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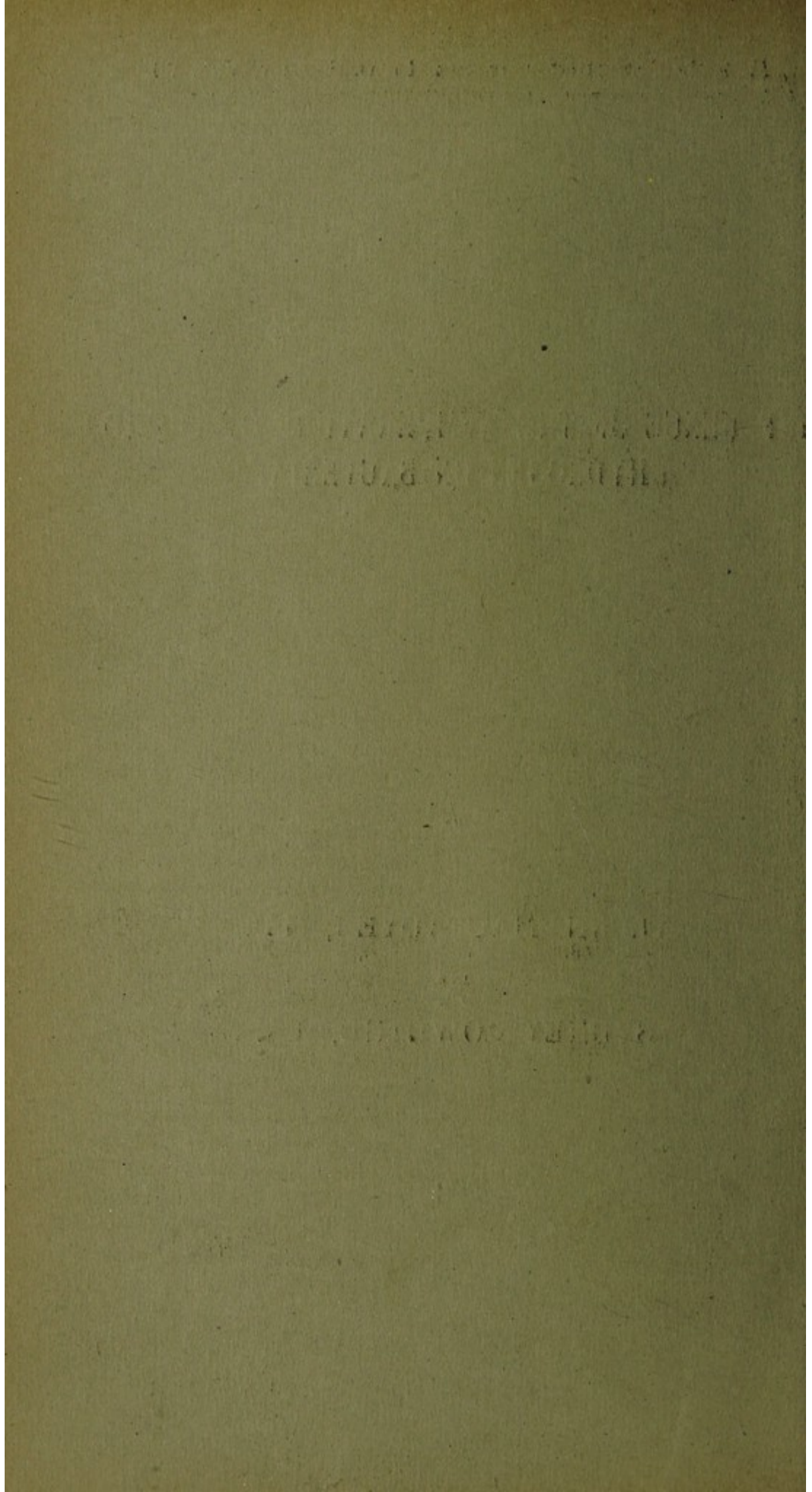
INFLUENCE OF THE TEMPERATURE OF LIQUID
HYDROGEN ON BACTERIA.

BY

ALLAN MACFADYEN, M.D.,

AND

SYDNEY ROWLAND, M.A.



Influence of the Temperature of Liquid Hydrogen on Bacteria."

By ALLAN MACFADYEN, M.D., and SYDNEY ROWLAND, M.A.

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In a previous communication we have shown that the temperature of liquid air has no appreciable effect upon the vitality of micro-organisms, even when they were exposed to this temperature for one week (about -190° C.).*

We have now been able to execute preliminary experiments projected in our last paper as to the effect of a temperature as low as that of liquid hydrogen on bacterial life. As the approximate temperature of the air may be taken as 300° absolute, and liquid air as 80° absolute, hydrogen as 21° absolute, the ratio of these temperatures roughly is respectively as 15 : 4 : 1. In other words, then, the temperature of liquid hydrogen is about one-quarter that of liquid air, just as that of liquid air is about one-quarter of that of the average mean temperature. In subjecting bacteria, therefore, to the temperature of liquid hydrogen, we place them under conditions which, in severity of temperature, are as far removed from those of liquid air as are those of liquid air from that of the average summer temperature. By the kindness of Professor Dewar, the specimens of bacteria were cooled in liquid hydrogen at the Royal Institution. The following organisms were employed: *Bac. acidi lactici*, *B. typhosus*, *B. diphtheriae*, *Proteus vulgaris*, *B. anthracis*, *B. coli communis*, *Staphylococcus pyogenes aureus*, *Spirillum cholerae*, *B. phosphorescens*, *B. pyocyaneus*, a *Sarcina*, and a yeast.

The above organisms in broth culture were sealed in thin glass tubes

* 'Roy. Soc. Proc.,' February 1, 1900; *ibid.*, April 5, 1900.

and introduced directly into liquid hydrogen contained in a vacuum jacketed vessel immersed in liquid air. Under these conditions they were exposed to a temperature of about -252° C. (21° absolute) for ten hours. At the end of the experiment the tubes were opened, and the contents examined microscopically and by culture. The results were entirely negative as regards any alteration in appearance or in vigour of growth of the micro-organisms. It would appear, therefore, that an exposure of ten hours to a temperature of about -252° C. has no appreciable effect on the vitality of micro-organisms.

We hope to extend these observations upon the influence of the temperature of liquid hydrogen on vital phenomena, and to make them the subject of a future communication, and to discuss their bearing upon problems of vitality.

