amount of untreated water. The addition of $H_2O_2$ to a solution of TNA in concentrations of $10^{-3}$ and $10^{-6}$M caused neither an initial nor a continuous drop in viscosity. It appears likely that the secondary decay in the viscosity of the TNA is the result of progressive intramolecular alterations in the nucleic acid particle, which are set in motion by the primary effect of the X-radiation.

In order to ascertain the nature of the change brought about by X-radiation of TNA, a series of chemical and enzymatic studies were undertaken. These results indicate that there is no splitting off of ammonia or inorganic phosphate upon irradiation; neither are any titratable acid groups opened up. Spectroscopic studies on the dialysates of control and X-rayed samples, according to the technique described by Carter and Greenstein (*1*), show that there has been no splitting off of purine- or pyrimidine-containing fragments small enough to penetrate a cellophane membrane. Presumably this indicates that if depolymerization has occurred, the molecular weight of the product molecules is still greater than 10,000. The ultraviolet absorption spectra of the control and X-rayed nucleates are identical.

Purified desoxyribonuclease (McCarty's preparation) and rat tissue extracts behave in an exactly parallel fashion toward control and X-rayed TNA. The specificity of the substance, as determined by its susceptibility to enzyme action, is in no way altered by the irradiation. Whatever the way in which the particle has been changed by X-radiation (whether by depolymerization or rearrangement involving a change in shape), the change in the axial ratio of the particle has not involved a splitting of primary linkages or a rearrangement of the spatial configurations necessary for its susceptibility to enzymatic attack.

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## An Improved Oxygen Absorption Bulb for the Carpenter-Haldane Gas Analysis Apparatus


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One of the most time-consuming aspects of basal metabolism determination by the open-circuit method of Lewis (*2*) is the Carpenter-Haldane process (*1*) of gas analysis. Though this method yields excellent results, it is most tedious and laborious, particularly the process of oxygen absorption by an alkaline pyrogallol solution. To insure complete absorption of oxygen, the analyst must pass the gas sample into the pyrogallol tube about 25 times while he watches a weird little windshield wiper "burp" a rubber bulb to facilitate automatic circulation of the pyrogallol solution from the reservoir.

Numerous efforts toward a more rapid absorption procedure proved that the old Hempel tube method was highly applicable. The Carpenter oxygen absorption tube was replaced by a simple bulb with a capillary stem arranged so that it could be easily shaken by hand, and the original 800-cc. pyrogallol reservoir was replaced by a small 200-cc. bulb fitted with a water seal. The windshield wiper circulator was found unnecessary when the small volume of solution was more frequently renewed.

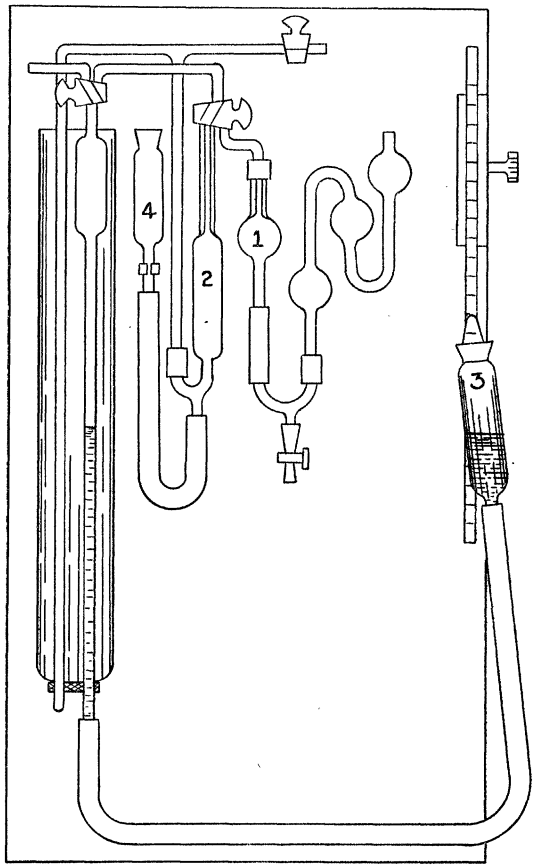


Fig. 1. Oxygen absorption bulb (1), KOH tube for $CO_2$ absorption (2), mercury leveling reservoir (3), and KOH reservoir (4).

Using this modified Hempel tube, the analysis of a gas sample is much the same as that by the Carpenter method. After $CO_2$ absorption in KOH solution, the gas sample is passed into the "Hempel" tube. The stopcock to this tube is closed, and the tube is shaken for about 10 seconds. This procedure is repeated 6 times, a burette reading being taken on the 5th and a check reading on the 6th. Thus, oxygen is completely absorbed after a total of 6 contacts with the pyrogallol solution.

With this improvement, the time necessary for a complete analysis of oxygen and carbon dioxide was reduced from the previous average of 30 minutes to about 15 minutes, a time decrease which looms more significant as the number of analyses increases.

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