HISTORY OF ELECTROCARDIOLOGY

Introductory Note to a Classic Article on the Auriculo-Ventricular Bundle by Keith and Flack

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Arthur Keith received his medical degree from the University of Aberdeen in 1894 and began his career as an anatomist at the London Hospital Medical College. His major contributions to cardiology were in the first decade of the 20th century, with subsequent contributions in anthropology. Later in his distinguished career he became the curator of the Hunterian Museum and was named the Hunterian Professor of the Royal College of Surgeons of England. From 1916 to 1933 he was the editor of the prestigious *Journal of Anatomy*. He was knighted in 1921, and during his octogenarian years he continued his work in anthropology and wrote several books on Darwin and the physical and moral evolution of man. He died in 1955 at 88 years of age. Sir James Mackenzie, the great English cardiologist and a close personal friend of Sir Arthur Keith, said that "whenever Keith looks at anything, he sees something no-one else has noticed, and when he sees it he begins to wonder why."

In 1905 when Dr. Keith was an anatomist at the London Hospital, he invited a young medical student, Martin William Flack, to work with him on a series of projects. After Flack received his medical degree from Oxford University in 1908, he became involved in cardiovascular physiology, and during World War I he was Director of Medical Research in the Royal Air Force Medical Service and investigated hypoxia in pilots at high altitudes. He died prematurely in 1931 at 49 years of age from septicemia.

Keith and Flack jointly published two major articles, both of which have become classics. Their first joint publication entitled "The Auriculo-ventricular Bundle of the Human Heart" was published in *The Lancet* in 1906¹ and is reprinted in the History of

Electrocardiology section of this issue of the *Annals of Noninvasive Electrocardiology*. Keith and Flack are best known for their 1907 publication of the localization and description of the sino-auricular node, referred to by the eponymic term the Keith-Flack node.²

These two giants in the field of anatomy humbly acknowledged in the second paragraph of the reprinted article on the auriculo-ventricular bundle¹ that "...we take this opportunity of clearly stating that although some of our observations are new our work is in the main but a verification of the accurate and complete monograph published recently by Tawara,³ a Japanese working in the laboratory of Professor Achoff of Marburg." With elegant diagrams, Keith and Flack highlighted the location of the atrio-ventricular node and the penetrating bundle sandwiched between the fibrous and muscular parts of the ventricular septum, with the bundle branches descending on either side of the septum.

This detailed anatomic information provided the background for understanding the Stokes-Adams disease with slow pulse and syncopal attacks that Osler described in 1903⁴ and was subsequently described as heart block in numerous electrocardiographic publications over the ensuing years.

REFERENCES

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4. Moss AJ. History of heart block. *Ann Noninvas Electrocardiol* 2002;7:78.