Profiles in Cardiology

This section edited by J. Willis Hurst, M.D., and W. Bruce Fye, M.D., M.A.

Guy Fontaine: A Pioneer in Electrophysiology

FRANK I. MARCUS, M.D.

Section of Cardiology, The University of Arizona, University Heart Center, Tucson, Arizona, USA

Guy Fontaine (Fig. 1) was born in the city of Corbeil Essonnes, a suburb of Paris. He is the son of a bank worker who was responsible for the department of international affairs. His primary school was in the city of Bordeaux, in a Loyola institution, and he moved to the secondary school at the Lycée Montesquieu in Bordeaux and then moved to Paris. During World War II he lived in the city of Orleans at the time his father was a prisoner of war. After the end of World War II he entered secondary school in Paris.

Dr. Fontaine is the epitome of the international scientist. When one tries to locate him, it is as likely that he is lecturing in Japan, Brazil, Greece, or in the United States, as it is to find him working at his office at the Hôpital Jean Rostand, Ivry, France, where he is co-director of the University Department of Clinical Electrophysiology.

For the past 30 years he has continuously been expanding the frontiers of electrophysiology. His training in electrical engineering, together with his medical degree, was the perfect background to enable him to contribute to this field when he first started his career in the 1960s, a time of rapid development in pacemaker technology. In 1966, he received his doctoral degree for his work entitled "Contributions of Electrical Stimulation to the Human Heart." He then used his knowledge of electrical phenomena to make significant advances in pacemaker technology. He was among the first to implant

permanent pacemakers using intracardiac leads in Paris in May 1967. His expertise in this area resulted in his receiving referrals of patients with difficult arrhythmia problems from Europe and abroad. In 1968, he joined the cardiology staff at the Hôpital de la Salpêtrière in Paris in the service of Professor Jean Facquet. In 1976, he published *The Essentials of Cardiac Pacing*, co-authored by his mentors and colleagues, Professors Y. Grosogeat and J.J. Welti. This work was translated from French into English, German, and Spanish. Together with his talented and thoughtful surgical colleague, Dr. G. Guiraudon, Dr. Fontaine and colleagues were the first Europeans to perform successful surgical treatment of an accessory pathway. Patients with difficult arrhythmia problems, both supraventricular and ventricular, were referred to the group at La Salpêtrière hospital, and later to Hôpital Jean Rostand where Dr. Fontaine relocated. Often these patients were unresponsive to or intolerant of antiarrhythmic drugs. Dr. Fontaine and his associate, Dr. Robert Frank, then perfected the technique of epicardial mapping, which permitted them to obtain the first recordings of epicardial delayed potentials in humans. Using hand-held probes, Drs. Fontaine, Frank, and Guiraudon began to map the reentrant circuits in patients with ventricular tachycardia during surgery with the aim of interrupting the reentrant arrhythmia by a "simple ventriculotomy." It was during this experience that they discovered that some patients with sustained ventricular tachycardia had a peculiar condition characterized by fatty replacement of the free wall of the right ventricle, which was the site of origin of the tachycardia, whereas the left ventricle generally appeared normal. This led to the discovery of "arrhythmogenic right ventricular dysplasia," (ARVD) which resulted in the publication of some of the first clinical descriptions of this condition. Dr. Fontaine has continued to enhance our knowledge of this condition by many astute observations, including his discovery of delayed epicardial potentials on the surface electrocardiogram. Together with Dr. Fontaliran, these physicians found that patients with right ventricular dysplasia appear to be prone to an inflammatory process of unknown etiology involving the right and sometimes the left ventricular myocardium superimposed on the genetic background of ARVD. Recently, Dr. Fontaine made the important clinical observation

Address for reprints:

Frank I. Marcus, M.D.
Professor of Medicine
Section of Cardiology
The University of Arizona
University Heart Center
1501 N. Campbell Avenue
P.O. Box 245037
Tucson, AZ 85724-5037, USA

Received: September 11, 1997

Accepted: September 19, 1997

FIG. 1 Guy Fontaine, M.D.

that patients with right ventricular dysplasia have a parietal block which results in a QRS complex that has a longer duration in lead V₁, V₂, or V₃ compared with that in V₆. This should be of clinical value for screening or for assisting in verification of this condition. An exciting discovery by Dr. Fontaine in conjunction with Dr. Mallat and other colleagues is that there is evidence of apoptosis in right ventricular dysplasia that may provide insight into the pathogenesis of this inherited condition. He was instrumental in organizing and was President of the First International Symposium devoted to right ventricular dysplasia held in Paris in 1996. Since it is now known that this is a genetic disease, the problem of how to define the risk of sudden death or identification of this condition in family members has come to the forefront. This and other considerations have brought Dr. Fontaine to initiate a registry of right ventricular dysplasia with the International Society and Federation of Cardiology (ISFC) and the working

group of the European Society of Cardiology including Drs. McKenna in London, Wichter in Germany, and Corrado in Italy, as well as Dr. Marcus of the United States.

Dr. Fontaine also did extensive research to help understand ablation using direct current energy. This culminated in his being awarded a doctoral degree in science from the 11th faculty in Paris in 1991. The title of his thesis was "Physical, Biophysical and Electrophysiological Effects of Fulguration: Application to the Treatment of Cardiac Arrhythmias."

Dr. Fontaine has always stressed international cooperation in medicine. He realized that the traditional French policy of insisting that congresses in France had to be conducted in French impeded this goal. In 1985, he organized an international symposium in Paris on the topic of fulguration and lasers in cardiac arrhythmias. This was one of the first medical scientific meetings in Paris conducted entirely in English—a revolutionary development at that time.

He is frequently sought for his expertise in catheter ablation of arrhythmias, especially for ventricular tachycardia, and has participated as a consultant on this procedure in a number of laboratories in the United States and elsewhere. He is also sought after as a lecturer and is a prodigious worker. When he is at home in Paris, it is routine for him to be working on a manuscript or at his desktop computer until 11:00 P.M. daily or on weekends. He is the author of 739 scientific articles and abstracts, of which 364 have been published in English. He is the author of five books on different subjects in electrophysiology. The world of technology has not left Dr. Fontaine behind. He is seldom seen without his laptop computer. He has learned dBase programming language and is currently using his computer skills for statistical analysis of his data.

Dr. Fontaine is fortunate to have a devoted wife, Ilfat, who is a practicing psychiatrist in Paris, and four children who are accomplished in their own ways. His eldest daughter has a degree in business management; another daughter is a medical student in Paris. His youngest daughter is applying to medical school. His son, who is a computer expert, is assisting his father in developing computer programs for the right ventricular dysplasia registry.

Dr. Fontaine truly exemplifies the scientist who has an international view and scope. His contributions continue because he is always looking ahead and applying whatever technology is needed to answer difficult questions.