

THE
Chicago Medical Journal.

A MONTHLY RECORD OF

Medicine, Surgery and the Collateral Sciences.

EDITED BY J. ADAMS ALLEN, M.D., LL.D.; AND WALTER HAY, M.D.

VOL. XXIX. — MARCH, 1872. — No. 3.

Selections.

History and Statistics of the Operation of Transfusion of Blood.
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Without pretending to give to the subject the space to which its importance entitles it, the following *resume* only aims at calling attention to a somewhat neglected point of operative surgery, which, for its simplicity of application, the brilliancy of its results, and the comparative oblivion which has enshrouded it of late years, has, perhaps, no parallel in the list of surgical remedies.

As a result of that fitful caprice which seems to sway the medical mind, as all others, some points of doctrine, therapeutic agents or surgical appliances, greeted with applause and with flattering satisfaction on their first appearance, reign for awhile by their right of vogue, and then gradually lapse into disuse, disfavor or forgetfulness, as the varnish of their newness wears away. Others, again, born and reborn, as it were, in difficult travail, acknowledged, legitimized, holding a place conquered by painstaking research and elaborate clinical investigation, seem fated always to stand

among the "novelties," and to bear continually, despite their venerable titles, the odium that has attached itself to the youth of most really useful or striking discoveries. Among the latter must be counted the operation of the "transfusion of blood," a procedure antecedent in its hypothetical genealogy, even to circumcision.

A short review of its historical record will serve to explain its varying fortunes, and may, it is hoped, awaken interest in the further practical prosecution of the subject in its relations to the physiology and pathology of the present day.

A passing allusion to the transfusion of blood, in a verse of Ovid,* has served as a text for the belief that this operation was known, or even practiced in the Augustan era; however founded this idea may be, it is necessary to pass over the medical records of remote antiquity, and to reach an epoch more nearly contemporaneous with our own, to find what has been accepted as the first example of the procedure, practiced as an operation on a human patient. No less illustrious a subject than the Pope Innocent VIII, has been credited with the honor of being the first recipient of foreign blood through surgical intervention. His Holiness was, in April, 1492, dying of what a certain grim humor has called "that terrible disease—extreme old age." A daring Jewish innovator, whose name has, unfortunately, not come down to us with the memory of his deed, proposed to find the Pontiff a "fountain of jouvence" in the blood of three youths, who died martyrs to their own devotion and the practitioner's zeal, and without perceptibly lengthening the patient's existence. This statement we owe to Sismondi,† who draws his authority for it from Reynaldus.‡ An examination of the original passage, however, would seem to show that the quotation is a mistranslation, and the treatment adopted was medical rather than surgical; a chemical compound formed from the blood used having been ingested, and not, properly speaking, transfused. But even though the criticism be just, and while it thus divests the early history of transfusion of its most striking episode, it is certain that the unfortunate issue of this case exercised a repressing influence upon the progress of the idea, and retarded its development many years. In 1615, we find a description of the operation in Libavius,§ but it is not until the middle of the 17th century that the real surgical history of transfusion commences.

It would appear that the new impulse given to physiological and pathological studies, in the return from the old Galenic doctrines

* Ovid, *Metamorph. Lib. VIII, v. 33, 4.*

† Sismondi, "*Histoire des Republique Italiennes du Moyen Age*," Paris, 1815.

‡ Reynaldus, "*Annales Ecclesiastici*," 1733, quoted by V. Belina.

§ Libavius, "*Appendix Necessaria Syntagmatis Arcanorum Chemicorum*," 1615.

by the promulgation of Harvey's researches and their results, led to the new and more successful attempts to rehabilitate this operation. In 1664 we find Wren in England, and Major in Germany, proving the possibility of successful transfusion in animals; and in 1666 Denis and Emmerets, in France, were fortunate enough to establish the practicability and utility of the operation in man. The results of Denis's experiments are consigned in a "letter written to M. de Montmor, Counsellor of the King in his Councils, etc., by J. Denis, Doctor in Medicine, Professor of Physiology and Mathematics," 1667. Denis's first trial was made on a youth of seventeen years, suffering from fever, and debilitated by frequent venæsection: three ounces of lamb's blood were injected into his veins, with an entire and almost immediate success. The second essay was one rather of curiosity than necessity; the patient, a stout man, aged forty-five, received an injection of lamb's blood, as in the preceding case, without experiencing any disturbance in the prosecution of his ordinary vocation. Denis repeated these experiments on animals with a like result.

At this point one would have thought the operation established on a firm basis, but veteran doctrines, religious prejudices, and metaphysical sophistications mingled themselves with the discussions that ensued upon the promulgation of Denis's letter, until to appease the storm that raged between the two opposed scientific camps, a decree of the Parliament of Paris,* in 1668, virtually suppressed the operation in France. In 1667, however, Lower and King, in England, had repeated the operation on man, with success.† An account of a German case, also that of Dr. John Daniel, who successfully transfused from three to four ounces of blood into a debilitated man in 1667,‡ if perfectly authentic, would dispute priority with Denis's first case. In 1668 Riva and Manfredi § put the operation into practice in Italy:

Now become one of the properties of surgery, the operation again underwent a vicissitude of scientific favor, and lapsed once more into neglect, remaining a dead letter until our own day. Blundell, in his "Physiological and Pathological Researches," published in 1824, brought transfusion again to the notice of the profession, and once more demonstrated the practicability of its application. It is to this publication, and to the article in his

* The immediate cause of this edict was the crimination (and criminal litigation) following upon a case in which Denis commenced the transfusion, but was prevented from completing it. The patient, a man, died very shortly, under circumstances tending strongly to fix suspicion upon his wife as his poisoner. The evidence exonerated Denis, but the event itself proscribed the operation *pro tempore*.

† "Journal des Savants," 6 Fevrier, 1668.

‡ Sprengel, "Histoire de la Medecine," p. 122.

§ "De Novo et Inandita Medico-Chirurgica Operatione," Rome, 1668.

"Obstetricity,"* that is due the prominence ever since assigned, in text-books, to this operation as a restorative means after puerperal hæmorrhage. And yet, despite the complete, if somewhat tardy acknowledgment of the claims of transfusion thus obtained by Blundell, its progress into public favor and practice was still slow. The accumulated statistics, however, of the quarter of a century following Blundell's publications, enable us to bring together a very respectable number of cases, enough already to give material for a fair criticism of the question in its application, accidents and results.

Of the physiological memoirs on the question, elicited by Blundell's essays, the most prominent and well known, probably, is that of Dieffenbach,† published in Muller's "Archives." The same eminent surgeon added a series of six cases to the operations practiced on the human subject, unfortunately with an unfavorable result in each case, an insuccess that is explained by reference to the conditions of those for whose cure the transfusions were performed. MM. Prevost and Dumas published in 1821, in connection with their researches on the blood-globules, the results of experiments instituted for the purpose of determining the practical value of transfusion, endorsed with a decidedly unfavorable opinion, while Milne Edwards in his inaugural thesis (for the doctorate in medicine) in 1823, gives it a favorable mention. The subject was taken up by Bischoff,‡ in a series of transfusions in which birds and mammals alternately served as source and recipient, one for the other; the great point established by the investigator, and one which forms an epoch in the history of the operation, being the efficacy and even the superiority of defibrinated blood for purposes of transfusion. Dr. Routh,§ of London, published in 1849 an interesting paper on the statistics of transfusion, in which he gives the record of the published cases up to his time—forty-eight in all. The total rate of mortality in this list is 1 in 3; the reduced mortality after elimination of all causes of death that could not reasonably be attributed to the operation itself, or of conditions that rendered its good effects but transitory, is 1 in 8½, an exceedingly low rate, although differing only by a very small fraction from the result reached by Mr. Peet, in a paper of which an abstract is contained in the "Lancet," for 1842, and in which 35 cases are recorded, with a total mortality of 1 in 2.7, and a reduced mortality of 1 in 8.3. Dr. Giovanni Polli, of Milan, repeated the experiments of Bischoff in 1852, and with confirmatory results;|| rein-

* Reprinted in this city, perhaps the earliest of the very few medical works issued here.

† Dieffenbach, Ueber Transfusion; Muller's Archives, 1810.

‡ Muller's Archives, 1838.

§ Medical Times, August 1, 1849.

|| Archives de Medicine, Oct., 1852.

forcing them with two cases which indicate, if not the active value, at least the innocuity of the operation.

In 1859, Dr. Martin, of Berlin,* presented a record of 57 cases which he had collated, of which 43 were complete successes, and 7 temporary; counting these latter among the failures, we have a mortality of 1 in 4; counting the partial and complete successes together, we have a mortality of 1 in 8; a result very nearly approaching that obtained from the two tables already noticed.

In 1868, Dr. J. Braxton Hicks,† reported three cases of puerperal hæmorrhage treated by transfusion; the interest of these cases centering principally on the fact that the blood injected was first treated by the addition of phosphate of soda, for the purpose of retarding its coagulation. The same gentleman reports six cases in Guy's Hospital Reports for 1869; two of them treated by the old method, and four by his new method; all of these cases had finally a fatal termination.

Two of the most extensive individual records of the late years, so far as I know, are due to Neudorfer, of Vienna, and Nussbaum, of Munich.‡ The first named of these eminent practitioners has had the courage to publish a series of eight cases, with seven deaths; the result in the eighth case being favorable, in that the patient's life was prolonged sufficiently to justify the transfusion. The second has recorded six operations with but one death. With one exception, these fourteen transfusions were performed for causes other than hæmorrhage; and the seven unfortunate cases of Neudorfer were certainly in the first instance unpromising ones.

The annals of European surgery since 1820 are enriched with several lesser series and a large number of unique cases; all of which will be found in the tabulated record at the end of this article. Before analyzing the statistics thus accumulated, (and passing by the minor literature of the subject, in the shape of inaugural theses, essays, and journal articles,) I may make mention of two monographs, the most complete that have yet appeared, and both of them valuable contributions to surgery; those of Dr. Von Belina,§ of Heidelberg, and of Professor Ore,|| of Bordeaux, both works of remarkable merit, and together exhaustive of the subject up to their dates of publication.¶

* Ueber Transfusion bei Blutungen Neuentbunderer, Berlin, 1859.

† Brit. Med. Journal, August, 1868.

‡ Die Transfusion des Blutes, von Dr. L. V. Belina, Swiontkowski, Heidelberg, 1869.

§ Op. Cit.

|| "Etudes Historiques et Physiologiques sur la Transfusion du Sang," par le Dr. Ore, etc., Paris, 1868.

¶ Apropos of the two works just cited, the author owes it to himself to state that he was unaware of their existence when this paper was written, and until he commenced to prepare it for publication, otherwise he would certainly not have

During the war the operation was performed once in this city, at the Quartermaster's hospital, with encouraging temporary effect, but final insuccess. I am indebted to my friend, Dr. King, of this city, for knowledge of this case; further inquiry has only verified the fact, without eliciting any details beyond the nature of the injury and the result; the name of the operator, I regret to say, is still unknown to me. To the courtesy of Dr. J. P. S. Houstoun, late President in the Transylvania Hospital, I owe the details of three cases, two performed in Philadelphia by Dr. J. G. Allen, and one by Dr. Hunter in the same city. I can hardly think that all American cases are comprised in this list of four, but these are all that a very patient investigation of published records has discovered.

Let us now rapidly glance at the physiological rationale of transfusion.

The earliest authentic operations on record were, as we have seen, performed not merely for the purpose of supplying to the circulatory system a quantity of blood lost in substance, but also to render new and worthier qualities to a deteriorated fluid, being thus, in reality, based upon a higher order of pathology than that on which some operators have placed themselves, even in our time. But this excellent premise was complicated and clouded by the proposition that the physical qualities of the individual, and perhaps even his moral attributes, might be transmissible along with his blood. Hence the quarrels that arose even among the very adherents of the operation, when Denis, in an age whose abundance in theoretical notions of physiology and mystical doctrines of biology rendered it pugnacious and discussive to the last degree, proposed to demonstrate that he could accomplish the purposes of transfusion in man, and by the blood of other animals. Indeed, up to a very late period, it has been deemed a *sine qua non* for the success of the operation that this interchange of circulatory fluid should take place between individuals of the same or nearly allied species—this doctrine was held even by Blundell. The cases of Denis, however, disprove it: in three of the successful cases reported by Dr. Routh, sheep's and calf's blood was used, when the patient, in Dr. Routh's words, "got well in spite of the remedies employed;" while the experiments of Brown-Sequard* are confirmatory of the fact that identity in the specific origin of the

undertaken what had already been so ably done. But it will probably not impair the value of the results to know that they have been independently corroborated by three investigators in as many different countries. With the acknowledgment (over and beyond his general indebtedness) of 48 cases that were new to him, gathered from their united statistics, his distinguished predecessors will hold the writer guiltless of any plagiarism in this brief outline of the subject which has formed the common area of their researches.

* "Comptes Rendus de l' Academies des Sciences," 1857.

blood is not essential to the success of the operation. *A priori* it would seem preferable to employ a fluid which, in its physico-chemical characters, approaches most nearly the blood of man, and so, doubtless, it is; the blood of the sheep, ram, and ox, which have been the main purveyors in the experiments thus far instituted in this direction, being little dissimilar to that of the human species, though not quite so near to its characters as is that of the dog and the monkey, *i. e.*, if we take as a standard the red corpuscles, (the only character by which the differences can be gauged,) these being very little smaller in the two latter races than in man.

Granted, then, that blood, as nearly as possible similar to that of man, is the only essential, and that its origin, this condition fulfilled, is of secondary importance, how does it act?

According to Dr. Playfair,* "the benefits derivable from it are probably two-fold: 1st, The actual restitution of blood which has been lost; and 2d, The supply of a sufficient quantity of blood to the heart, to stimulate it to contraction, and thus to allow the circulation to be carried on, until fresh blood is formed. *Its stimulant action is probably of far the more importance.*" To these I would add: 3d, The supply of a sufficient amount of blood to the cerebro-spinal axis to awaken its exhaustive motive power; and 4th, The supply of nutritive material to the starved economy—every portion of which, in those conditions where transfusion is decided upon as a last resort, must be in urgent need of restoration, and in which every cell and fibre, every ultimate constituent, is failing in its function by a drain of the reparative material needed to bring it, in elementary constitution, up to that point where nutrition is transformed into heat, motion and vital force. That the supply of oxygen to the tissues is not the sole mode of action of transfused blood is shown by the fact that, while we have conclusive evidence to show that the affinity of the fibrine of blood for oxygen is scarcely less great than that of the red corpuscles themselves, yet the experiments of Bischoff, Polli, Panum, and many others, demonstrate that the transfusion is just as effectual when performed with defibrinated blood; and, moreover, the readiest and safest modes of performing the operation are those in which the venous blood furnished for the transfusion, that has already lost a sensible per centage of its oxygen, is transmitted to the patient without contact of the outer air, *i. e.*, without an opportunity of becoming re-oxygenated. *Mass* has something to do with its action, evidently, for in the cases of cholera submitted to transfusion, it was necessary to inject very much larger quantities than in any other condition, to produce a sensible effect. In one case, as much as thirty ounces were thrown in before the choleraic symptoms were overcome. I need not recall the fact that saline

* "Handbook of Obstetric Operations," London, 1865.

solutions have been injected, in cholera patients, in very much larger bulk than this.

It is then probable, that the action of transfusion as a remedial agent is, instead of two-fold, *three-fold*: 1st, Stimulant to the heart and nerve centres; 2d, Nutritive to the economy at large; 3d, Repletive to the circulatory system.

In conclusion, the practical inquiry remains to be answered—to what conditions has transfusion been remedially applied, and with what success?

1. The cases which seem, during the present century, to have been specially selected for the experimental essays of transfusion, are those of *post partum* hæmorrhage. Of these, (not reckoning those of uncertain nature,) I find a record of 89 cases, of which 56 were successful; I simply give here the gross results without entering into the details.

2. For cases of surgical hæmorrhage, transfusion has been performed 23 times; result, 12 deaths, 1 doubtful, 1 in which the patient died before the operation could fairly be said to have been commenced. In two other surgical cases the result was unfortunate or null.

3. In hæmorrhages, other than surgical, (including the higher grades of anæmia due to hæmorrhage,) 13 cases gave 5 complete successes, 1 incomplete.

4. Of 9 transfusions performed in surgical cases attended with extreme exhaustion, 8 were unsuccessful.

5. In asphyxia of the new born child, 3 cases; 2 failures.

6. In cholera, 4 transfusions were followed by death in each case, but in each case, also, after temporary, and in 1 after marked reaction.

7. Poisoning by carbonic oxide, treated by transfusion in 7 cases, yielded to it in only 2; the theory directing its use in these cases being, the restitution to the blood in the body of the oxygen displaced by the carbonic oxide taken into the circulation.

8. Dieffenbach made a trial of it once in hydrophobia, without success.

9. Leucæmia, Bright's disease, mania, and marasmus from various causes, have each been treated by transfusion, but with somewhat doubtful result. In some of these conditions, as anæmia, chlorosis, leucæmia, the operation is worthy of more extensive trial.

10. Transfusion has also been suggested, by Dr. Markham, as a means to be used in the cattle plague, and possibly the records of veterinary surgery may contain some late cases in which this means has been used with advantage. I have not, however, looked up this branch of the statistics of the subject, its records not being

so generally accessible as those of experimental science on the human subject.

It will be remarked, that transfusion has proven much more successful in the hands of obstetricians, or, rather, in the obstetrical cases, than when used as a surgical or medical agent proper, but it will also be seen that accoucheurs have thus far availed themselves of it much more frequently than either of the other classes of practitioners. And while other suggestions as to the remedial efficacy of transfusion might be added to those here given, and will, doubtless, present themselves as accomplished facts in the future, it is, however, probable that it will always find *post partum* and primary surgical hæmorrhages the most favorable conditions for its application. In so far as those cases are concerned in which the operation has been performed, they speak for themselves, and the result of the array, I think, justifies the belief that transfusion is finally, and with every right, establishing its claim to be considered one of the least doubtful and most valuable resources of our art. And whatever fate the future may have in store for it, thus far its chequered career forms certainly one of the most interesting chapters in medical history.

I append a list of all the cases of transfusion that I have been able to find recorded up to date, under their appropriate heads, and in their order of occurrence. Most in the first table having all been performed for hæmorrhages, occurring in the pregnant woman, before, during or immediately after labor, I have deemed unnecessary any further allusion to the pathological condition of the individual patients, the necessary memoranda of the sex and morbid history being added in the remainder of the cases.

No. 1.—Cases of Transfusion in Hæmorrhages of Pregnancy and Parturition.

No.	Operator.	Result.	Date.
1	Blundell	Death	1820
2	"	"	1820
3	Blundell and Doubleday	Recovery	1825
4	"	"	1825
5	Blundell and Waller	"	1825
6	Brigham	"	1825
7	Doubleday	"	1825
8	"	Death	1826
9	Doubleday and Waller	Recovery	1826
10	Ralph	"	1826
11	Jewell	Death	1826
12	Barton and Brown	Recovery	1827
13	Douglas Fox	"	1827
14	Waller	"	1827
15	Clement	"	1828
16	Howell and Doubleday	"	1828
17	Klett and Schrage	"	1828

No. 1.—Cases of Transfusion in Hemorrhages of Pregnancy, etc.—continued.

No.	Operator.	Result.	Date.
18	Klett	Recovery	1828
19	Savoy	"	1829
20	Blundell	"	1829
21	Gondin	"	1829
22	Bird	"	1829
23		"	1830
24	Killian	"	1830
25	Ingleby	"	1830
26	Killian	"	1831
27	"	"	1831
28	Internes Hotel Dieu, Paris	Death	1831
29	Crosse	"	1832
30	Banner	Recovery	1833
31	Horling	"	1833
32	Bickersteth	"	1833
33	Schneemann	"	1833
34	Tweedy and Ashwell	Death	1834
35	Collins	"	1834
36	Killian	Recovery	1834
37	Healy and Frazer	"	1835
38	Berg	"	1835
39	B. Oliver	"	1840
40	May	Death	1840
41	Wolf	Recovery	1842
42	"	Death	1842
43	"	"	1842
44	"	"	1842
45	"	"	1842
46	Abele	Recovery	
47	Neumann	Death	1842
48	Ritgen	"	
49	Bayer	"	
50	Berry	Recovery	1844
51	Brown	"	1845
52	Greaves and Waller	"	1848
53	Norman and Ormond	"	1849
54	Nelaton	Death*	1850
55	Malfen	Recovery	1851
56	Marmonnier	"	1851
57	Devay and Desgranges	"	1851
58	Monmontier	"	1851
59	Schneemann	"	1852
60	"	"	1852
61	"	Death	1852
62	"	"	1852
63	Turner and Wells	"	1852
64	Higginson	Recovery	1856
65	"	Death	1856
66	"	"	1856
67	"	"	1856
68	"	"	1856
69	Simpson	Recovery	1856

* Patient lived three weeks after the operation, dying at last of puerperal fever.

No. 1.—Cases of Transfusion in Hæmorrhages of Pregnancy, etc.—continued.

No.	Operator.	Result.	Date.
70	Wheatcroft	Recovery	1857
71	"	"	1857
72	Martin	"	1857
73	Dutems	"	1858
74	Martin	"	1861
75	Hicks	Death	
76	"	"	1862
77	Weickert	Recovery	1862
78	Hicks	Death	1863
79	"	"	
80	"	"	
81	"	"	
82	"	"	
83	Greenhalgh	Recovery	1863
84	Thorne	"	1863
85	S. Thomas	"	1865
86	Mosler	"	1866
87	Knauff	Death	1867
88	V. Belina	"	1868
89	Hunter	Recovery	1870

No. 2.—Cases of Transfusion in Traumatic Hæmorrhages.

No.	OPERATOR.	CAUSE OF HÆMORRHAGE.	SEX.	RESULT.	DATE
90	Blundell	Rupture of artery	M	Death	
91	Danyon	Complicated fracture	M	"	1829
92	Philpot	Varix in pregnancy	F	Recovery	
93	Roux	Gunshot wound, subclavian	M	Death	1830
94	Scott	Hæmorrhage after removal of tumor	M	"	1833
95	Walton	Hæmorrhage after circumcision	M	Recovery	
96		Complicated fracture, amputation		Death	
97	Turner	Hæmorrhage after amputation	F	Recovery	1835
98	Lane	" operation for strabismus.	M	"	1840
99	Blasius	Wound of thigh	M	"	1842
100	Simon	Wound of crural artery	M	Death	1851
101	Sacristan	Rupture of varix	F	Recovery	1851
102	Maisonneuve	Hæmorrhage after removal of tumor	M	Death	1854
103	Neudorfer	" from epithelioma	M	"	1860
104	Esmarch	Exarticulation femur	M	"	1860
105	"	Hæmorrhage after amputation	M	"	1860
106	Michoux	" after removal of polypus	M	Recovery	1860
107	Higginson	" amputation	M	"	1860
108	Braun	Recurrent hæmorrhage, from polypus	M	Doubtful	1863
109		Complicated fracture	M	Death*	
110	Gentilhomme	Hæmorrhage from uterine tumors	F	Recovery	1866
111	Allen	Compound fracture	M	Death	1869
112		Compound fracture	M	Recovery †	1870

* Case performed in Washington City.

† By a Prussian surgeon, during the late war.

No. 3.—Cases of Transfusion in Miscellaneous Practice.

No.	OPERATOR.	CONDITION.	SEX.	RESULT.	DATE
113	Denys	Anæmia	M	Recovery ..	1865
114	"	Diarrhœa and vomiting	M	Death	1865
115	Daniel	Debility	M	"	1867
116	Lower and King	"	M	Recovery ..	1867
117	Blundell and Cline	Scirrhus of pylorus	M	Death	1819
118	"	Puerperal fever	F	"	"
119	Dieffenbach	Hydrophobia	M	"	1830
120	"	Asphyxia after Cæsarean sec.	"	"	1830
121	"	Melancholia	"	Unfav'able ..	"
122	"	Erotomania	F	"	"
123	"	Cholera	M	Death	1831
124	"	"	M	"	1831
125	"	"	M	"	1831
126	Bougard	Anæmia	M	"	1831
127	Blasius	Asphyxia after Cæsarean sec.	"	"	1832
128	Josenhanns	Scurvy	M	"	1832
129	Walton and Routh	Cholera	"	"	"
130	Stokes	Collapse in typhoid	M	"	"
131	Bliedung	Pulmonary hæmorrhage	M	Doubtful ..	1839
132	Pritchard and Clarke	Exhaustive vomiting	"	Recovery ..	1843
133	Uyterohoven	Hæmorrhage diathesis	M	Death	1848
134	Chassaingnac & Monneret	"	"	"	"
135	Polli	Anæmia	M	Death	1851
136	"	Epilepsy	M	Doubtful* ..	1851
137	"	Chlorosis	M	Recovery ..	1851
138	Fenger	Anæmia	M	Death	1853
139	Touvenet	"	M	"	1853
140	Lever and Bryant	Hæmorrhage diathesis	M	"	1854
141	Higginson	Exhaustion from lactation	F	Recovery ..	1854
142	Larsen	Pyæmia	M	Death	"
143	Neudorfer	Exhaustive suppuration	M	"	1860
144	"	"	M	"	1860
145	"	"	M	"	1860
146	"	"	M	"	1860
147	Nussbaum	"	M	Recovery ..	1860
148	"	Chlorosis	F	"	1860
149	Blasius	Leucæmia	M	Death	1861
150	Neudorfer	Pulmonary tuberculosis	M	"	1861
151	Nussbaum	Exhaustive suppuration	M	"	1862
152	"	Extreme debility	M	Recovery ..	1863
153	"	Epilepsy	M	"	1864
154	"	Anæmia	M	"	1864
155	"	Carb. oxide poisoning	M	Death†	1864
156	Mollier and Wagner	"	M	"	1864
157	Sommerbrodt	"	M	"	1864
158	Mosler	"	M	"	1865
159	"	"	M	"	1865
160	Martin and Badt	"	M	Recovery ..	1866
161	Mosler	Leucæmia	M	Favorable ..	1866
162	Demme	Exhaustion after diphtheria	M	Death	1867
163	Bennecke	Asphyxia in neonatus	"	Favorable ..	1867
164	Neudorfer	Tuberculosis	M	"	1867
165	Lange and V. Belina	Albuminuric eclampsia	M	Recovery ..	1868
166	V. Belina	Asphyxia in neonatus	"	Death	1868
167	Hefne and Knauff	Bright's disease	M	"	1868
168	Mader	Scorbutic anæmia	"	Recovery ..	1868
169	Allen	Hæmorrhage diathesis	M	Death	1869
170	Hunter	Carb. oxide poisoning	M	Recovery ..	1870

* This case and date are both doubtful.

† In a Berlin hospital; operator's name unknown.

—Richmond and Louisville Med. Jour.