Middle Articles

MEDICAL HISTORY

Tercentenary of Blood Transfusion

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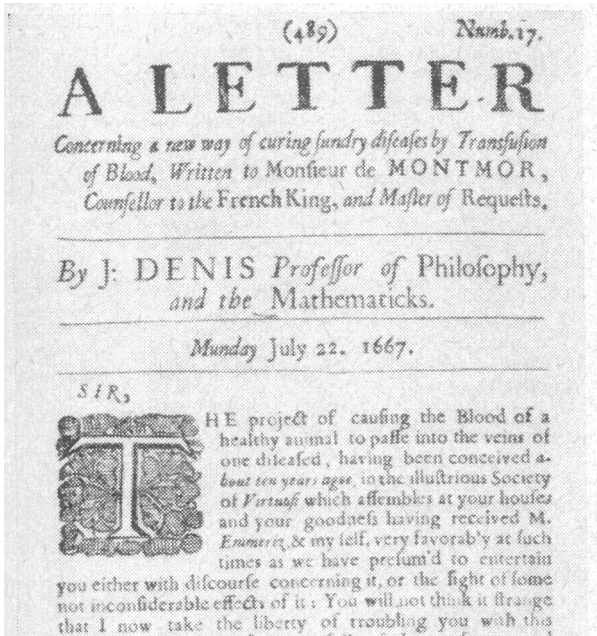
In July 1667 Jean Denis, Professor of Philosophy and Mathematics at Montpellier and Physician to Louis XIV, sent a letter to the editor of the *Philosophical Transactions* of the Royal Society of London. This was a translation of "Copie d'une lettre touchant une nouvelle Manière de guérir plusieurs Maladies par la Transfusion du Sang," addressed



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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* Mathematicks.

Munday July 22. 1667.

SIR,

THE project of causing the Blood of a healthy animal to passe into the veins of one diseased, having been conceived *about ten years ago*, in the illustrious Society of *Virtuosi* which assembles at your houses and your goodness having received M. *Emmerez* & my self, very favorably at such times as we have presum'd to entertain you either with discourse concerning it, or the sight of some not inconsiderable effects 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 successes and successes we have made in this Operation; wherein you are justly intitled to a greater share than any other, considering that it was first spoken of in your *Academy*, & that the Publick 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 & con-

Ccc vince

on 25 June 1667 to Monsieur de Montmor, Counsellor to the King. The letter was set up in type to be issued as No. 27 of the *Transactions* dated "Munday July 22. 1667," but it was suppressed before general publication. The issue numbered 27 actually published was dated "Munday, Septem. 1667" for the months of July, August, and September. The number begins with "An Advertisement concerning the Invention of the Transfusion of Blood," in which the editor, Henry Oldenburg, explained that he was "returning to his former exercises which by an extraordinary accident he was necessitated to interrupt for some months past." The "extraordinary accident" was in fact his confinement in the Tower of London on suspicion of spying for a foreign power. He then proceeded to state that, though transfusion of blood may have been conceived in other parts, "it is notorious that it had its birth first of all in England," through the hands of Dr. Lower and Dr. Edmund King, who had published accounts of it in November and December 1666. Denis's letter had, it seems, "come abroad" in July 1667, but it was omitted from most copies of the *Transactions*. In this manner a battle of priorities began, and it might be doubted whether the three hundredth anniversary of the practice of blood transfusion should be noticed in 1966 or 1967. From the fact that the present article is published in 1967 it may be guessed that the second date is to be preferred. It is not due to an oversight.

Denis himself in his first sentence emphasized that the conception of transfusion happened "about ten years ago in the illustrious Society of *Virtuosi* which assembles at your house," and that the Society had received Denis and a friend as visitors to see the experiments. As is well known, the investigations were initiated by Dr. (later Sir Christopher) Wren, who suggested injecting various liquors, such as milk or beer, into the circulation of animals. Subsequent experiments were carried out chiefly by Dr. Richard Lower, accounts of these being published in a series of papers in the *Philosophical Transactions*. Lower was a careful investigator and limited his experiments mainly to transfusing blood directly from an artery of one dog to the jugular vein of another. In this way he showed that a dog could be exsanguinated to the point of death and then be completely recovered by transfusion. He rightly concluded that the "most probable use of this Experiment" would be for replacing blood lost or for rectifying corrupt blood.

Once Denis's letter became known the London experimenters were not slow to complain, in the *Transactions* for 21 October 1667, that he was claiming a priority due to them. This seems ungenerous, since Denis had deliberately assigned to them the first conception of transfusion. He was, however, announcing an advance in technique by stating his idea of transfusing blood from one species of animal to another species—calf to dog—and finally, in logical sequence, from an animal to man. He then told how he actually carried this out as a therapeutic operation. On 15 July 1667 he had noticed a youth of 15 or 16 who had suffered 20 bleedings for "a contumacious and virulent fever, in order to asswage the excessive heat. Before this disease, he was not observed to be of a lumpish dull spirit, his memory was happy enough, and he seemed chearful 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 drowsie that he was not fit for any thing. I beheld him fall asleep as he sate 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 of the 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."

Denis attributed this state of affairs to loss of blood rather than to the fever. He accordingly bled the boy of 3 ounces (86 g.) and transfused about 9 ounces (255 g.) into his arm from the carotid of a lamb. The boy felt a burning along his arm, but had no other symptoms and quickly recovered from his drowsiness, becoming as nimble as before and putting on weight. Encouraged by this result, Denis tried another transfusion on a man of 45 "having no considerable indisposition"—in fact the experiment had little justification. The man was bled 10 ounces (283 g.) and was given 20 (567 g.) in exchange from a lamb. He had the same pain along his arm as the first patient, but felt stronger than before and cheerfully slaughtered and flayed the donor lamb, being a butcher by profession. Later Denis performed further transfusions, and one patient, suffering from "an inveterate phrenzy," showed every sign of having received a considerable amount of incompatible blood, exhibiting pain in the arm, a rapid and irregular pulse, sweating, pain in the back, vomiting, diarrhoea, and finally passing urine almost black with haemoglobin.

The best the London *virtuosi* could do was to publish in the *Transactions* for 21 October 1667 part of a letter from Dr. Edmund King describing his *preparations* for transfusing a man from an animal, though the experiment had not actually been done. It was not until 23 November of that year that Arthur Coga, an indigent Bachelor of Divinity of Cambridge, was transfused with lamb's blood by Drs. Lower and King at Arundel House. He suffered no inconvenience and asked for a second transfusion, no doubt in return for a suitable reward. Samuel Pepys witnessed both the early experiments and the first one done on a man, making many pleasant quips about it in his diary.

It is clear that, though London had priority for the initiation of the preliminary transfusion experiments, Paris could justly claim it for the therapeutic operation on a human being. Even when London first transfused a man, it was purely experimental, not therapeutic. So let us hand the laurel to Paris in this, the tercentenary, year—though we must also record that the value of this priority was soon to be sadly discounted. Denis published five more pamphlets in 1667 and 1668, but in the latter year one of his patients died after three transfusions, and proceedings against the doctor were instituted by the widow. When brought to trial Denis was exonerated, the patient's death having been proved to be due to arsenic administered by his wife. Nevertheless a law was introduced forbidding the performance of any transfusion without the permission of the Faculty of Medicine of Paris. The Faculty was in any case strongly opposed to the whole idea and the practice of transfusion from animals was quite rightly abandoned. In London, too, no account of the second transfusion given to Coga was ever published, since the affair was bringing ridicule and discredit on the Royal Society. Indeed, little further was heard of blood transfusion for more than a hundred years. A tercentenary likely to elicit more enthusiasm will not be due until the year 2118. It was on 22 December 1818 that James Blundell, obstetrician to Guy's and St. Thomas's Hospitals, described in a paper delivered to the Medico-Chirurgical Society the first blood transfusion from *man-to-man,* performed with the help of a surgeon, Henry Cline. That was the true beginning of modern therapeutic transfusion.

CONTEMPORARY THEMES

Some Weaknesses in Hospital Service Organization

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It is now clear that no appeals or protests are likely to produce a big increase in the money allotted to the National Health Service. This is a political decision taken because taxation is already heavy, and all Government spending must be kept within the bounds of practicable taxation. Cries to "Take the N.H.S. out of politics" are futile; though everybody wishes to provide excellent medical care, the cost—over £1,500m., or over £30 for every man, woman, and child in the country—can be provided only by the Government out of taxation, which must always be a political matter.

Waiting-lists

The waiting-list for admission to hospital remains steadily at about half a million—about four weeks' admissions; but since in many hospitals half or more of admissions are emergencies the delay for elective admissions may be several months, so that a patient with a simple hernia or with varicose veins may wait for several months. A reduction in stay of only one day for each patient would increase the throughput of the N.H.S. hospitals by about 300,000 each year, and presumably reduce the waiting-list.

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The reasons for waiting-lists, like their size, vary from region to region, from hospital to hospital, and from department to department. About 15% of hospital beds for acute cases are occupied by long-stay patients, many of whom are suitable for local authority geriatric homes, were there enough of them; but these again have to be provided for out of taxation. In my own hospital some specialist waiting-lists are inflated because many of those on them have been offered admission but have asked for a delay, thus wasting one or two bed-days. Those who refuse are usually women who cannot arrange for their young families to be looked after during their absence. Closer co-operation between hospital admission officers and local authority social services might reduce these difficulties. Some waiting patients need investigations which could be done while they were outpatients were a day ward available, or radiological or laboratory facilities improved, or, what may be equally important, if sufficient specialist time was available for cystoscopy, gastroscopy, and the like.

In some hospitals the limit to surgical admissions is the time available in operating-theatres. I have heard one surgeon complain that within a month two of his patients had died while he was waiting for an operating-theatre to become available. Registrars complain to me that patients are avoidably detained in hospital to await specialized radiological or