CINCINNATI 19, OHIO

KETTERING LABORATORY OF APPLIED PHYSIOLOGY
COLLEGE OF MEDICINE—EDEN AVENUE

CABLE ADDRESS: KETLAB, CINCINNATI
TELEPHONE: UNIVERSITY 2665

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Bob:

Attached please find a memo to Johnson McGuire, which is an attempt to make more clear the rationale of the proposed study on Cor Pulmonale. Your interest in this project gives me a chance to discuss its wider implications.

Since you first impressed me with the importance of lung disease as one of the most expensive and frequent causes of industrial disability, I have followed the literature and studied many patients with breathing difficulties with particular care. I can now amply confirm your teaching from my experience and testify that the differential diagnosis is obscure, the measurement of disability difficult, the understanding of the pathological physiology vague, and the treatment frequently unsatisfactory. Using your equipment and with your indirect encouragement we have already made important advances in the theoretical understanding of the pathological physiology, and the practical measurement of the disability.

Our discovery that the volume of air in the chest is one of the most important factors in controlling the sensitivity of the centers controlling respiration is original and far more than a purely academic contribution. If we can show that afferent reflexes from the lungs are frequently responsible for anoxia and hypercapnia, we may be able to direct therapeutic efforts more rationally and more productively. Patients asphyxiated or with depressed respirations from toxic causes might be treated with suck-blow respiration, rather than made extremely acidotic with carbon dioxide, a far less powerful stimulant to breathing than suction respiration. Patients with pulmonary edema from irritant gases may be given positive pressure respiration with intermittent oxygen inhalation (a partially successful therapy introduced as a result of a different rationale). Subjects with cor pulmonale secondary to silicosis might be

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studied or treated with controlled respiration and drugs that act on the lungs and bronchi. To the lasting benefit of clinical medicine, post-operative and bed-ridden patients might be given passive pulmonary stimulation to combat anoxia and pulmonary stasis, rather than have their respiration further depressed by oxygen therapy. Possibly barbiturate and anesthetic deaths may be lessened through the development of superior methods of rescussitation.

The theories of gas exchange we are developing will make more simple the measurement of the residual air, and make possible the measurement of lung-blood gas exchange from breath to breath, an impossibility by previous techniques. The theory will simplify the understanding of gas exchange, through defining the factors that control it and making them measurable.

To me this adds up to a series of studies far more extensive than the study of cor pulmonale, and of far greater clinical and industrial importance. The clinical facilities available at the Cardiac Laboratory are an important adjunctive asset, for there are men there interested in working with us, testing our theories and methods, and transforming our ideas to clinical applications in a way we cannot duplicate and can ill afford to neglect. We can also develop diagnostic facilities here in order to perform a parallel function for men with industrial disease of the lungs. Close contact with a group of clinically oriented cardiologists will make the work on our own patients more authoritative.

These applications of the theories and methodologies are basically dependent on the proof of our theories. This is our real potential contribution. The facilities you have developed here through this building, its library and librarian, your men, your school, and your university and industrial contacts would put this broad study on a firm, continuing foundation.

Therefore, I feel that it is important to help McGuire in his efforts to solve clinical problems in cardiology, but that we can be of much greater value by developing a

laboratory for the study of respiratory physiology here, of which our work with McGuire would be but one aspect. The real advances would come from the Kettering; the driving force and ultimate responsibility would be ours. We can develop a laboratory to which industrial problems can be referred from all over the country, the definitive diagnosis of the nature and extent of the disability measured, and the treatment authoritatively determined. At the same time we will be developing the ideas that will make the prevention and control of these important diseases a matter of practical accomplishment.

Henry W. Ryder, M. D.

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Dr. Robert A. Kehoe, Director,
The Kettering Laboratory,
Cincinnati, Ohio.