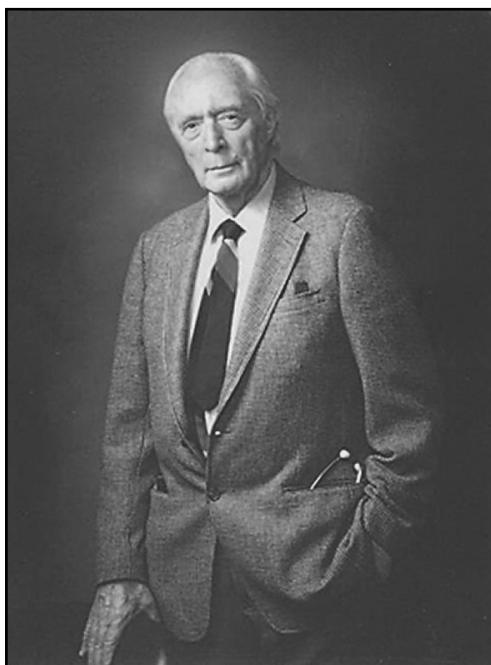

RICHARD BING



HUNTINGTON MEDICAL RESEARCH INSTITUTES

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RICHARD BING was a towering figure in the medical sciences who laid the foundation for much of contemporary cardiology. He was a pioneer in cardiac catheterization and the father of cardiac metabolism. He was also a Renaissance man who lived life to the fullest. I first met Richard in the early 1970s when we served together on an advisory committee. There was an instantaneous understanding between us and a spontaneous affinity that became a cherished friendship. We were bound by shared roots, by the same passion for science, and by a deep love for the arts. Both of us had fled terrorist regimes. We had sought liberty and had found it in America. Both of us embraced this country with all our hearts and minds and became rooted here.

Richard was born in Nürnberg, Bavaria, into an art- and music-loving family. His mother was a professional singer, his grandfather a serious and devoted self-taught musician. Richard's gifts and interests tended to music but were equally strong in science. He had formal conservatory training, and when he entered the university, he studied both music and medicine. He received his M.D. degree in 1934. After a short stay in Switzerland, he went to the Carlsberg Laboratory in Copenhagen on a quest to learn tissue culture. But things turned out differently. At the Carlsberg Laboratory, Richard met two visiting scientists from the Rockefeller Institute in New York: Alexis Carrel and Charles Lindbergh. This was a fateful meeting. Richard collaborated with Carrel and Lindbergh on organ perfusion and artificial circulation. The work led to a Rockefeller stipend and an invitation to visit the institute in New York. It became a visit without return.

Richard remained in New York, first taking a position in Alan Whipple's Department of Surgery at Columbia University. He married Whipple's daughter, Mary, with whom he had two sons and a daughter. But Richard felt that he was not cut out to be a surgeon, so he moved into physiology and, in 1938, joined the laboratory of Homer Smith at New York University. Smith was a brilliant experimentalist; he was Richard's great mentor and role model. In Smith's department, Richard acquired the tools of experimental medicine and carried out important work on kidney physiology and hypertension.

When war broke out, Richard volunteered for the Army Medical Corps after a medical residency at Johns Hopkins. He was commissioned as a lieutenant in 1943 and served until 1945.

In 1945, Richard returned to Johns Hopkins, first to the Department of Internal Medicine. He was soon discovered and recruited by the eminent cardiac surgeon Alfred Blalock. The years that followed mark a pinnacle in Richard's life as a scientist and the golden era of cardiology and cardiac surgery at Johns Hopkins. Two keywords

characterize this period: diagnosis and cardiac metabolism. Diagnosis came first. Together with Helen Taussig and Blalock, Richard started one of the first laboratories that applied catheterization of the heart to diagnosis. It was the first that focused on congenital heart defects in children, and techniques that were developed then are still in use today. Richard identified twenty different inborn cardiac malformations and defined their pathophysiology. One of these congenital defects is named after him and his coworker Taussig. Until then, the study of congenital heart defects tended to be an archival activity, listing everything that can go wrong during the fetal development of the heart. But the information obtained by catheterization was of immediate clinical significance and an absolute prerequisite for surgical correction because the imaging techniques available at that time were inadequate as guidance for the surgeon. Oxygen and hemoglobin values and nutrient and pressure readings are indicative of the specific anatomic changes associated with cardiac abnormalities and provide essential preoperative information. Richard's work became the critical enabling factor that allowed early surgical corrections of congenital heart defects.

The second keyword for Richard's tenure at Johns Hopkins is cardiac metabolism. Here serendipity played a role. Following a chance observation, Richard realized that he had entered the coronary sinus with his catheter. The coronary circulation supplies the heart muscle with blood, providing oxygen and nutrients. The coronary sinus collects the deoxygenated blood from the heart muscle and drains it into the right atrium. From there, it goes into the right ventricle and is pumped through the lungs. Blood from the coronary sinus provides a comprehensive picture of heart metabolism, nutrients used and altered, and drugs taken up and modified. Cannulation of the coronary sinus also allows measurement of coronary flow and circulation. Richard could now study requirements and preferences of the heart for specific substrates in great detail. He could follow these activities of the heart in normal and abnormal diseased conditions. Since that time, he has been referred to as the "father of heart metabolism."

From Johns Hopkins, Richard moved in quick succession to the University of Alabama in Birmingham, to Washington University in Saint Louis, and to Wayne State University in Detroit. Although these positions came with increasing clinical and administrative responsibilities, Richard's research remained at the forefront of cardiology. During his time in Detroit, Richard had the brilliant idea of using positron-emitting isotopes to image the heart and measure coronary blood flow. He collaborated with George Clark, a physicist at the Massachusetts Institute of Technology, and this collaboration resulted in a groundbreaking publication on the measurement of blood

flow using the positron emitter Rubidium 84. This was the spark that ignited an impressive technical development, culminating in today's positron emission tomography.

In 1969, Richard accepted an invitation from the University of Southern California to head experimental cardiology at the Huntington Medical Research Institutes in Pasadena. It was here that Richard made fundamental contributions to our knowledge of nitric oxide in cardiovascular physiology. Richard initiated collaboration with Caltech scientists on rapid imaging of coronary and cerebral circulation, and it was here that he pointed out the dangers of COX-2 inhibitors for the heart, later confirmed by the withdrawal of Vioxx® from the market.

Johns Hopkins, the University of Alabama, Washington University, Wayne State, USC-Huntington—any of these periods in Richard's life contains enough eminent achievements to confer distinction on an entire career. Richard ushered in a new era in clinical and experimental cardiology. He was one of the founders of the International Society for Heart Research and, together with Lionel Opie from Cape Town, was a founding editor of the *Journal of Molecular and Cellular Cardiology*. In his lifetime, Richard received numerous recognitions and honors. Just to name a few, he was awarded honorary degrees from Johns Hopkins and the universities of Bologna, Düsseldorf, and Würzburg. He was the lifetime president of the International Society for Heart Research. He was a member of the American Philosophical Society, the oldest and most venerable academy in the United States, founded by Benjamin Franklin.

Richard also excelled as a composer of music, and altogether he had wide interests, talents, and accomplishments. The most beautiful memory I have of Richard is from the performance of his Mass at the cathedral in Vienna. It was an enchanting and happy occasion, and much of Richard's life seemed condensed into this event. When I think of it, I am reminded of Richard's own words. In an interview, replying to a question about his science and his art, he said, maybe a bit tongue-in-cheek, "I do not consider myself a pure scientist; rather, I am a romantic in the field of science, music, and medicine."

Elected 1995

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