Body Surface Mapping of Cardiac Fields

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Body Surface Mapping of Cardiac Fields

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With 139 figures and 7 tables


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Preface

Those who have been interested in electrocardiography from a physical standpoint have always been aware of the possibility that more information might be obtained by using a larger number of leads. Wilson's Tetrahedron and precordial leads were the first steps in this direction to have become accepted practice. Further extensions have been limited by a variety of difficulties: collecting, storing, processing, and presenting the additional data as well as the greatly increased time necessary to apply the leads to the patient.
Moreover, serious questions were raised and supporting evidence was presented over the years that purported to show that recordings from more lead connections would provide not new but only redundant information. The last decade saw the introduction of digital computers into medicine, the availability of tape recorders, and the development of low-power microcircuits and solid state switches with great speed and low noise; as a result, all the technical problems, with the possible exception of those associated with lead attachment, have progressively diminished in severity. The recording and presentation of complete whole-body time-varying maps is presently no more expensive or time-consuming and considerably less dangerous and uncomfortable to the patient than many currently accepted diagnostic procedures considered as routine. At this writing, it is probable that more than a thousand subjects have been mapped and new maps are being added daily.

As the maps began to accumulate, many striking and unexpected features were observed and attention slowly shifted from the technical aspects to focus on other questions: Is there enough new information in body surface maps to justify the procedure in clinical situations; would Body Surface Mapping become a widespread clinical method and constitute a subdivision of electrocardiographic practice as Vectorcardiography and Standard Twelve Lead Electrocardiography have become; might the new diagnostic criteria discovered in maps ultimately be found with just a few additional leads; to what extent could a mathematically generated ‘inverse solution’ from maps specify physiologically meaningful sources; and finally, how best could maps be used and interpreted in the light of new data on human heart activation sequences?

It was the urgency and importance of these questions that prompted the organization of the Conference on Body Surface Mapping which was held on August 22-25, 1972 at the University of Vermont. Approximately 60 investigators with a variety of specialized backgrounds met in single session to listen to and discuss some 50 papers related to the Conference theme. The main conclusion was that mapping already does contribute to clinical diagnosis and that there is every reason to believe that its potential for doing so in the future is far greater still. The participants also decided that publication of the proceedings would make available to the conferees and other investigators new information about body surface mapping that should help speed the conversion of research results to clinical procedures. This volume is the result of that decision.

We would like to take this opportunity to acknowledge and thank the
several organizations and individuals who contributed greatly to the successful outcome of the Conference. First of all, the Heart and Lung Institute of the National Institutes of Health contributed significant financial support under PHS Grant 15115-01; participation of Dr. LEPESCHKIN was assured through his Research Career Award 5-K6-HL-440. In addition, the National Life Insurance Company of Vermont and Marquette Electronics provided additional funds that were extremely helpful. The excellent supporting services furnished by the University of Vermont received widespread praise from the attendees and allowed for maximum concentration on the exchange of scientific information. The Panel Session organizers, Drs. JOHN BOINEAU, ROBERT PEARSON, and BRUNO TACCARDI, gave a great deal of time to arrange comprehensive and informative sessions. Dr. TACCARDI also acted as a consultant in the Conference planning from its inception, and we are greatly indebted to him for his many valuable suggestions. We would also like to express our grateful appreciation to our associates: MARTHA CAMERON, YVONNE STARCHESKA, BENJAMIN TIER, BORIS CHEN, and JAIRO CORREA, who worked long and unusual hours to enable the meeting to run smoothly. Finally, we would like especially to thank Mrs. HELEN RUSH, who organized the social aspect of the Conference, and Mrs. JULIE LEPECHSKIN who, as an after-dinner speaker, shared with the entire group recollections of her experiences as the daughter of Dr. FRANK WILSON. Her talk represents a unique contribution to the history of electrocardiography and she has kindly consented to permit inclusion of an abridged version in this volume.

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