

Mr. Buchanan drew the conclusion, in explanation of the small amount of oxygen at depths of 300 fathoms and upward, "that animal life must be particularly abundant and active at this depth, or at least more abundant than at greater depths." In other words, that a permanent condition, probably of all conditions the most unfavorable to animal life, is produced and maintained by its excess.

This is entirely contrary to experience. I think, however, that the observation, which is in itself of the highest interest, goes far to support the opposite opinion, at which I had previously arrived from other considerations, that in deep water a wide intermediate zone between the surface and the layer immediately above the bottom is nearly destitute of animal life—at all events, in its higher manifestations.

If the view which I have adopted of the cause and course of the circulation of the water in the Atlantic and Pacific oceans be correct, it seems to afford a ready explanation of the peculiar distribution of oxygen. Free oxygen is doubtless in all cases derived by the water of the sea from the atmosphere, and it is consequently absorbed through the surface, where the water is constantly agitated in contact with the air, and the surface-water contains most.

In the Antarctic regions, the surface-water sinks rapidly to the bottom, and moves northward as the cold southern indraught. The bottom-water has thus, next to the surface-water, had the latest opportunity of becoming impregnated with air, and a considerable portion of that air it retains. If the deep circulation in the Atlantic and the Pacific be chiefly maintained, as I have been led to believe, by evaporation of the surface-water and a slow indraught of Antarctic water beneath to supply its place, a central belt, or, at all events, a belt at too great a depth to be affected by surface influences, must be the *oldest* water in the vertical section, and must consequently have been longest subjected to the removal of oxygen by the scanty fauna which may