

## INTRODUCTORY NOTES

*This transcript is a copy of a section called 'The Story of Blood' published in an information booklet called 'The Flow of Life' by Blood Systems Inc, P.O. Box 1867 Scotsdale, Arizona 85252, published in the USA in 1980. Copyright 1980 Blood Systems, Inc. – it is reproduced here with permission. Note: The original illustrations included within the booklet have been placed at the end of this transcript.*

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*This short publication summarises some of the essential points relating to the history of blood transfusion.*

## THE STORY OF BLOOD

### ***Blood Systems Inc***

Blood banking as we know it today is very new. However, the story of blood is old, beginning with the dawn of mankind.

Early man discovered that blood was an important clue to the health of the body. Through simple reasoning he understood that the loss of blood resulting from an injury could result in the death of a tribesman or an animal he stalked. And from these observations arose many superstitions and taboos about blood, many of which were passed down from generation to generation until modern times.

In pagan and primitive societies, blood figured prominently in rituals, totems, celebrations, covenants and even ceremonies to induce weather changes. Blood lore is evident today in such expressions as “blood will tell” or “blood is thicker than water”; and blood is variously described as royal, red, blue, hot or bad – and in TV commercials, as tired.

There are many references to the power of blood in ancient mythology and in the Bible. It is known that Egyptian princes took baths in blood as a way to gain strength and spirit, and Romans would rush into the arena to drink the blood of dying gladiators for the same reason. The Greeks spilled the blood of the ram, lamb or cock on the foundation stones of buildings to assure the edifice's strength and durability. In ancient times the Danes concluded a treaty by sprinkling each other's footprints with their own blood. Incas protected their bodies from disease by smearing themselves with a paste of blood and maize. The ancient Chinese inscribed their doorposts with bloody signs to ward off pestilence.

During the middle ages, drinking blood was thought to restore health and strength. In medieval physiology blood was thought to be one of four fluids of the body, the dominance of which was thought to determine the character and general health of a person. Blood was considered by many to be the sea within which the soul resided and which harbored disease-inducing demons that could only be released by means of phlebotomy. For this reason, blood letting was common practice through centuries of medicine for the treatment of infections, hypochondria, internal pains of the liver and many other ailments. At the time of the birth of Christ, barber-surgeons practiced in ancient Rome; they were called “Tonsores” and cut hair, pulled teeth and bled at the public baths.

The legends and stories about blood stand as a record of our respect and awe toward this mysterious life fluid throughout history. However, the scientific and therapeutic values of blood have only been accurately understood for a very short time.

## BLOOD TRANSFUSION THERAPY DEVELOPED

The earliest written account of what possibly could have been the first attempt at human blood transfusion was recorded in 1492. Pasquale Villari gives this account of the effort to save the life of Pope Innocent VIII: "The vital powers of Innocent VIII rapidly gave way... All means to awaken the exhausted vitality had been resorted to in vain, when a doctor proposed to do so by the transfusion, by using a new instrument, of the blood of a young person – an experiment which had hitherto only been made on animals." The three youths who served as donors promptly died, as did the Pope. And though this story seems to describe a transfusion it is most likely that the Pope drank the blood.

The early scientific discovery which contributed most significantly to the development, of blood transfusion therapy was that of William Harvey, who announced his theory of the circulation of blood in 1616. Shortly after his discovery there were many reports of transfusions being performed in France, Italy and England, though none have been authenticated.

An Englishman named Christopher Wren took an important step when he proposed the injection of fluids and drugs directly into the veins. One account claims he successfully infused opium into the veins of a dog. Reports of Wren's experiments led a countryman, Richard Lower, to attempt the injection of blood instead of drugs, and in February, 1665, he successfully transfused blood between two dogs.

Many more experiments with animal transfusions followed, which naturally led to an interest in human transfusion. In June, 1667, Jean Baptiste Denys successfully transfused nine ounces of lamb's blood into a young French boy. That patient recovered, as did a second patient. But a third patient lived only a few hours after transfusion. And when his fourth patient likewise died, Denys was arrested and charged with murder. Although Denys was later exonerated of the charge, in 1670 the French Parliament issued an official judgment forbidding physicians to perform blood transfusions. They were shortly outlawed in Italy and England as well.

It was not until the 19th century that interest in blood transfusion was renewed. Dr. James Blundell, a London obstetrician, performed the first successful human-to-human blood transfusion on December 22, 1818. Though Blundell and others ultimately performed a number of successful transfusions, the cure remained as dangerous as the disease, and blood transfusions were seldom performed through the 19th century.

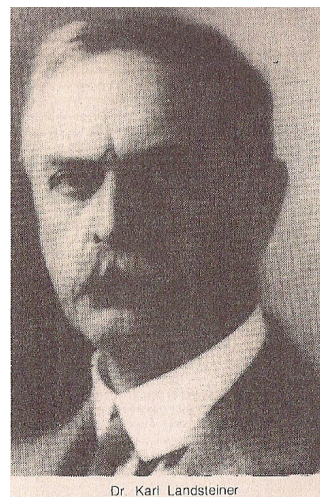
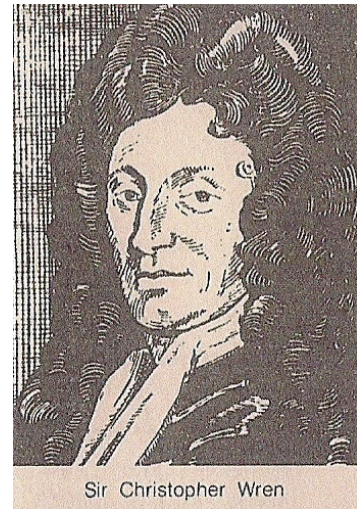
A real breakthrough came in 1900 when Karl Landsteiner, an Austrian scientist, discovered that human bloods are of different types, and therefore safe transfusion is possible only if the donor's blood is matched to that of the recipient. After compatibility was recognized to be important, and methods were improved, one other problem was left to be solved. Until 1939, blood could not be stored for more than four or five days or it would coagulate. Even the four or five days' storage was impossible to achieve until after 1914. Prior to that it was necessary for the donor's blood to go directly to the patient.

In 1939, long-term preservatives were developed by Dr. Elmer DeGowin of Iowa and Dr. John B. Alsever\* of Syracuse, New York. They developed citrate dextrose solutions which kept blood in a transfusable state for 21 days. The Alsever solution is still used today in some laboratories, but for most purposes it has been replaced by

the ACD solution which requires less volume of solution per unit of blood, or CPDA which allows storage for 35 days.

Nearly five centuries after the death of Pope Innocent VIII, these scientific discoveries permitted operation of blood centers on a large scale. Furthermore, today many thousands of scientists are dedicated to the study and understanding of the marvelous complexities of blood and its role in keeping us alive and healthy. Blood needs in all areas of the country are rapidly increasing; an indication of the important role blood plays in the treatment of sick and injured patients.

*\*Dr. Alsever joined Blood Services in 1955 as vice president for medical affairs and served as medical consultant until his death in 1978.*







Animal-to-man transfusion.