

DIE TRANSFUSION DES BLUTES

BY: Dr FRANZ GESELLIUS (1873)

A TRANSLATION OF PAGES 161-187 OF THIS BOOK BY PHIL LEAROYD

The book 'Die Transfusion des Blutes, eine historische, kritisch und physiologische Studie', published in 1873 in St Petersburg [by Eduard Hoppe] and Leipzig [by Franz Wagner] can be viewed or downloaded at the following sites:

<https://wellcomecollection.org/works/c4p6wp9f>

https://books.google.co.uk/books/about/Die_Transfusion_des_Blutes.html?id=jp_zqbcnDKEC&redir_esc=y

https://archive.org/stream/dietransfusionde00gese/dietransfusionde00gese_djvu.txt

As you may expect from the title, 'The transfusion of blood, a historical, critical, and physiological study' this book should contain information regarding the history of blood transfusion. Although given precedence in the title, the history of transfusion is actually included only at the end of this 187 page book.

Within the book, Gesellius describes and illustrates his 'capillary blood transfuser' apparatus, whilst at the same time admitting that this method of blood collection does not provide sufficient quantity of blood for transfusion and goes on to describe and illustrate his venous blood collection method into a jacketed 'temperature controlled pressure vessel'. He then spends some time comparing his apparatus to those devised by a number of other researchers, detailing advantages and disadvantages of different aspects of their equipment.

He discusses the disadvantages of the production and use of defibrinated blood, which the author describes as being 'dead blood' and includes a number of charts summarising the details and outcomes of various transfusions performed by different investigators, as well as extensive discussion of various animal experiments related to the temperature of transfused blood and mechanisms for excluding the infusion of air. Gesellius also includes a number of critical comments regarding the publications of other authors, including transfusions in different clinical conditions, as well as critically denouncing comments made about some of his publications. The book ends with a plea for the direct transfusion of blood from the artery of a lamb, stating that it is oxygen-rich, alive, and life-giving and his concluding prophecy of 'Die Lammblood Transfusion wird in der Medicin eine neue Aera die – blutspendende – inaugurieren', i.e. that 'lamb blood transfusion would inaugurate a new era within medicine' would soon prove to be very much misguided.

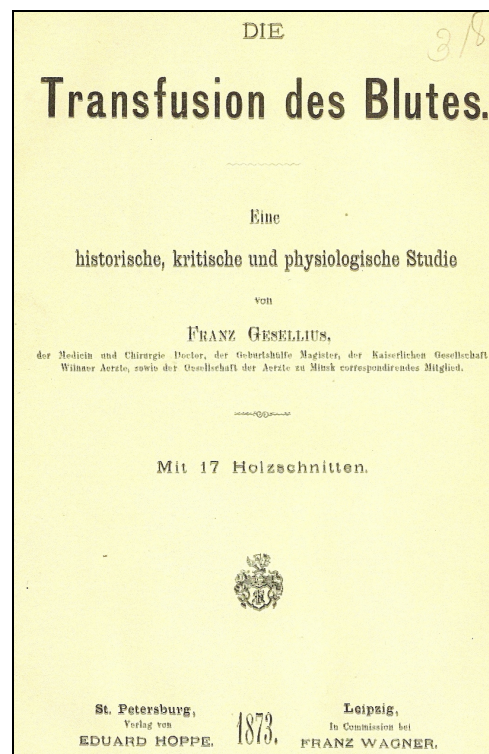
Although some historical aspects of blood transfusion are identified in the body of the text, the 'historical aspects of blood transfusion' part of this book does not actually start until page 161. This final section of the book in fact comprises selected references of 'Old Transfusion Literature', some of which also include the authors own comments (which I have translated). This is followed by a list of 'New Transfusion Literature' (starting on page 176) of nearly 270 references, in published date order, from 1815 to 1872. I have reproduced these (as written) – some comments have also been translated (included within square brackets). It is however a fact that many of these references relate to a thesis or dissertation that cannot be

easily obtained, many references lack the author's name(s), whilst many others in fact lack sufficient detail to make them easily sourced, e.g. 'Gazette médicale de Lyon, Avril, 1864.'

Although I have taken great care not to misrepresent the author's original wording I cannot guarantee that this work does not contain 'translational errors' and the reader is recommended to check specific details against the original German text.

Dr FRANZ GESELLIUS – BIOGRAPHICAL INFORMATION

The son of a Neubrandenburg doctor, Franz Gesellius was born on the 8th September 1840 in Malchin, Germany. After studying medicine in Greifswald, Berlin and Breslau, he joined the Greifswald Corps in 1861 and the Berlin Corps in 1862. Following his time in the army he obtained his doctorate in Rostock. Initially living in Helsinki he went to Helsingfors and eventually settled in St Petersburg. He was instrumental, together with Oscar Hasse, for reviving experimentation and research during the 1870's on the transfusion of animal blood into humans. However, when he reviewed his own and other animal-to-human transfusions for which he could find records, this showed that 56 percent of patients died shortly after the transfusion and that many other patients were not helped by the procedure. He subsequently founded the St Petersburg Herald in 1875, of which he remained editor-in-chief until his death from meningitis on the 24th March 1900 in St Petersburg.



Title page of 'Die Transfusion des Blutes, eine historische, kritisch und physiologische Studie'
By Franz Gesellius (1873)
(Image credit: Wellcome Collection)

OLD TRANSFUSION LITERATURE with accompanying notes until 1803.

Ovid. Metamorph. Lib. VII. 159 ff. u. 333 and 333. (Medea)

- "Quid nunc dubitatis inertes?

Stringite - ait - gladius veteremque haurite cruorem,
Ut repleam vacuas iuveneli sanguinis venas!" -.

Magnus Pegelius. Thesaurus rerum selectarum, magnarum dignarum, utilium, suaviū pro generis humani salute oblatus. 1604

Magnus Pegelius was born in 1547; he undoubtedly was the first to publish the idea of transfusion first. At the time of the above work, he was a professor in Rostock.

Andreae Libavii appendix necessaria syntagmatis arcanorum chymicorum contra Hening. Scheunemanum. Francofurt 1615. Fol.

Audreas Libavius from Halle was a doctor of medicine, director and professor at the Coburg grammar school. From this work by Libavii, who is an opponent of the idea of transfusing blood into human beings, if one tries to make those passages that Libavius seeks to ridicule it compared with those passages in the above work, it is unquestionably clear that Magnus Pegelius thought of the idea of transfusion in the above work, even if it was still very obscure, pronounced it first

Johann Colle, methodus facile parandi tuta et nova medicamenta. Venet. 1628.

Joh. Colle, professor in Padua, occasionally mentions transfusion here, noting in connection with the foodstuffs and chemical medicines that can prolong life: it is far easier to draw the blood through a tube to get it out of a perfectly healthy young man and overflow it into an old man, than to prolong life than with medicines. He does not say where he got the thought from.

Philosophical Transaction. Vol. No. 7, 1665; Nos. 19, 20, 22, 1666; Vol. II Nos. 25, 28, 30, 35. 1667; No. 54. 1669.

In this collection the first beginnings of transfusion in England and France are specified very precisely. [CLARKE, Henshaw, Lower, Boyle, Coxe, King, Hock, and other transfusion experimenters].

Robert Boyle, certain physiological essays on the usefulness of natural philosophy. Oxon 1667. 4.

Often about transfusion, also includes the first successful transfusion story about Coga, the Baccalaureus who voluntarily allowed himself to be transfused by LOWER and KING.

Kingi opera 1667. 4.

Similar content.

Jean Denis, extrait d'une lettre à M... sur la transfusion du sang; Paris du 2 Avril 1667.

Claude Tardy, Traite de l'écoulement du sang d'un homme dans les veines d'un autre et de ses utilités. Paris, Avril 1667. 4.

J. Denis, Professeur de Philosophie et de Mathématique, lettre écrite à Mr. Montmor, touchant deux experiences de la transfusion faites sur les hommes. Paris 1667.

Also under the following title:

J. Denis, Lettre écrite à Mr. Montmor, Conseiller du roi en ses Conseils et premier Maître de Requestes par 1. Denis Professeur de Philosophie et de Mathématique, touchant' une nouvelle manière de guérir plusieurs maladies, par sa transfusion du sang confirmée par deux expériences faites sur des hommes; Paris le 25 Juin 1667. 4. (18 pages).

G. Lamy, Maître aux arts en l'université de Paris à Mr. Moreau, Dr. en médec. Lecteur et Professeur ordinaire du roi, contre le prétenduës utilités de la Transfusion du sang, pour guérir des maladies, avec la réponse aux raisons et expériences de Mr. Denis; Paris le 8 Juillet 1667. 4. (15 pages).

C. Gaudrois, lettre écrite à Mr. l'Abbé Bourdelot, Dr. en Méd, de la faculté de Paris et premier Médecin de la Reine Christine de Suède, pour servir de réponse au Sr. Lamy et confirmer en mesme temps la transfusion du sang par des nouvelles expériences; Paris le 8 Août 1667. 4. (16 pages).

G. Lamy, Maître aux arts en l'Université de Paris, lettre écrite à Mr. Moreau, Dr. en médec. etc. dans laquelle il confirme les raisons qu'il avoit apportées dans sa première lettre, contre la transfusion du sang, en repondant aux objections qu'on luy a faites; Paris le 26 Aoust 1667. 4. (16 pages).

J. Denis, Lettre écrite à Mr. l'Abbé Bourdelot, Dr. en Médecine de la faculté de Paris, premier Médecin de la reine Christine de 'Suède, à present auprès de Mons. le Prince de Chantilly par Gaspard de Gurye, Ecurien Sieur de Montpolly, Lieut. au regiment de Bourgogne; sur la transfusion du sang, contenant des raisons et des expériences pour et contre; Paris le 16 Sept. 1667. 4.

Claude Tardy, Lettre écrite à Mr, le Breton, Dr, en Mèd. pour confirmer les utilites de la transfusion du sang et repondre à ceux qui les estendent trop; Paris 1667. 4.

Journal des Sçavans. Paris 4. 1667. pag. 63.

Louis de Baril, Advocat en Parlement, réflexiens sur les disputes, qui se font à l'occasion de la transfusion. Paris 1667. 4. 7 pages.

J. Denis, Lettre écrites à Mr par J. Denis, Dr. en Mè de c. et Prof. de Philos, et de Mathém. touchant une folie invétérée, qui a été guérie depuis peu par la transfusion du sang; Paris le 12 Janvier 1668. 4. 12 pages.

G. Lamy, Lettre écrite à Mr. Moreau, Dr. en Médec. dans laquelle et décrite la mort du fou prétendu guérie par la transfusion, avec un récit exact de ce qui s'est passé aux transfusions. qu'on lui a faites, et quelques reflexions sur les accidents, qui lui sont arrivés; Paris le 16 Fevrier 1668. 11 pages.

J. Denis, Lettre écrite à Mr. Sorbière, Dr en Médec touchant l'origine de la transfusion du sang, et manière de la practiquer sur les hommes avec le récit d'une cure faite depuis peu sur une personne paralitique. Paris le 2 Mars 1668. 4. 12 pages.

Piere Martin de la Martinière, opuscles contre les circulateurs et la transfusion du sang. Paris 1668.

Eutyphronis de nova curandorum morborum ratione per transfusionem sanguinis. Paris. 1668,

Monsieur de Sorbière, discours touchant diverses expériences de la transfusion du sang. Rom. Decembre 1668. 4.

Messrs. Montmor, professor of surgery Claudius Tardy, Gadroys, Bourdelot, Gaspard de Gurye Sieur de Montpolly, Louis de Baril, and others were like the present brochures say, for transfusion and for Denis. Lamy covered by the majority of the envious doctors at the Paris Faculty, as well as Piere Martin de la Martinière were the fiercest opponents, who hurled lie upon lie, slander upon slander against Denis. They finally managed to discredit transfusion through this dispute, especially since Denis' zeal finally flagged because he became the royal personal physician.

Joh. Dan. Majoris delicia e hibernae sive tria inventa medica. Kilon 1667 fol.

Major, Professor of Medicine in Kiel, calls himself the inventor of transfusion in this document and gives it the name "Transplatatio nova", in contrast to the "sympathetic transplantation of diseases", which many people once believed.

His method is as follows: take a 2-finger long cylinder of silver, which holds about 5 - 6 ounces, one end of which in a finely curved tube, the mouth of which is designed like a cupping head. The fine end of this cylinder is brought into the vein of the patient, to whom one drains 3 - 4 ounces of blood before, and on whose arms below the opening had put on a bandage to stop further bleeding. Then the vein of a healthy, full-blooded person is opened and the cupping head-shaped mouth of the cylinder is tightly fitted so that blood flows into it without being spoiled by the outside air. If the surgeon believes that the cylinder is full, he immediately inserts a suitable stamp and drives with this, like a syringe, the blood into the patient's vein. In order to prevent the blood from clotting even more, Major believes that one can first throw some volatile stag-horn salt, or ammonia, into the cylinder and warm it by heating from outside with glowing coals. Before the operation both persons should be allowed to relax gently. Major died in Sweden in 1693, allegedly out of annoyance over a ring with false diamonds that one of his patients, a Swedish countess, had given him.

J. Sigismundi Elsholzii, clysmatica nova, sive ratio qua in v enam sectam medicamenta immitti possent, ut eodem modo operentur ac si ore admissa fuissent; addita inaudita omnibus saeculis transfusione sanguinis. Colon. Brandenb. 1665. 1667. 1668.cum Francof. cum collegio anatomico Severini et aliorum.

Elsholz was Brandenburg's personal physician and wrote about the infusion of Arzenej agents. Elsholz's opinion of transfusion is favourable; one can use animal blood or the blood of pletoric people to strengthen weak and anaemic people and improve hot blood; and if one can otherwise believe in the sympathetic cures, diseases can be transplanted from a person into an animal and through reciprocal ones and can reconcile disunited spouses or brothers with one another through mutual transfusion. The practice of transfusion with a syringe is easier, but the transfer by means of a tube is preferable, because the blood is not changed so much. The remaining part of the second edition of his work is historical and contains the transfusion and infusion attempts that were made in various countries before 1667, as far as they had come to Elsholz's knowledge.

N. A. Tinassi, Rilazione del successo di alcune transfusione del sangue fatte negli animali; auch Rilazione d'esperienze fatte in Inghilterra, Francia ed Italia intorno la formosa transfusione del sangue per N. A. Tinassi in Roma 1668. 4.

Tinassi reports here on Dominicus Cassini of Bologna, who on 28th May 1667, as the first Italian to transfuse the carotid of a lamb into the jugular of another lamb, when so much blood came, he let it run out of the latter. After 6 months the lamb died. He

also reports about a very strange transfusion which took place on 20th May 1668 in the house of Mr. Griffoni, performed with the help of the surgeon Mr. Andreas Carassini. One has a sniffer dog, not very big for its kind, who is 13 years old and has been completely deaf for 3 years, who walked very little, and with weakness could no longer pick up his feet, but taken, dragged them on the ground. The blood of a lamb was poured into this depleted dog. After the operation, he remained lying on the table for an hour after he was untied, then he jumped down and sought out his masters who had gone to another room. After 2 days he ran around outside the house against his habit with the other dogs; he no longer dragged his feet, and besides that he was more and more eager to eat, he also began to give clear signs of the restoration of hearing, by turning them on the whistles of his masters. On 13th June he had almost completely regained his hearing; he was much livelier than before surgery etc. etc.

Ippolito Magnani also performed transfusions in Rome from October 1667 to January 1668 and came to the opinion that one should not pass on foreign blood in too large a quantity.

Pauli Manfredi de nova et oinaudita chirurgica operatione, sanguinem transfundente ex individuo ad individuum, primum in brutis, dein in homine Romae experta. Roma 1668. 4. 32.

This document contains the three transfusions in humans by Riva, as well as his own transfusion to a carpenter with a disease.

Barthol. Santinelli, confusio transfusionis, sive confutatio operationis transfundentis sanguinem de individuo ad individuum. Romae 1668. 8. 139.

(Dedicated to the Prince and Cardinal Rospiglioso)

Santinelli, a great opponent of transfusion, made transfusion so suspicious through this writing that the authorities forbade it for reasons of religion, because transfusion is in conflict with God's commandment, which in the books of Moses forbids the internal consumption of blood and it was forbidden to carry it out on people .

Regner de Graaf, De clysteribus et usu siphonis. Lugd. Batav. 1668.

The Dutchman Graaf mentions transfusion only incidentally in his writing, he and a certain Tob. Andreae name their compatriot Ludwig de Bils as the inventor of transfusion. He performed transfusion many times. At Delft, he relates, in the presence of many onlookers, he happily carried out transfusion of animals by means of tubes made of duck bones pushed into each other.

Joh. van Horne Microtechnae seu methodica ad Chir. Introd. Lugd. Batav. 1668.

The same, also Dutch, claims to have carried out transfusion into animals with ease and happy success in the presence of many spectators. With regard to human surgery, he wants to wait for more experience.

Richard Loweri tractatus de corde. Lond. 1669

Lower mentions here his well-known transfusion attempts in Oxford.

Irenaei Vehr, Diss. praesidium novum chirurgicum de methaemochymia; Francof. ad Viadr. 1668. 22 pages.

Vehr defends this dissertation in Frankfurt. One should only transfuse those who suffered from a persistent chronic disease, whose powers have not yet sunk much, and who would not be frightened by the sight of the blood. Between humans one may only transfuse from a vein into a vein, since arterial blood is more excellent, but arteriotomy is associated with too much danger. He is very much against the transfusion of animal blood into a human being, citing a touching story that a girl

developed the nature of a cat from drinking cat blood. In an emergency, however, the blood of a meek lamb could be taken.

Henr. Krüger, Diss. praeside I. D. Majore de clysteribus Veterum ac Novis; Kiliae 1670. 4.

Krüger from Lüneburg prefers the infusion of medicinal products to transfusion and warns against the transfusion of animal blood into humans. With the help of the police, he would defend himself against immodest attacks on his person and views.

Sculteti armamentarium chirurgicum, c. I. B. Lamzweerde de auctioro. Lugd Batav. 1672. 8. pag. 54.

On page 54 of this work is a detailed description and illustration of Lower's transfusion apparatus.

G. Abraham Merklin, de ortu et occasu tranfusionis sanguinis. Norimberg 1674. 8.

The transfusion from one animal to another is of no concern to the doctor; that from one animal to a human is to be advised against for many reasons, whilst from one human to another does not allow fear of pernicious mutation, but must be tested even more by experience.

J. Cornel Hönn, Diss. praeside Joh. Chr. Sturm, prof. Physet Math. de transfusione sanguinis historia, methodo, et artificio. Altorfii 1676.

It is the best dissertation from this period; useful for physiological experiments; the German doctor Philippi was an eyewitness to Denis's happy transfusion into the sleep addicted servant, the litter carrier and the old horse rejuvenated by transfusion. From the experiments made so far, he cleared: 1. that the transmission of better blood can at least alleviate several diseases, if not relieving them; 2. that one animal can live with the blood of another, and 3. that old people could be brought to better strength by new blood, if not rejuvenated, at least for a while. The former should, however, only be attempted in very severe diseases in which one has tried in vain to improve the juices by medicines, but in which the inner parts are not spoiled. The latter still requires many experiments on malefactors or animals in order to be certain of it. Transfusion can be used as an aid against severe blood loss. Human blood is better, but animal blood is not entirely to be discarded. He does not believe that one can make disagreed spouses agree through a reciprocal transfusion.

(You can see that the brave German doctor Hönn developed the same views 200 years ago that we still have today, i.e. we have not come a step further in 200 years.)

Claude Perrault, Essais de physique. 1680. Bd. IV pag. 405.

Claude Perrault, already an opponent of Denis's time, did not publish his opposing views until 20 years later, although he assured us that they were written much earlier.

Francisci Kleini, disput an sanguinis transfusio utilis sit adhibenda, Herbipol. 1680. 4.

Klein, professor in Würzburg, mentions that the professor of medicine in Altorf Moritz Hoffmann was the inventor of the transfusion. As early as 1662, as his pupil Irenaeus Vehr (l. c.) assures in his dissertation in 1668, in a lecture in Pavia, transfusion by means of a glass tube in the form of a Greek Z was suggested for the cure of melancholy and it was also proposed and defended in a dissertation in Altdorf in 1663. According to Klein, in his next work: Sanguine apolineae, etc., Hoffmann suggests it in certain diseases, especially in anger/rage and leprosy. Merklin (l. c.) Hofmann's friend and pupil gives us a message about his invention in his above-mentioned: "Ortu et occasu transfusionis". Hofmann wants to transfer only a few drops, not several ounces, of blood from a vein in the back of a healthy person's hand through a short tube into the vein of a sick person's hand, and he considers this

little blood to be sufficient to improve diseases of the mind and body "quasi per insitionem" in order to change the mass of the blood as if by a new ferment, especially if one were to take blood of the opposite quality.

Francisci Kleinii sanguinea apollineae palaestrae acies, quam sine strage coecis visum, surdis auditum deliris mentem, vetulis juventutem, uxoribus pacem restituendo, istruxit autor, dum Dominum Joh. Vit. Helmuth medicinae Doctorem crearet. Herbipol. 1680. 4.

This program is characterized by its pompous title. But does not contain anything. A change of mind by transfusion is indeed possible, since according to Aristotle an old man only needs to have the eye of a young man in order to see like a young man, so the blood of a young man would make an old man bold and cheerful. Animal blood transfusion is useful, but human blood is preferable.

Francesco Folli Stadera medica nella quale oltre la medicina infusoria si bilancia la Transfusione del sangue quia inventata da Fr. Folli. Firenze 1680. 8. 217 pages.

Follius in Florence, a doctor and natural scientist who was very respected at the time, proposes the following execution of a transfusion. Take a kind of small funnel of bone with a small incision, so as not to compress the opened vein of a healthy person on which it is placed, from which the blood is drawn by means of a tied bladder or an intestine to which a fine silver tube is attached that is inserted into the patient's vein. In doing so, care must be taken that no air penetrates with it. If, instead of the intestine, one took a prepared artery, one could look for one that had a small branch from which the air could find an exit. The transfusion tube can be left stuck in the vein if it is not to cause considerable pain in order to save oneself the trouble of inserting it again. According to his experiments, the blood will overflow well from the bladder without the need to squeeze it.

Michaelis Ettenmülleri Diss. de Chirurgica transfusione, Lipsiae 1682. 4.

In this dissertation, Ettenmüller proves that any transfusion cannot be made without risking life due to specific differences in the blood; it is unable to restore the strength of old people or those weakened by illnesses, just as it is not able to do little against illnesses of solid parts. Only very rarely, and in desperate cases, could transfusion be used against diseases of the fluid parts. Fever, hypochondria, scurvy, palpitations, and so on, trying to heal with them should not occur to anyone. Certain types of melancholy and mania were no longer used, as did violent blood flows. You always only have to transfer over small portions of blood at once. Lower's transfusion tubes are too long and easily induce coagulation of the blood; he likes the tubes of Denis better, whose transfusion method he himself claims to have seen in use during his stay in Paris.

Acta Naturae curiosorum Dec. II, An. 8. Obs. 131; Dec. III An. 9-10 Obs. 21 u. 204. 1684

Various things about transfusion and transfusion attempts.

Matth. Gottfr. Purmann, Chirurgischer Lorbeer-Krantz, oder Wund-Artzney. Frankf. u. Leipzig 1691. 4. pag. 284, 285.

In my edition of the Chirurgischen-Lorbeer-Krantz in Halberstadt, printed in 1684, I find nothing about transfusions, although Scheel states it. Purmann reports, probably in the second edition, besides his human transfusion in association with his teacher Kaufmann; also of transfusion experiments in animals, which the Hessen-Casselsche Archiater ['chief physician of a monarch'] Johann Dolaeus made.

Anton Nuck, Observationes et experimenta chirurgica, edita per J. T. Brem. Med. Stud; Lugd. Batav. 1696 (Der Dedication nach zu urtheilen 1692 verfasst).

Nuck, Professor in Leiden, judges transfusion with moderation. He does complete justice to it for its use in physiology for demonstrating blood circulation and saving from bleeding to death. In view of their application in serious illnesses, he is less favourable to them. He criticizes transfusion apparatus for the fact that the communications tube is either too inflexible if it is made of metal, or too limp if an intestine is used; he therefore suggests the windpipe of a hen or young duck as equidistant from those two extremes, and depicts his transfusion tube on the last panel.

Matth. Gottfr. Purmann, *Chirurgica curiosa* in 3 Th. u. 73 Kapit. mit Kpfrn. Francof. u. Leip. 1699. 4. 1766. n. 1739 pag. 712.

Tells about his own transfusions and finds that due to the untimely death of the most ardent defenders of transfusion, such as Elsholz, Major and others, transfusion did not gain a firm foothold in Germany.

Du Hamel, *historia Academiae regiae scientiarum*. Lips. 1700. Cap. III. pag. 20.

Here Du Hamel reports that he saw the transfused Baccalaureus Coga two years after the transfusion; he found a healthy, robust body, but just as crazy as it was before the transfusion.

Joh. Ludw. Hannemann, *Diss. de motu cordis*. Kiel 1706.

Hannemann, a restless, confused mind, friend and defender of alchemy, astrology and chiromancy, who had risen to professor in Kiel through Cabalen, wrote to annoy his colleague Major, violently against infusion and transfusion. In the present document he declared the doctrine of the circulation of blood and also transfusion, to be absurd.

P. Dionis *cours d'operations de Chirurgie*. Paris 1708. 8. (8. Demonstrat.)

Dion, surgeon of the Dauphin and Lector of Surgery in Paris, claims, in order to warn his listeners and to give them a fair rejection from transfusion; that the poor people who had the transfusion carried out in France have fallen into foolishness and frenzy and finally died. Parliament then forbade it under severe punishment and thereby put a stop to this new way that would have caused much harm to the love of one's neighbour and to religion. This dreadful operation died again with its inventors, and has now almost been forgotten.

Barchusen, *Historia Medicinae*. Amstelodamae 1710. (Dialogo XVII)

Barchusen mentions transfusion in this dialogue, which he is favourable to, because he concludes from the benefits of blood ingested through the mouth on the good effects of transfusing into the veins.

Chr. Friedr. Garmanni *epistolarum centuria e Museo Iman Henr. Garmani Rostocki et Lips*. 1714.

Garmann, Provincial Physician and Physicus of Chemnitz, was made aware of infusion by Major. Transfusion also aroused his interest. He judged that it could be useful after strong blood flows, but never in consumption, emaciation and the like.

Olai Borrichii *Diss. de sanguine*, edit. a Sever. Lintruprio. Hafn. 1715.

Olaus Borrichius, famous professor of botany and chemistry in Copenhagen, thinks in this dissertation that theologians first have to decide whether the prohibition of the Mosaic Law against the consumption of blood also applies to medicinal use, otherwise he would not be afraid by lack of adequate trials before transfusion returned.

Johann Junker, *Conspectu Chirurgiae*. Halle 1721. 4. (pag. 527.)

Junker, a general practitioner in the orphanage, limits the benefits of transfusion only to violent blood flows.

Fürstenau, *Desideratis Medicis*. Leipz. 1727 (pag. 444.)

Prof. Fürstenau disagrees with the possibility of rejuvenation through transfusion; otherwise he does not express his judgments decisively.

Heisteri *institutiones chirurgiae*. Amstelodami 1739. 4. (Cap. 14)

Heister is just as unfavourable about transfusion as Peter Dion.

De la Chapelle, Cheynes *Methode naturelle de guerir les maladies*. Paris 1749.

Mr. de la Chapelle is the first Frenchman to bring the completely forgotten transfusion back to light in the preface to this work. He judges that it was set aside too soon, and that diligent experiments with it on animals would presumably give important results for the maintenance of health and the prolongation of human life. To this requests for experiments, he adds on 48 octavo pages, a description of the transfusion method and some to try.

Mercure de France. May 1749 pag. 158. 161. 163.

In this learned newspaper, encouraged by de la Capelle, an unnamed person (M. I. P. v. D.) wrote a letter in which he raised some questions concerning transfusion. Two letters followed in response, which apart from compliments for the questioner contain nothing essential. However, none of this had any consequences for the transfusion issue in France.

Dominicus Brogiani, *De veneni animantium natura*. Florent. 1752 (pag. 909 and 111.)

Brogiani attributes the invention of transfusion to his compatriot Folli.

Birch, *History of the Royal philos. Society* 4. 1757. Vol I pag. 303.; as well as Vol. II pag. 50. 54. 67. 83. 89. 98. 115. 117. 118. 123. 124. 125. 132. 133. 134. 161. 164. 166. 167. 179. 189. 191. 209. 216. 217.

A real treasure trove for the history of transfusion.

Halleri *Elementa Physiologiae*. I, II, Lausanne 1754.

Halleri *Bibliotheca anatom.* 1774. Figur 4.

The famous physiologist Haller paid considerable attention to transfusion, if only because of physiological experiments. He thinks very unfavourably about their therapeutic effect, except in the case where quick help is possible after the bite of a poisonous animal. In addition, he tells all sorts of stories about transfusion without specifying the source, e.g. in his library med. pract. T. III p. 250: Denis had transfused horse blood into the veins of a young person without damage.

James Mackenzie, *History of Health and the art of preserving it*. Edinb. 1760.

Mackenzie gives a very moderate judgment on transfusion. He believes that one can extend life through it.

J. A. Hemman, *Medicinisches chirurgische Aufsätze*. Berlin 1778, 2. Auflage 1791.

Hemman, Royal Prussian Pensionair-surgeon, a young scholar who died prematurely, is very taken with transfusion. He gives a history of transfusion almost entirely according to Haller, and therefore somewhat inaccurate; asserts that this operation is wrongly referred to in library books as a medical antiquity, it deserves to be used again, but one does not have to place such exaggerated hopes on it, such as rejuvenating life.

Fuller, New hints relative to the Recovery of Persons drowned. London 1785.
Fuller advises, in addition to the use of electricity, to attempt the transfer of warm blood from the vein of an animal into the vein of the apparently dead man.

Lassus, Discours historique et critique sur les decouvertes faites en Anatomie. Paris 1783.

Lassus, professor at the Surgical College in Paris, wrote a short and fleeting history of transfusion on 10 pages and at the end pronounced its condemnation. Equally unfavourable is the judgment in the famous Encyclopaedia Universal T. 41, p. 226.

G. Richter, Diss. de Haemorrhagiarum pathologia, semiologia et therapia. Marburg 1785.

Suggests transfusion in blood flows. Later wrote about the transfusion in Hufeland's Journal.

Michele Rosa, Lettre fisiologiche, terza editione ridornata ed accesciuta di una pre faz del autore e di alcune giunte importanti, T. I, II Napoli 1788. 8.

Rosa, professor and president of the Med. Faculty of Modena, the famous author of the foregoing work, definitely did most service to transfusion during this century. His animal transfusions are valuable to this day. I refer to it (in Scheel Theil II, p. 132.) He came to the following conclusions: 1. that the vessels of a living and healthy animal are capable of taking up and circulating a much larger amount of blood without life suffering from it; that consequently the vessels are not entirely full; 2. that one can mix the blood of one animal of various kinds with the blood of another in its veins without harming life: 3. that the resuscitation of an animal that has bleed to death and thereby become lifeless by the re-drawing of the arterial blood of another animal kind is possible.

An Essay on vital suspension etc. by a Medical Practitioner.
Request to use transfusion in the case of apparent death.

Sammlung physicalischer Aufsätze von einer Gesellschaft Bömischer Naturforscher. herausgegeben von Mayer 1793. 8. (Bd. III.)

[Collection of physical essays by a Society of Bohemian Naturalists. edited by Mayer 1793. 8. (Vol. III.)]

A certain Cetti from London writes in this journal that Dr. Haarwood in college at Cambridge in 1792 resuscitated a bleeding dog by transfusion of mutton blood in front of his audience. Haarwood heard one day that a man was bleeding to death from a dangerous gunshot wound near town. He immediately picked up a calf and hurried over there, unfortunately the man had already died. (Scheel II, p. 52)

Historical Magazine. London 1792 (May pag. 167.)

Story that the surgeon Russel saved a boy who had Lyssa [rabies] by transfusion.

Nicolai, Recepten und Curarten. Jena 1792 (Th. IV pag. 411–446)

Notes on transfusion according to Haller and Hemman; Councilor Nicolai completely rejects transfusion.

Rougemont, Handbuch der chir. Operation. Frankfurt 1793.
Professor Rougemont judges transfusion rather favourably.

Darvin, Zoonomia. Lond. 1796. 4. Vol. I. pag. 32.

Darvin, an astute physician and original thinker, is of the opinion that at the onset of a putrid fever, when the small pulse and other signs betrayed the lack of the stimulus of distension, a repeated transfusion of about 4 ounces a day from a healthy person, or

a sheep, or a donkey will be of great use. Furthermore, during the illness, as long as the stomach is still inactive, it can be repeated every second or third day until you can finally trust your stomach to eat your food again. Even with Scirrhus Oesophagi or a similar obstacle to nutrition, the transfusion must be used as an aid. In order to carry out the transfusion properly, the blood must not be exposed to the air and kept at its natural temperature, and one must be able to properly determine its quantity. For this end he recommends a transfusion instrument made from a fresh chicken intestine, an inch long, with a tube a little wider like a swan's feather attached to one end and a tube as thick as a raven's feather at the other. After the man and the animal have been brought into contact, the intestine, the capacity of which is known, is allowed to run full in portions, and so the blood is pressed into the human vein. To prevent the blood from cooling down, perform the operation in a warm room and hold a 98 degree Fahrenheit vessel under the tube.

Sundhets-Journal. Juny 1796. (pag. 37.)

Professor Tode, Danish doctor, suggests transfusion in the event of major blood loss and in general in asphyxia.

Metzger, Skitze einer pragmatischen Literärgeschichte der Medicin. Königsberg 1792 (§ 268).

Councilor Metzger calls transfusion an equally dangerous an operation as it is based on the utter brutality of concepts; he names the attempts made with it in therapeutic terms as a talking example of the aberration of the human spirit.

Medical Extract on the Nature of Health; by a friend to Improvement. A new Edit, London 1796. 8. (Vol. III, pag. 653).

In this popular work, transfusion is recommended as the only remedy in violent blood flows. He complains that transfusion has wrongly fallen into decline and at the same time draws attention to the stimulus that the overflowing arterial blood exerts in addition to its effect by expanding the vessels through its larger amount of oxygen.

J. C. Haefner, Teltoviensis Diss. de Infusione et Transfusione. Jenae 1798. 4. 26.

The transfusion of animal blood would not, with due care, be detrimental. He advises that the tubes for the transfusion should be made quite thick, so that the blood does not cool down too quickly in them, although one only has to give them a small opening so that the foreign blood can only gradually mix with the old one.

Hufeland, Journal, der prakt. Heilkunde, 8. Bd. 1. St. pag. 141. 144. 1799.

Hufeland draws attention to the almost forgotten transfusion, from which he expects a lot for the purpose of resuscitation.

Kausch, Geist und Kritik der med. u. chirurgischen Zeitschriften Deutschlands. 3. Jahrgang, 2 Bd.

Dr. Kausch objects to Hufeland's suggestion that, in order to be able to do transfusion, one must first make way for the new blood by draining the old blood, and this would usually make asphyxia deadly.

Willich, Series of Lectures on Health. London. 1798.

Willich is convinced that transfusion is able to extend life.

Arnemann, System der Chirurgie. Göttingen 1799.

Hofrath Arnemann cites transfusion, but abstains from a certain judgment about its value.

Bichat, Recherches sur la vie et la mort. Paris 1800. (Cap. II).

Bichat made various transfusions on animals that were only of physiological interest.

Portal, Cours de Physiologie experimental. Paris 1800.

Portal judges transfusion that it is associated with many difficulties, namely: 1) care must be taken that only about as much blood is reintroduced as there is flowing out, since overfilling the vessels entails dangerous coincidences and could even result in death; 2) the flooded blood of another animal must have approximately the same degree of warmth as its own blood, since otherwise it could easily become harmful; 3) run the risk of communicating the diseases of animals to man with their blood; 4) the operation in and of itself is difficult to make, for it is partly not easy to insert the tube into the artery of the animal, partly the animals bleed to death easily during the operation, and often the blood in the tubes coagulates when they weren't really warm. Finally, 5) not even much is aligned with it; a lot of diseases did not affect the blood at all. Although Portal now declares transfusion to be a mere medical curiosity, he made very successful experiments with it in order to demonstrate the blood flow to his listeners.

Hufeland, Journal der prakt. Heilkunde. XI. Bd. 4. St. pag. 171. 174. 1801.

The doctor, G. Richter, already mentioned here, prompted by Hufeland's article, re-stimulates his proposal to use transfusion as a remedy for blood flow. Since it is most expedient to transfuse human blood, and since this must be arterial blood, he raises the question of whether wrongdoers could not be determined by the authorities to give up part of their blood to save a person who bleeds to death, especially with due care no mortal danger for them is associated with it.

Die Kunst sich wieder zu verjüngen. Hamburg 1801.

It is ironically advised to old matrons to have a transfusion carried out for the purpose of rejuvenation.

Paul Scheel, Die Transfusion des Blutes und Einspritzung der Arzeneyen in die Adern. Historisch und in Rücksicht auf die praktische Heilkunde bearbeitet. Band I, Copenhagen 1802. Band II. Copenhagen 1803.

Paul Scheel, a German doctor in the Danish service, ensured through his above historical compilation that the majority of educated doctors no longer regarded transfusion as a "surgical curiosum", but as an operation that was very worthy of attention and closer research. Scheel travelled the continent for two years, rummaging through all the major libraries in Germany (Göttingen, Wolfenbüttel, Berlin, Dresden, Vienna), Italy and France, except the Copenhagen library, with the iron industry of the German scholar. It is thanks to this tireless research effort that we currently have a completely historical overview of transfusion. Paul Scheel's name will be honourably intertwined with transfusion forever.

NEW TRANSFUSION LITERATURE

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