ARTICLES HONORING BRUCE DELMAR

Introduction to Articles Honoring Bruce Del Mar and His Contributions to Noninvasive Electrocardiology

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It is the most pleasant duty of the International Society for Holter and Noninvasive Electrocardiology and its official Journal, the *Annals of Noninvasive Electrocardiology*, to celebrate Bruce Del Mar with this issue dedicated to him.

Bruce started his own company in aircraft engineering in 1952 not as a novice in the field of engineering. His early interest in aviation brought him to Douglas Aircraft in 1934 and his achievements in this field made him a leader fast with dozens of patents credited to him. It is to the benefit of Medicine that Bruce chose to change interests in the early 1960s and, as we heard from him personally some time ago, his first stimulus to develop machinery for medical purposes came from Dr. Elliot Corday who at the time was a young cardiologist in Los Angeles, who aroused Bruce's interests in measuring blood flow through the vital coronary artery system. Not much later, Corday made the connection between Bruce Del Mar and Norman J. Holter, who was then an anonymous electrical engineer working in his modest laboratory in Montana. The meeting between the two can be seen as a milestone in the history of medicine, as it brought together these two visionaries. Jeff Holter experimented since 1949 on the possibility of recording long-term electrical signals, first from the brain and later from the heart. Holter's first broadcasting equipment of the ECG was cumbersome, heavy, and complicated but soon his work progressed to the design of a prototype of a wearable tape recorder and an oscilloscope with the capability to play back a few hours of ECG recordings from the tape. Bruce Del Mar foresaw the ingenuity of this invention and he was able to combine this with his previous know-how and experience gathered with William Thornton, as they had already built a single-channel tape recorder with a means for a write-out of the tape.

From that time on, Bruce Del Mar focused on how to record the ambulatory electrocardiogram most efficiently, artifact-free, and for periods as long as possible. Bruce was encouraged by the input from several clinically minded investigators, who soon realized the great potential of this new technique for detecting irregularities in heart rate and rhythm, its use for monitoring drug therapy, its potential to identify sudden death candidates and then also to detect transient ischemia of the heart. Bruce patented his long list of inventions in this area of medicine and soon Del Mar Medical produced the first effective ambulatory ECG monitoring system that became quickly accepted by cardiologists worldwide. This was followed nearly every year by improved and more sophisticated systems, each of them carrying the fingerprint of Bruce Del Mar. His recorder served to monitor in orbit the heart of astronaut John Glenn and was worn by William Thornton during his orbits of earth in the space shuttle Challenger. His equipment served patients all over the world, and for many of them, Bruce Del Mar's inventions were truly life saving.

We thought that the best way to honor Bruce Del Mar's contributions to clinical cardiology was through a group of articles by leading investigators in the field. The invited articles in this issue of *Annals* highlight the current and ongoing clinical research in the field of noninvasive electrocardiology and serve as a stepping-stone for future research and new clinical applications. Noninvasive electrocardiology plays an important role in the identification of patients at risk for life-threatening arrhythmias, ischemic events, and heart failure. Accurate clinical diagnosis of high-risk patient is essential in the selection of patients who will benefit from medical, device, and surgical therapies used in the primary and secondary prevention of cardiac disorders. We, and especially our patients, are

indebted to Bruce for his vision, foresight, dedication, and pioneering contributions to noninvasive electrocardiology—a field that has and continues to contribute so much to patient care.

No tribute to Bruce Del Mar would be complete without mentioning his excellent human qualities. Bruce not only used his personal talents and ingenuity, but was also able to build an outstanding team from the people around him, and together

they invented and brought into production their pioneering ideas. On a personal level, Bruce was not only a father figure but also a trusted friend of all his staff and colleagues. We, the writers of this tribute to Bruce, were fortunate enough to meet him at an early stage of our career and become fascinated by his warm personality. We proudly consider ourselves “Bruce’s friends” and it is only a small token of our appreciation to devote this issue to him.