other animals, than of that of men, for many reasons, the chief whereof are these.

1. It is easy enough to judge that the blood of animals is less full of impurities, than that of men; because debauchedness and irregularity in eating and drinking are so ordinary to them, as to us. Sadness, envy, anger, melancholy, disquiet, and generally all the passions, are as so many causes which trouble the life of man, and corrupt the whole substance of the blood. Whereas the life of brutes is much more regular, and less subject to all those miseries, which we ought to confider as sad consequences of the prevarication of our first parents. And indeed experience sufficiently shows us, that it is a rare chance to find ill blood in the veins of beasts; it is almost impossible not to find some corruption in that of men, how healthful so ever they seem to be. Yes, even in children yet sucking, it is not wholly unblamable; because, having been nourished with the blood and milk of their mothers, they have sucked corruption together with their nourishment.

2. If physicians so successfully employ the milk of certain animals, to which they oblige certain patients for some whole years together. If we are very well nourished with the flesh of some, during all our lives; and if their juices be so advantageous to us for repairing our natural strength, why may we not hope greater advantages from the mixture of their blood with ours.

3. The operation may be made more boldly, and with greater success by employing brutes. For, being we design to take the best blood that is to be had, and least subject to coagulation, it is certain that the arterial blood upon account of its heat and tenuity possesses both those qualities in much more perfection than the venal. And the dangers and inconveniencies which would occur in opening the arteries of a man are not considerable, when it is a beast on who the operation is made.

4. Beasts may be better fitted and prepared for this use than men. For I should advise those, that would employ this experiment to the best

thought and I am convinced that it would be much more appropriate to use the blood of animals, than of that of men, for several reasons, of which these are the main ones.

1. It is easy enough to judge that the blood of animals must have less impurity than that of men, because debauchery and irregularity in drinking and eating are not so common to them as it is to us. Sadness, annoyance, anger, melancholy, anxiety, and generally all passions are so many causes which disturb the life of man, and which corrupt all the substance of his blood: instead of the life of the beasts being much better regulated and less exposed to all these misfortunes, which we must consider as disastrous consequences of the prevarication of our first Father. And in fact experience makes us see enough that if it rarely happens to find bad blood in the veins of animals, it is almost impossible that we do not always notice some corruption in that of man, in whatever health he may be. We do not even find anything commendable enough in children who still suckle, because having been nourished with the blood and the milk of their mothers they have succeeded corruption with nourishment.

2. If the Doctors so happily use the milk of certain animals, to which they reduce a few patients for whole years: if we nourish ourselves very well with the flesh of a few during our whole life, and if their juices are so beneficial to us to repair our natural vigour; why can we not expect great benefits from mixing their blood with our own?

3. The operation will be done much more boldly, and with more success, by using animals. Because as it is a question of taking the best blood that one can find, and that where coagulation is less to be feared, it is certain that the arterial blood, because of its warmth and subtlety possesses much more perfectly all these qualities than the venal blood. However, there would be dangers and inconveniencies in opening the artery of a man which are not found in the opening of that of a beast.

4. We can better arrange and prepare the animals for this purpose, than the men themselves; because I would advise those who would begrudge

advantage, to feed their beasts for some days before-hand with more care and exquisiteness than ordinary; since, if by the taste we can discern the flesh of calves fed for some time, with milk, and yolks of eggs to be much more pleasant than that of others, reason ought to persuade us that their blood is also meliorated according to their feeding.

All these reasons joined to the experiments we have made, could not but induce us to give assurance to the public of the little danger to be feared, and the considerable effects to be expected from this operation. Yes, we imagined that there was no rashness to make trials of it upon men, and indeed diverse persons of much gravity and prudence solicited us to beg some condemned criminal, on whom to make the first essay. But having considered that a man in that condition, being already much disordered by the apprehension of death, might be further intimidated, by looking upon this transfusion as a new kind of death and thus, conceit might possibly cast him into faintings and other accidents, which would undoubtedly be ascribed to the experiment by such as decry it. We thought not fit to expose ourselves to that danger, nor to importune his Majesty without any necessity; being persuaded that there would not be so much reason to fear the like events in persons whom we knew perfectly well, and who had some confidence in our words, we chose rather to wait till a favourable occasion offered us such a person as we wished, than to hazard the loss of all by too much precipitation. This resolution being taken we neglected nothing that prudence obliged us into; and at length after some attendance we lighted upon a subject suitable to our wishes. The particularities of our proceedings I here subjoin in few words, they being as so many authentic confirmations of all that I have hitherto written.

On the 15 of this month, we happened upon a youth aged between 15 and 16 years, who had for above two months been tormented with a contumacious and violent fever, which obliged his physicians to bleed him 20 times in order to assuage the excessive heat.

themselves to be more fruitful and useful, to feed them a few days beforehand with more delicacy than usual. Because if the taste lets us know that the flesh of these calves that we feed for some time with milk and egg yolks is much more pleasant than that of other calves; reason must also persuade us that their blood is much better for it.

All these reasons, related to the experiments which we have made, should undoubtedly engage us earlier in giving assurances to the public of the little danger which there is to be feared, and of the considerable effects which can be expected from this operation. There was not this seeming temerity to test it on men. Also several equally wise and prudent people asked us to do so, and some even urged us to ask a criminal to make the first attempt on him. But having reflected that a man in this state who is therefore greatly affected by the apprehension of death, might be even more intimidated and that by considering transfusion as a new kind of death, this thought alone could cause him some disturbance and some syncope, which one would undoubtedly attribute to the transfusion: we did not consider it advisable to expose ourselves to this peril, nor to make ourselves annoying with his Majesty without any necessity, and persuading ourselves that there would not be so much to fear from people who know us perfectly, and who would have some confidence in our words, we preferred to wait until some favourable opportunity made us discover some things as we wished them, than to put ourselves at risk of losing everything by too much haste. This resolution being formed, we neglected nothing that prudence obliged us to do: and finally after having waited some time, we found ourselves in the state of fulfilling our wishes, and happily executing what we had planned. Here in a few words is how the thing happened, and I beg you to hear its particularities, because they are so many authentic confirmations of all that I have said here.

On the 15th of this month we met a young boy aged from 15 to 16 years old, who had been tormented for more than two months with a stubborn and violent fever, which had obliged the doctors to make him bleed up to twenty times to appease their ardour.

Before this disease, he was not observed to be of a lumpish dull spirit, his memory was happy enough, and he seemed cheerful and nimble enough in body; but since the violence of this fever, his wit seemed wholly sunk, his memory perfectly lost, and his body so heavy and drowsy that he was not fit for anything. I beheld him fall asleep as he sat at dinner, as he was eating his breakfast, and in all occurrences where men seem most unlikely to sleep. If he went to bed at nine o'clock in the evening, he needed to be wakened several times before he could be got to rise by nine the next morning, and he passed the rest of the day in an incredible stupidity.

I attributed all these changes to the great evacuations of blood, the physicians had been obliged to make for saving his life, and I persuaded myself that the little they had left him was extremely incassated by the ardour of the fever (which usually dissipates only the more tenuous part) and so stagnating in his vessels, he wanted the motion and heat necessary to volatilise the same, and to diffuse a sufficient activity into the nerves and muscles. Accordingly my conjecture was confirmed by our opening one of his veins, for we beheld a blood so black and thick issue forth, that it could hardly form itself into a thread to fall into the porringer. We took about three ounces at five o'clock in the morning, and at the same time we brought a lamb, whose carotid artery we had prepared, out of which we emitted into the young man's vein, about three times as much of its arterial blood as he had emitted into the dish, and then having stopped the orifice of the vein with a little bolster, as is usual in other phlebotomies, we caused him to lie down on his bed expecting the event; and as I asked him now and then, how he found himself, he told me that during the operation he had felt a very great heat along his arm, and since perceived himself much eased of a pain in his side, which he had gotten the evening before by falling down a pair of stairs of ten steps; about ten o'clock he was minded to rise, and being I observed him cheerful enough, I did not oppose it; and for the rest of the day, he spent it with much more liveliness than ordinary; eat his meals very well, and showed a clear and smiling countenance. He bled only 3 or 4 drops at the nose, about 4 o'clock of the evening, and after he had supped very well, I caused him to go to bed about 9, and falling asleep at 10, he awakened at 2 after mid-night, and finding that he could not fall

Before this illness no heaviness was noticed in his mind, his memory was quite happy, and he seemed quite happy and ready with his whole body: but since the violence of this sitting his mind seemed quite dull, his memory entirely lost and his body so heavy and so sleepy that it was no longer fit for anything. I saw it myself, falling asleep by sitting down to the table, while having breakfast, and in all the meetings, where one must seem to be the furthest from sleep; if he went to bed at nine in the evening, he had to be woken up several times to wake him up at eight or nine in the morning, and he spent the rest of the day in an unbearable numbness.

I was grateful for all these changes to the great currents of blood that we had to do to save his life, and I persuaded myself that the little that remained in him was extremely thickened by the heat of the fever (which usually dissipate only the most subtle) and thus, by stagnating in its vessels, it lacked the movement and the heat which it required to cover itself in spirits, and to diffuse sufficient activity in the nerves and in the muscles. Indeed, my conjecture was confirmed by the opening which we made in one of his veins at the folds of the elbow in view of the transfusion; for we saw blood come out, which was so black and so thick, that it had difficulty in composing a streak to fall into the dish. We drew from it about three ounces at five o'clock in the morning, and at the same time we had to bring a lamb whose carotid we had prepared, and we introduced this arterial blood into the vein of this young man about three times as much as he had lost in the dish, and then having blocked the opening of the vein with a compress as in ordinary bloodletting, we let him lie down to observe what happened to him; and as I questioned him from time to time about the state he was in, he told me that he had felt during the operation a very great heat along his arm, and that since then he had felt much relieved from his bad side that he had after falling the day before from the top of a ten-foot ladder. He wanted to learn to ten o'clock, and as I saw him quite gay, I did not oppose it, he then worked the rest of the day with more action than usual; he ate very well at his meals, and gave a quite serene and laughing face. He lost only 3 or 4 drops of blood through his nose at 4 hours in the evening, and after a very good evening I told him to sleep at 9 o'clock, and sleep having taken him at ten I left him at about two hours

asleep again, he arose at 4 in the morning. All this day we observed his humour much more lively and the agility of his body much greater than ordinary. The next day he slept a little more, and from that time he easily got the victory over his drowsiness, which before he had often attempted without success; for now he never fails to rise very early without needing to be wakened. He executes nimbly what ever is appointed him, and he hath no longer that slowness of spirit nor heaviness of body, which before rendered him unfit for any thing. He grows fat visibly, and in brief, is a subject of amazement to all those that know him, and dwell with him.

Now who sees not that all these admirable effects undoubtedly proceed from that little arterial blood of the which having been mixed with the mass of his thick blood, was like a ferment to it, to rarefy and attenuate it more than ordinary, whence followed the production of greater plenty of spirits, and a more nimble performance of the actions of the body.

This first trial thus succeeding engaged us to make a second upon a stronger man, aged 45 years. Now this man having no considerable indisposition, we intended to make a larger transfusion upon him than on the former. But finding his vessels very low and not well filled with blood, we took from him only about 10 ounces, and afterwards imitated into him twice as much from the crural artery of a lamb purposely provided for it, as well because the same is bigger and easier to come at than the carotid, as for that we would put some difference between this second experiment, and the first. The man abated nothing of his jovial humour during all the time of the operation, and amongst other reflexions which he made concerning the placing of the lamb near his arm he said merrily that there were strange ways in physick to preserve life, that he knew not who had invented this of bleeding, but that he felt a very great heat from the orifice of his vein up to his arm-pit; which proceeded from the course of the new arterial blood, passing up that way towards the heart.

after midnight and seeing that he could not go back to sleep, he went to four o'clock. We noticed throughout the day that his mood was much brighter, and the agility of his body much greater than usual. The next day he slept a little more, and since then he has easily gained from his numbness what he might have tried before without any success, which is to settle into his sleep; because thee is no more sitting down in the morning, and without the need to go and wake him up: He carried out even more promptly what he was ordered to do, and no longer had that slowness of mind and numbness of the body which previously made him incompetent in all things. He visibly grows fat, and in short is a subject of surprise and astonishment for all those who know him and who stay with him.

But who does not see that all these admirable effects undoubtedly prove that a little of the arterial blood of the lamb, who having been mixed with the mass of his coarse blood, has served him like ferment and leaven to rarefy and steal himself more than usual, to produce a greater abundance of spirits, and to maintain all the functions of the body freer and more clear.

This first experiment thus conducted, led us to attempt a second on a more robust man aged about 45 years. And as he had no considerable indisposition, we proposed to give him a larger transfusion than the first; but having pierced his deep enough vessels and found them not very bloody, we only drew from it about ten ounces, and then we introduced it quite a few times of the crural artery of the lamb that we had prepared on purpose, both because it is bigger and easier than the carotid artery, and to put some difference between this second experience and the first one. Besides, this man did not leave his playful mood during the whole time of the operation, and among other reflections he had on the situation of this lamb near his arm, he told us while laughing that there was strange ways of preserving life in medicine, that he did not know who had introduced this way of bleeding, but that he saw very great heat from the opening that we had made to him under the armpit, which took the course of this new arterial blood which must take this path to go to the heart.

When the operation was ended, we advised him to lie down to rest' but being he found no indisposition in himself, it was impossible to prevail with him, and we could not keep him from falling to work with the poor lamb, cutting his throat, and fleecing him, in which he is very dextrous, having exercised the same profession from his youth. Afterwards he declared his intention to return home, and promised us that he would take a mess of some comforting broth there, and lay himself to rest for the remainder of the day; but as soon as he went forth he betook himself to find out his comrades, and carried them to the tavern to drink part of the money given him for his day's business; at noon finding himself more hearty, (whether by the new blood he had received six hours before, or by the quantity of wine he had drank) he fell upon a fort of work so laborious to his whole body that it might almost tire a horse; thus he spent all the afternoon and so kept us from making such observations upon him as we had intended. I met him the next day in the streets, and understanding from him this behaviour, I was surprised at it, and blamed him of imprudence. But he told me in excuse of himself that he could not be at rest when he was in healthy that he had felt no pain either during or after the operation that he had eaten, drank and slept very well, that he had more strength than before, that if we were minded to repeat the same experiment at any time, he desired we would choose no other person for it but him, and that another time he would lie down to rest, and punctually behave himself as we should command him.

This is an account of our experiments, which indeed have not yet proceeded very far; nevertheless I could not longer conceal them from your curiosity, knowing well that from these few observations you will foresee consequences and advantages enough. I have not described the manner of our making this experiment upon man, which is very different from that which we use upon beasts; but the particular relation would be but tedious and useless to you, since you will behold it more plainly in an example whenever you shall find a convenience to command us to make the same before you. And I assure myself you will therein admire the dexterity and sagacity of Mr. Emmerez and confess that his industry renders him as happy in this operation as in many others of chirurgery which are much

When the operation was completed, we wanted him to rest, but as he felt no alteration in himself, it was impossible for us to overcome it, and we could not prevent him from immediately slaughtering the lamb, to suffer it, and to skin it, because he was skilful enough, and that he practiced it throughout his youth. Then he wanted to return to his house, promising us that he would take a broth there, and that he would rest there the rest of the day; but he was no sooner gone than he went to find his comrades, and took them to the cabaret to drink some of the money we had given him to pay for his day. And feeling more vigorous in the midday, either by the new blood that he had received six hours before, or by the quantity of wine which he had just drunk, he undertook a work with all his body and as hard as a man could bear, since even the horses would have difficulty in resisting him; he worked the whole afternoon, and thus prevented us from making the observations we proposed to make on him. I met him the next day in the streets, and having learned this behaviour from him, I was surprised; I despaired of it and blamed him for imprudence; but he told me, as an excuse, that he could not rest when he was well, that he had not felt any pain during the operation, that he had drunk and ate very well, and slept, that he had more vigour than before, and that if we wanted to start the same thing again some day, he begged us not to take anyone other than him, and that another time he would rest and punctually carry out whatever we ordered him to do.

Here is where we are with our experiences, they are not well advanced yet, but I could not hide them any longer from your curiosity, knowing well that from this little observation you would expect the consequences and the advantages. I have not spoken to you of the manner in which we have done it on a man, which is very different from that in which we would have been on the beasts; but this detail would only be annoying and useless to you, you will see more in a moment, if you have the convenience of seeing us experience it some day, than I could tell you here in several words. And I assure myself that you will admire there the skill and the vigilance of Mr. Emmerez, and that you will hear that his industry makes him as happy in this operation as in several others of surgery which are much more difficult,

more difficult for indeed it is done with as much speed as an ordinary phlebotomy, and he that receives new blood complains not of any pain that he feels.

But I perceive that I abuse your patience and that the length of my letter has passed the bounds wherein the respect I have for the person ought to confine me, I beseech you pardon me this liberty, and be not displeased that I take this occasion to consecrate to you my most humble service and to assure you that I am,

Sir,
Your most humble and obedient servant,
J. Denis
Paris, June 25 1667.

since this one is done as quickly as an ordinary bleeding, and that he who receives new blood does not complain of any pain.

But I realize that I am abusing your patience, and that the length of my letter has gone beyond the limits within which the respect I have for your being as a person should contain me. Forgive me, please, this freedom, and find it good that I have taken this opportunity to be able to devote my most humble services to you, and assure you that I am.

Sir
From Paris this 25th June 1667
Your very humble and very obedient servant,
J. DENIS.