Epilogue: The return

I am on my way to the Paris Museum of Medicine lodged in a corner of the huge École de Médicine in central Paris. I want to look at the Roussel *transfuseur direct* exhibited there. Halfway up the winding staircase to the museum I have to stop and look. Tucked away in this obscure place is a large painting showing a dramatic medical intervention. It's subject? '*Transfusion du sang du chèvre*'.

The painting's central figure is a bearded man, presumably a doctor, surveying the transfusion of goat's blood to a seemingly unconscious young woman. He is assisted by two men in butchers' aprons and two colleagues in black suits. One of them introduces a cannula into the patient's vein, the other keeps check of time. In the background, a nurse is busy arranging test tubes and other medical paraphernalia. She has turned away from the scene; perhaps she disapproves of this attempt to move animal blood into a helpless patient?

The painting is by the young French artist, Jules Adler, best known for his realist depictions of common folk. Perhaps he felt that the doctor commissioning the painting was on the side of the working classes. It was the Paris physician, Samuel Bernheim, a tuberculosis specialist who had established a charity to send poor patients and their children to the seaside as part of the sanatorium movement. The painting was exhibited at the Paris Salon of 1892 where it was well received and won an award.

The painting is intriguing. Was animal blood transfusion being reintroduced in France, a country that twenty years earlier had been completely disinterested in the therapy? The answer is yes, but only for a short while and with a very different physiological rationale than before. Medicine had changed after Koch's discovery of the tuberculin bacillus in 1882 and Pasteur's immunological research. Blood was once again seen in a different light.

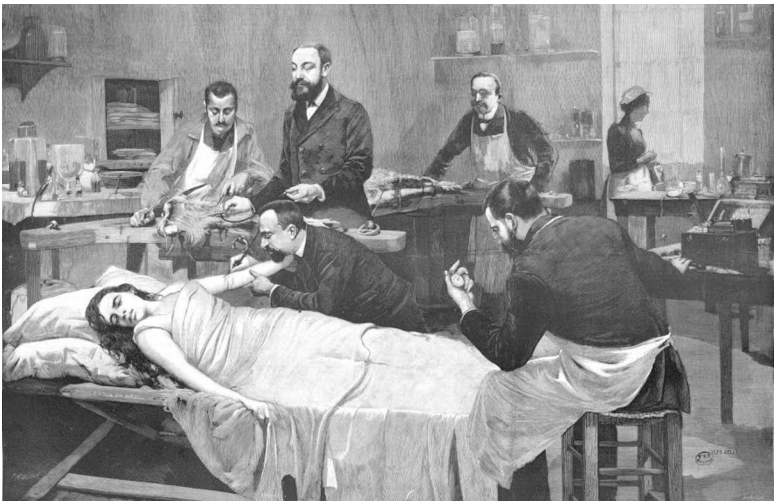

Figure 31. Jules Adler, Transfusion du sang du chèvre. Engraving by Henri Meyer (*Le Journal Illustré*, May 22, 1892).

The advent of serotherapy

Here is Bernheim describing his work in a lecture to the Société des Practiciens de France, published in *Le Moniteur Médical* in March 1891. He had, he reported, 'in the last two months' made thirty-three transfusions with goat's blood to tuberculosis patients, and with astonishing success. One of them may have been the young woman in the painting:

> Miss B., nineteen years old, residing at 4, Boulevard du Temple, lost her father to tuberculosis. Three of her brothers died from the same disease. She herself, ill since six months, has tuberculosis to the second degree on her upper left lobe. Three months ago, Koch's bacillus was detected in her sputum. The patient has been treated with two transfusions at an interval of fourteen days.
>
> Today, the patient no longer coughs, the expectorations have disappeared. The young girl has been greatly strengthened; she eats and sleeps well. We can no longer discover any trace of lesions on her left top lobe and she breathes normally [...]. No more bacilli in her sputum.[1]

At about the same time, between the end of December 1890 and March 1891, two colleagues in Nantes, Georges Bertin and Jules Picq, made subcutaneous injections with goat's blood into some fifty patients. The procedure was repeated every fortnight, each time with about 15 grams of blood and with positive results.

These injections and Bernheim's transfusions were based on a different physiological reasoning than what we have encountered earlier in this book (though Bernheim was quite vague about why his transfusions worked). The physicians were not interested in moving oxygen-rich red blood cells into the patient's organism, neither did they intend to fill up the vessels to prevent a loss of blood pressure. Instead, they seemed to see the transfused or injected goat's blood as a *biochemical* substance. The aim was to transfer the animals' innate natural immunity to tuberculosis as a kind of vaccine to the suffering patients and thereby help them resist the dreaded disease.[2]

These were sensational ideas. Bernheim went on to treat some ninety phthisis patients, all of whom, he reported, asked for a second transfusion after having happily experienced the first one. The procedure was now being studied by a professor at the Faculté de Médicine.[3] Bernstein made public demonstrations, gave interviews and had the procedure depicted in newspaper images as well as commanding the painting by Adler. His and the Nantes group's successes were reported as far away as Australia, New Zealand and the USA.[4]

Serotherapy was, indeed, a newsworthy subject. Only a few days before Bertin's and Picq's injection experiments, Behring and Kitasato in Berlin had published a seminal study on diphtheria and tetanus immunity; Roux and Yersin in Paris were also on the track. Based on these studies, serotherapy for large-scale treatment of diphtheria would soon be undertaken in both Germany and France. The technique was to induce immunity in host animals, normally horses, and then bleed them, separate out the serum and inject it into humans. In the mid-1890s, this represented a major therapeutic innovation and an important element of public health policy in France as well as in other European countries.[5]

Less publicized were the attempts by the Italian professor of pathology, de Domenicis, who in 1894 repeatedly injected dog's blood into patients suffering from anaemia and tuberculosis. He, however, only obtained limited results and only in a couple of not very sick patients.[6] Still, the French serotherapy researcher, Charles Richet (a future Nobel Prize winner), was positive about the attempt and argued that dog-serum could improve the patients' general con-

dition by its remarkable stimulating properties. Patients would thereby improve their capacity to resist the infection.[7] As it turned out, however, neither the French goat nor the Italian dog blood therapy was a long-term success; both practices were soon abandoned.

Hasse vindicated?

Then, a few years later, in 1901, animal blood transfusion was again on the agenda. This time, the advocate was none other than August Bier, professor in Greifswald, later the successor to von Bergmann in Berlin and one of the most prominent German surgeons of the early 20th century. And again, new physiological notions were advanced to underpin the use of this therapy.

Bier had made animal experiments with surprising results and found interesting similarities to how Hasse's patients had been affected by lamb blood transfusion back in the 1870s. In an article in the *Münchener Medizinische Wochenschrift*, Bier now forwarded the idea that 'alien' blood could work in the same way as a mild infection: it would kill or weaken certain bacteria in the sick body, plus stimulate digestion and appetite. Based on this idea, he injected over a period of three months (November 1900 to February 1901) defibrinated lamb's blood in small doses (thirteen times in all) into the veins of a young man suffering from severe tuberculosis. At the time of publication, the patient was feeling much better, had an appetite and moved about. Ten other, almost dead, tuberculosis patients were treated in the same way. Three of them had died but the others had gained weight and appetite, and two had already left the hospital. These results convinced Bier that blood from a lamb could work as a remedy if transfused in his suggested careful way.[8]

After this isolated announcement, no more was heard from Bier about the subject for another twenty years. But in 1921, he returned with an extended analysis of why lamb blood transfusion was useful against inflammatory diseases, like tuberculosis. Again, it was the patients' substantial improvement in weight and wellbeing, appetite and blood condition that inspired him. And again, Bier saw Hasse as somewhat of a pioneer who should be given the respect denied him in the 1870s. To Bier, Hasse had been unjustly attacked, ostracized and treated as a swindler. The result was that 'the transfusion of strange blood was buried by Landois and Panum. The funeral oration was given by v. Bergmann who even condemned transfusion of species-similar blood into earth and ground'.[9] Still, Bier argued, Hasse had been right

in transfusing lamb's blood, though initially for the wrong reasons, and he should really not have given such excessive dosages of blood. Bier instead, just like the Italian alienists in the 1870s, transfused only small doses of blood, but repeatedly, and to good results.

Bier now thought that a lamb blood transfusion could act as a benign infection that, if administered correctly, would be valuable to the organism. He saw his targeted injections of animal blood as an example of 'protein-body therapy', a homeopathic treatment coming into fashion in the early 1920s. A blood transfusion should not serve to replace blood, as had been believed for two hundred years. Instead, Bier argued, the 'foreign' blood would act as a trigger on the organism, which had to react by mobilizing its defences. The disintegration of the blood cells – what Landois and Ponfick had seen as a lethal effect of animal blood transfusion – would, Bier claimed, work as a stimulus on the inflammatory processes in the sick body. So, too, would the dreaded side-effects: the shortness of breath, the dry cough, the red and hot skin, the increased peristalsis, and fever. They would aggravate and thus heal the inflammation.[10]

This seems to have been Bier's last words about animal blood transfusion, but he inspired others. In the early 1920s, von Klebelsberg, a local doctor in the Austrian town, Hall in Tirol, injected repeated small doses of defibrinated blood from recently slaughtered cattle into seventy-two mental patients. His idea, similar to Bier's, was to use blood as a stimulus to the organism, somewhat like injections with cocaine or milk. The reactions were in some cases very strong: several, already quite sick, patients died; some had panic attacks while others did improve after each injection but only for a while.[11]

Later in the 1920s and early 1930s, Bier's colleagues in Berlin, Zimmer and von Balden made intravenous injections of lamb and ox blood in six cases of Basedows disease, reportedly with success.[12] Hadenfeldt made 200 intravenous injections of animal blood, mainly into cancer patients with, as he argued, good results. He used blood from different animal species (calf, pig, lamb, even horse) but the blood of lamb proved to be the most suitable alternative and also the easiest to procure. Hadenfeldt's conclusion, following Bier, was that this procedure was 'a method – stronger than any other that I know of – to give a certain respite and force an improvement in the general condition of the patient and thereby, in many cases, make an operation possible at all'.[13]

Soon, however, there were no more reports of such attempts based on protein-body theory. The idea that species-alien blood would destroy and dis-

integrate the recipient's blood cells, and thereby stimulate the body's defences and encourage the formation of new healthy blood and tissue thus seemed to have been abandoned, for this time and perhaps for all.

French interventions

Meanwhile in France, there were a few more attempts. They were based on more conventional notions of the value of an animal blood transfusion.

In 1916, a private practitioner, Dr Famius, writing in the popular journal, *La Science et la Vie*, described his many transfusions 'during the last forty years'. Some of them had been made with goat's blood when no human donor was at hand. Famius preferred goats to other animals since their blood cells were much smaller than human ones and because they were immune to a number of serious diseases. His favourite was the 'Lamartine' type of goat: small, with long white and silken fur, hanging udders, disappearing horns, a soft skin and a mild gaze.[14]

Famius' efforts were not well known. Ten years later, René Cruchet, professor of pathology and general therapeutics at the University of Bordeaux, would make a greater stir, also internationally, with his animal blood transfusions. Cruchet saw himself as the successor to Jean-Cyprien Oré, a lamb blood proponent whom we have met in previous chapters. Not only was Cruchet at the same university as Oré had been in the 1870s. He also wanted to return to Oré's 'classical studies' showing that animal transfusion was superior to the man-to-man alternative. Thus, Cruchet had, 'on a more modern basis', made numerous animal-to-animal experiments in the laboratory as well as injected sheep's blood and transfused horse's blood into tuberculosis sufferers and mental patients. The trick, Cruchet argued, was to introduce the blood very, very slowly, especially in the beginning of the two-to-four minute operation and to dilute the blood with physiological serum. One of his patients had died, two other remained unchanged, but the state of several patients had improved, 'and they have even asked urgently for repeated transfusion', he reported in 1926.[15]

Again, however, the use of animal blood transfusion did not meet with universal acclaim, far from it, and it would soon disappear. An anonymous writer in the *British Journal of Surgery,* reviewing Cruchet and his colleagues' 1928 volume on transfusion, was outright sarcastic. I will finish my book with this verdict:

> The reader's own blood runs cold as he reads the account of how severely the patients suffered from the expected symptoms and how narrowly they escaped death, and he is not consoled by the preliminary statement that, 'le mouton choisi était superbe'. No evidence is forthcoming that any improvement that the patients may have experienced was due to the treatment […]
>
> The authors nevertheless suggest in conclusion that the transfusion of blood from animals to man may soon fulfil a 'rôle énorme' in the treatment of disease. They have visions of stables with horses and of 'moutons superbes' immunized against every form of bacterial infection, including filter-passing organisms, with rivers of blood pouring from them into the veins of suffering humanity. We fear that they are, to say the least of it, sanguine.[16]

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Still, one cannot help but wonder what happened to the patients who were among the first to undergo the trial of a lamb blood transfusion. They were sick and desperate, and they were brave. What became of the thirteen-year old girl, Hermine Krüger in Schwenda? Or Carl Jacobsson, coughing his lungs out in Mösseberg, or Annunciata Rossi, one of the emaciated and depressed peasants in the San Lazzaro asylum in Reggio Emilia? Initial reports told of their improvement from 'the mighty influence of strange blood'. But how did they fare thereafter?

The archives finally produced some answers. Annunciata Rossi did not recover, after all. She died soon after the transfusion, at the age of thirty-six. She left a husband and a daughter; two other children had previously died.[17] Hermine Krüger, the very first person treated by Hasse with a lamb blood transfusion, was luckier. She recovered, married a man from Schwenda, had a daughter and lived on until 1903. Then she died of lung complications at the age of fifty-three.[18]

And Carl Jacobsson? He was the young man, severely ill with a lung affliction, who became the first patient in Sweden to receive a lamb blood transfusion. We last heard of him in 1875, one year after the intervention; he seemed to have recovered well. He then worked as a labourer, married a much younger woman in 1889, had no children and spent the rest of his life in the same village in northern Västergötland. There he died in 1929 at the ripe old age of eighty-one.[19]