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MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Cambridge
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October 3, 1942

Mr. E. P. Stevenson
A. D. Little, Inc.
30 Charles River Rd.
Cambridge, Mass.

Dear Mr. Stevenson:

I believe that one of the main causes of the erratic results that have been obtained on the deterioration tests is due to the variations in saturation of the compound. Last June we were using the timer originally prepared for us by Dr. Knobel. This timer had a variable speed motor and was not reproducing the cycle time very exactly. You will recall that at a meeting at A. D. Little during the early part of the summer, it was agreed that Dr. Knobel would prepare two additional timers with synchronous motors, one for our work and the other for Dr. Calvin. The new timer as actually employed gave a somewhat longer cycle, particularly a longer cooling period. It was with this operation that the high rates of deterioration were obtained. Recently, in attempting to duplicate original tests, the first timer was used and the deterioration rates were found to be much less. In checking through the differences in the cycles, it was found that the old cycle conditions were giving a saturation of about 2 weight per cent while the conditions given by the new timer gave a saturation of about 3 weight per cent. We feel that the increased rate of deterioration is quite likely related to this high degree of saturation. This could be due to either a higher degree of saturation or to a more rapid rate of reaction. In fact, if this is the case, it probably explains some of our other results. For example, an increased rate of air flow would give a higher saturation and therefore a higher rate of deterioration. Likewise, higher pressures would give higher saturations and increased deterioration, although in this latter case the absolute partial pressure of the oxygen may be very important.

It would seem very desirable to attempt a correlation of the rate of deterioration with the degree of

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BY AUTH. CG DAR-1 4.3.1
BY [signature] ADC DATE 4/1/96
By M. Bednack ADD 3/15/96

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saturation. The data available at present are not sufficient for such a purpose. However, they would seem to indicate that the rate of deterioration increased more than proportional to the degree of saturation. If this is the case, then a given production of oxygen would entail a lower deterioration if low degrees of saturation were employed. This latter is largely speculation but I feel that the relation between the deterioration and the degree of saturation will be very important in determining the proper cycle.

Yours very truly,

E. R. Gilliland

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cc: Mr. Lobo
Dr. Diehl
Mr. Larson
Mr. Curll
Dr. Calvin
Dr. Geissman
Br. Prentiss (2)
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