ARTIFICIAL HEARTS

What follows was prompted by an article, "Missing a Beat.The Challenges of Building an Artificial Heart," written by Joshua Rothman that recently appeared in The New Yorker (March 8, 2021.) It described how a 22 year old Australian, Daniel Timms began working on an artificial heart in 2001 in an effort to save his 50 year old father who'd suffered a massive heart attack. Timms had read about how in 1969 famed Houston heart surgeon Denton Cooley implanted the first artificial heart in a patient that kept the man alive for 64 hours. However, Cooley had an even more famous predecessor who prepared the ground for this epic achievement.

In November 1930, Charles Lindbergh came to visit the Nobel Prize Laureate Dr. Alexis Carrel at the Rockefeller Institute. It was about three years since Lindbergh's epic trans-Atlantic flight, but now he had a personal agenda far removed from aviation. His sister-in-law, Elisabeth Morrow, had a dysfunctional heart valve as a result of rheumatic heart disease and he hoped that Carrel could suggest a way of repairing the valve surgically, like could be done with engine valves. When told that such a procedure was impossible without the aid of an artificial heart, the mechanically gifted Lindbergh proposed to build one. The heart would have to be removed, repaired outside the body and then replaced and Lindbergh envisioned a pulsatile pump that could sustain life during surgery.

The story is well told in David Friedman's book *The Immortalists* (2007). Alexis Carrel was a pioneer in organ transplantation and In one ghoulish experiment had removed the heart from a chick embryo and placed it in a glass jar where, with special cleansing and feeding, it was kept beating for years with no signs of deterioration. As a result, Carrel believed that natural death wasn't inevitable and, impressed with the younger man's enthusiasm, invited Lindbergh to collaborate in research, already under way, searching for methods to keep "alive" and functioning excised portions of animal tissues and even entire organs. Over the next few years, using the so-called "Lindbergh Pump," Dr. Carrel performed successful surgeries on animals and after a thyroid gland was removed from a cat and successfully perfused for eighteen days, it was the first time an entire organ was kept alive outside of the body. Dr. Carrel exulted, "A new era has opened." Now the collaborators were ready to test their technique on human organs and they considered visiting the mental institution in Vineland, New Jersey in order to "look over the prospects."

Carrel and Lindbergh were an odd couple in physical appearance — the tall, thin flyer and the elfin, bald Frenchman who wore a black beret and pince-nez glasses — but in some ways they were a perfect match. Both were advocates of the eugenics movement that promoted better breeding practices; according to Carrel, “Eugenics is indispensable for the perpetuation of the strong.” He wrote, “The herd always profits by the ideas and inventions of the elite. Instead of leveling organic and mental inequalities, we should… construct greater men.” As a social Darwinist, Carrel advocated weeding out the unfit while encouraging the elite to multiply; “a great race must propagate its best elements.” Apparently, Charles Lindbergh agreed.

In September 1935 Dr. Carrel’s face appeared on the cover of *Time Magazine* and the accompanying article titled “Carrel’s Man” described the semi-secret collaboration of these two celebrities. In June 1938, the colleagues, now described as “Men in Black,” appeared together on *Time’s* cover with their hand-blown glass heart pump between them -- and the next year the pump was displayed at New York World’s Fair. *Time* magazine noted that “Lindbergh is considered exclusively as a flyer…but he is much more than that. He is a great savant. Men who achieve such things are capable of accomplishments in all domains.” Indeed, what these two great men were “capable of” is explored in great detail in a recently published book *Suspect No. 1, The Man Who Got Away,* written by retired California judge Lise Pearlman.

Lise Pearlman's narrative begins on the evening of March 1, 1932 when the world was startled to learn that the toddler son of America’s greatest hero Charles Lindbergh had been kidnapped, presumably for ransom. The New Jersey State Police performed like the Keystone Cops, vital evidence was lost or covered up and although an illegal German immigrant Bruno Hauptmann was convicted of the crime and executed, the case was never satisfactorily resolved. It became known as “The Crime of the Century” and conspiracy theories abounded; many claimed that Hauptmann was framed and that Lindbergh, himself, may have been implicated. All of this is well reviewed by Judge Perlman in more than 500 pages, but her own original contribution to this extremely cold-case concerns Lindbergh’s possible motive for infanticide.

Judge Pearlman suggests that infant Charles Lindbergh Jr. suffered from congenital hydrocephalus and, to his father’s twisted eugenicist mind, his was a life not worth living. However, some good might come from this misfortune if the boy’s viable organs could be salvaged for use in Carrel’s experiments. The two men had often discussed how this would be the next phase of their work and here was an opportunity. According to Pearlman's theory, Lindbergh staged an elaborate hoax to suggest that there’d been

a kidnapping but himself arranged to have the infant snatched from his bedroom and taken to the nearby Skillman Village where the Rockefeller Institute had a satellite laboratory. After several weeks the child's mangled body was found in a nearby field, missing various organs, presumably having been eaten by animal predators. Lindbergh immediately had the remains cremated before they could be examined forensically.

Without my elaborating further on this absorbing detective story that has elements of Greek tragedy, Lise Pearlman offers a plausible theory that, ultimately, is based on circumstantial evidence. To be sure, there was the infant's mutilated body and discarded surgical gloves nearby, but there was no "smoking gun." At least that's what I told the author when I had a chance to review her manuscript — but who am I to dispute evidence with a distinguished criminal judge and legal historian? What appears certain, in the context of this week's article in the *New Yorker*, is that the evolutionary narrative of artificial hearts (and heart transplants) has been circuitous. Even beyond the well known facts, medical history concerns human nature as much as natural science — or, as Oscar Wilde once wrote, "The pure and simple truth is rarely pure and never simple."