Tribute

Dr. René Favaloro: A Visionary With Pioneering Innovations and a Humanitarian Approach

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René Gerónimo Favaloro was a creator of cardiovascular bypass surgery, for which he has received little recognition and about whom little has been written or internationally acknowledged [1]. He was also a rural doctor, a committed citizen, and a teacher, researcher, and historian [2]. He was known not only for his scientific brilliance, but also for fighting for equality and social justice and for his commitment to education (Figure 1). This article was written to celebrate the 100th anniversary of Favaloro's birth and his legacy in education.

Dr. Favaloro's lectures went beyond medicine and addressed issues such as poverty, drugs, education, and the arms industry. He advocated for societal transformation and for education and social justice to be placed at the forefront. He urged university graduates to engage with their communities.

Dr. Favaloro closed the XII Argentine Congress of Bioengineering, held in Buenos Aires in 1999, with a lecture on "Ethics in Biomedical Sciences." During this talk, he addressed Argentine youth: "I want to especially ask young people to understand that material things are temporary; only ideals last forever. Within this context, the battle cry should be: education and scientific development for a society where social justice is a priority" [3]. Later the same year, Favaloro published a report [4] reflecting Dr. Paul Dudley White's legacy. Dr. White (1886–1973) was an American cardiologist charged with the care of U.S. President Dwight D. Eisenhower, who suffered a myocardial infarction in September 1955. This experience made White one of the most famous cardiologists in the United States at that time. Discussing Dr. White in his article, Favaloro distilled 10 messages: 1) clinical history prevails over technological advances; 2) all patients are equal; 3) teamwork; 4) respect for referring doctors; 5) modest fees; 6) clinical teaching and research; 7) prevention; 8) humanitarianism; 9) disarmament and peace; and 10) optimism. As Favaloro paid tribute to Dr. White, he noted problems he saw as degrading medicine and creating social injustice in consumer society. Favaloro analyzed the comparative costs of several

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Figure 1. Dr. R. L. Armentano (left), a coauthor of this article, had the honor of serving with Dr. Favaloro (right) as his personal consultant in the fields of data science and biostatistics for a period of 10 years. Photo taken approximately in 1997.

global priorities along with the additional annual investments required to achieve universal access to essential social services in developing countries. Concerned about the reduction in social protection budgets, including healthcare systems worldwide, Favaloro questioned the direction things were taking. His list of comparisons of global priorities and their corresponding annual expenses included the following.

- Basic education for all: The importance of providing accessible education for all is on par with the significant amount dedicated to beauty products (cosmetics) within a single country.
- Safer water and sanitation for all: Ensuring clean and safe water and global sanitation reflects the need for adequate infrastructure and resources to address this essential aspect of human well-being and is on par with the expenditure on ice cream in Europe.
- Reproductive health for all women: Highlights the importance of comprehensive reproductive health services and support for women worldwide, closely matched by annual spending on perfumes in Europe and the United States.
- Basic health and nutrition: Emphasizes the need for accessible healthcare and adequate nutrition for all individuals. Expenditures for such efforts were said to be considerably less than investments made in pet food.

Favaloro advocated for a new social contract, echoing Jean-Jacques Rousseau's 1762 treatise, *The Social Contract*. Favaloro said such a visionary new contract should encompass four key elements: addressing basic needs to overcome inequalities, promoting cultural exchange and dialog among diverse cultures, improving global governance through democratic principles, and striving for sustainable development as a collective responsibility. The four underlying guiding principles of this contract involve the right to work, the fight against poverty, protection against social risks, and the promotion of equal opportunities. He believed that implementing such a contract could inspire and engage new generations of globally connected students determined to challenge abuses of power and threats to our planet.

Inspired by Pedro Henríquez Ureña, Dr. Favaloro [5] identified global challenges affecting humanity, emphasizing the integral role of science and technology in addressing them, thus anticipating the discussions of the Millennium Project [6] by years (Figure 2). These challenges included ending poverty, achieving sustainable development while facing climate change, ensuring equitable access to safe drinking water, mitigating the threat of emerging diseases and microorganisms, fostering global convergence in information and communication technologies, and harnessing science and technology to improve human conditions.

Since Favaloro believed that the technological universe should be designed to fit and serve humans, the 32nd Annual International Conference of the Engineering in Medicine and Biology Society (EMBS) IEEE, held in Buenos Aires in 2010 in his honor, had the motto "Merging Medical Humanism and Technology." The inaugural keynote by Professor Luis Kun, "Merging medical humanism and technology: A holistic view of human needs," reflected this idea by highlighting the implications of science,

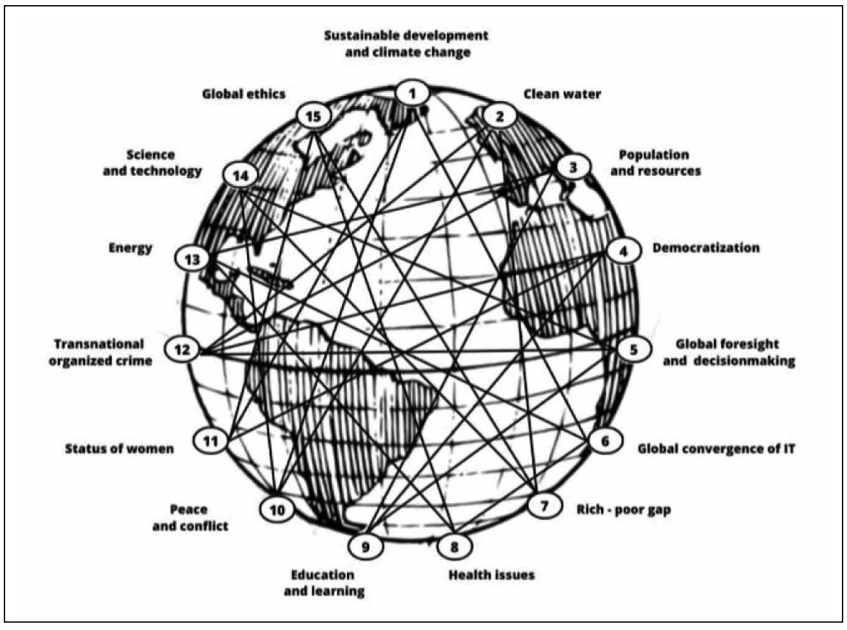

Figure 2. 15 Global Challenges—The Millennium Project (millennium-project.org). The 15 Global Challenges are a result of continuous research, Delphi studies, interviews, and the participation of over 4,000 experts from around the world, since 1996. Drawing by L. J. Cyberknop.

technology, the "crises du jour," the importance of critical thinking, and interoperability, among other topics. It emphasized that in terms of health and public health, a vision of why things need to be interconnected must be generated. An interconnected vision is especially important related to the focus needed on prevention. For his contribution to the ideas of Dr. Favaloro, Dr. Luis Kun was recognized as a professor honoris causa by Favaloro University and honored by the members of the university's supreme council (Figure 3). This acknowledgment reflects Dr. Kun's dedication to advancing the legacy of Dr. Favaloro and his commitment to the field of engineering applied to medicine and biology.

Favaloro left us a legacy: "The progress of medicine and bioengineering can be considered true achievements for humanity when all people have access to their benefits and they cease to be a privilege for the few" [7]. He also expressed his hope for social change: "I am convinced that a society blinded by the market, consumed by consumerism, will be succeeded by another that will prioritize social justice and solidarity." Finally, he referred to medical humanism: "In every medical act, respect for the patient and ethical and moral concepts must be present. Then, science and conscience will always be on the same side, on the side of humanity" [7].

Figure 3. In this ceremony, the title of "professor honoris causa" was conferred upon Dr. Luis Kun, with the Vice-rector of the University at that time, Dr. Villagrán San Millán, and the body of academic department directors from the same university jointly presenting him with the recognition.

In the Conference "Science, Education, and Development" at Tel Aviv University in May 1995, Favaloro expressed his noblest and purest conviction:

"Science is one of the highest forms of spiritual work because it is linked to the creative activity of the intellect, the supreme form of our human condition" [8]. Dr. Favaloro transferred his words into action by sponsoring, out of his own funds, an interdisciplinary group of young students, including engineers, doctors, physicists, physiologists, and mathematicians, among other specialists, to conduct research. In 1980, he created the Basic Research Laboratory, which he self-funded for a long period, initially under the Research and Teaching Department of the Favaloro Foundation. Subsequently, it became the Institute of Basic Sciences Research of the University Institute of Biomedical Sciences, which, in August 1998, gave rise to the creation of the Favaloro University.

Favaloro knew how to be at the center of the world's life while remaining distant from political and economic circles of power. This environment and the vision of this innovator led to his inability to continue with his challenging and supportive contribution to human development. His enormous social conscience led him to put economic aspects in the background: healthcare came first. During Favaloro's lifetime, it was decided at his Foundation to not worry about whether a patient had the resources for an intervention. Whoever needed medical treatment would be attended to, and then the Institute would analyze how to pay the medical staff and clinic expenses. In this, Favaloro was a great innovator who lacked political and business skills [2]. In addition, to carry out the innovation of coronary artery bypass surgery, Favaloro had to create new surgical instruments. These instruments were more precise than those existing at the time that had been designed for other types of surgeries. Medical practitioners around the world began using his technical innovations and employing his instruments [1], [2]. However, Favaloro never patented his discoveries because he wanted them to be freely available for use for the benefit of society [9]. However, large companies started mass-producing this equipment and earning hundreds of millions of dollars [1]. This extraordinary income never generated profits for Favaloro, the inventor of the equipment.

Favaloro spoke to a nation, Argentina, that loved him and felt proud of his simplicity, chivalry, and decency. He may well be the last Argentine national hero. He was entered as a contestant for first place on the 2007 television program "El gen Argentino" in which Argentine people were asked about the national personality (alive or deceased) that they most identified with. At the end of the show, José de San Martín obtained 55.8% of the votes, and Dr. René Favaloro was in second place, among a hundred other personalities. José Francisco de San Martín y Matorras (25 February 1778–17 August 1850), known simply as José de San Martín "The Liberator of Argentina, Chile and Peru" [10] was an Argentine general and the primary leader of the southern and central parts of South America's successful struggle for independence from the Spanish Empire. Coincidentally, Favaloro spoke of San Martín's remarkable ability to collaborate with his subordinates and the way he understood that "The task cannot be solely attributed to the providential man, who can do little without the full support of his collaborators with whom he must share both successes and failures" [10]. This insight underscores the importance of teamwork and shared responsibility in achieving goals, a lesson that remains relevant in leadership and cooperation today. In addition, he emphasized that one of the remarkable aspects of San Martín's personality and actions was his historic act of renunciation, which was prompted after San Martín's meeting with Simón Bolívar. During this encounter, the Great Captain, with a statesman's foresight, became convinced that Bolívar had no intention of collaborating with him to conclude the war of independence. San Martín also recognized that his sustained presence in Perú would jeopardize the decade-long efforts of revolution. Consequently, he made the selfless decision to step aside, allowing Bolívar to take center stage and claim the glory of bringing the war to its conclusion. This act of humility and sacrifice speaks to San Martín's commitment to the greater cause of independence for South America [10]. Favaloro firmly held, "Let us always remember San Martín's act of renunciation. Let us keep it in mind, for at some point in life, whether on a grand scale or a smaller one, depending on our individual or social responsibility, we will have to do the same, and like the Liberator, let us do it in silence."

At the time of expressing these ideas, Favaloro had already exemplified them in reality. His resignation from the Cleveland Clinic in 1971, at the pinnacle of his career, and his disregarding of the opportunity to amass considerable wealth, are testament to this. He did so quietly, choosing only to write a resignation letter, which deserves to be read repeatedly [11],

as it encapsulates many of the thoughts and actions consistently advocated by Dr. Favaloro. In it, he emphasized that there was no quality cardiovascular surgery available in Buenos Aires, that only the affluent could travel and undergo surgeries in San Paulo or the United States, while the rest slowly but inevitably succumbed without receiving proper treatment. "Once again, destiny has placed a difficult task on my shoulders. I am going to dedicate the last third of my life to establishing a Department of Thoracic and Cardiovascular Surgery in Buenos Aires. At this particular moment, circumstances indicate that I am the only one with the possibility to do it. This Department will be dedicated not only to medical care but also to postgraduate education with residents and fellows, postgraduate courses in Buenos Aires and the country's major cities, and clinical research. As you can see, we will continue to uphold the principles of the Cleveland Clinic" [5].

On the 100th anniversary of Favaloro's birth and in tribute to his legacy in education, we recall his words from his book *Don Pedro y la Educacion*, "I have always said that I prefer to be remembered as a teacher rather than a surgeon. I hope we understand that there is no better investment than that made in science and education" [12]. Rene Favaloro remained true to his principles and was a true visionary because he had a bold and pioneering vision, and because he was an innovator with a humanitarian approach that left a lasting legacy in cardiac surgery and healthcare in general. He had the ability to imagine and conceive innovative and futuristic ideas, envisioning possibilities and perspectives beyond the conventional [13], [14]. He brought about significant changes by pursuing his visions and working to make them a reality. Throughout his lifetime, Favaloro preached social change that anticipated by more than two decades the 17 areas for Sustainable Development Goals that the United Nations came to define in 2015 [15]. His anticipation of these 17 areas highlights an outstanding facet of his accomplishments, perhaps the least known of his career, but possibly the most significant, alongside his imprint as an educator.

Favaloro's tragic decision to end his life in July 2000 due to economic hardship revealed his vulnerability. While he excelled as a surgeon, innovator, and visionary, he lacked even a trace of a business spirit. Often, he placed his trust in those who were least reliable, or perhaps he forgot to include all the specialists who should have been part of his team and should have contributed their complementary and decisive perspectives in the various fields necessary for a comprehensive project. His perspective was primarily centered on social and human aspects. If Favaloro would have had better business advisors, he could have claimed the patents of all the surgical tools he invented and developed for the procedure of bypass surgery. The fortune he could have earned would have been more than enough to provide him with funds to do all the projects he cared about and wanted to carry out, funds that government authorities in Argentina never provided him with.

Dr. Favaloro faced situations and circumstances that defy easy solutions. These intricate challenges demand more than just a conventional approach; they require a holistic perspective that recognizes the interconnectedness of seemingly disparate elements. The cost of neglecting this interconnectedness can be substantial, and it is precisely in addressing such situations or crises, driven by what is often referred to as "islands of excellence" that we must emphasize the importance of cross-pollination with fields outside of our own expertise. Indeed, in these cases, nothing can be more critical than the audacious mingling of the profane with the specialized, as significant breakthroughs often hinge on such daring ventures into the unknown. ■

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