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# Engineers' Week Affects the University of Dayton

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DAYTON, Ohio, February 15, 1968 --- The week of February 18-24, 1968, is designated nationwide as Engineers' Week. The theme, "Engineering...Design for World Health," is appropriate for this week in that it emphasizes the many contributions of the engineering profession to the medical and health fields.

The University of Dayton, through the cooperative efforts of its Research Institute and academic departments, is fostering the application of engineering knowledge and techniques to the solution of medical and health problems. Dr. Walter J. Bornhorst and Prof. John Minardi, professors in the Department of Mechanical Engineering and research engineers, at the Institute recently have applied thermodynamic concepts to muscles in an attempt to enhance the understanding of muscle contractions. Thermodynamics as a very general science dealing with the relationship between heat, work, and energy is directly applicable to muscle which basically is a system capable of doing work at the expense of energy supplied by a fuel, i.e., food. Previous muscle research has provided much valuable information, but has not revealed much pertinent knowledge about the mechanism that enables the muscle to convert food energy into mechanical work.

The results of this initial study supported by the University of Dayton, indicate that further research applying the principles of thermodynamics may contribute to the solution of the many problems arising from the numerous diseases which plague the muscles. Heart failure, of course, is the most serious of such diseases U.D. researchers hope to be able not only to direct the results of their work to heart disease, but also to provide valuable insight to other muscle diseases such as muscular dystrophy.

Dr. Bornhorst and Prof. Minardi plan to substantiate their theoretical predictions in the near future by performing experiments on muscles taken from the legs of frogs. Isolated muscles stimulated artificially by an electrical impulse will contract in much the same way as when stimulated by nerve impulses in the body. In fact, an isolated, stimulated, frog-leg muscle can lift about 100 times its own weight. They will compare the chemical measurements made on such isolated muscles with theoretically predicted chemical rates. Similar experiments on both healthy and failed heart muscles from small animals also are planned.

The fulfillment of a program of such scope will require more than engineering knowledge. Thus, Dr. Bornhorst and Prof. Minardi have established a team. From the University of Dayton, Dr. Bernard Katchman of the Department of Chemistry and Dr. Praphulla K. Bajpai of the Department of Biology will assist with problems related to their particular fields of specialization. To complete the team, the Cox Coronary Heart Institute has agreed to collaborate by supplying the needed medical guidance.

Continued support is needed for this program. The Dayton-Miami Valley Chapter of the American Heart Association has been contacted for immediate support. The sponsorship of long-term research has been requested from federal agencies, specifically the National Science Foundation and the Public Health Service.