

XII. Diffusion of Hydrogen through Wet and Dry Cotton Fabrics.

Some experiments were made on the transfusion of hydrogen through a closely woven cotton fabric when wet and also when dry. When this fabric was dry the gas diffused through it so rapidly that it was impossible to obtain a measure of the rate of transfusion with the katharometer. On the other hand, when the fabric was thoroughly wetted with distilled water it was found that the transfusion of hydrogen through it was so slow that it could not be detected with the katharometer, even when the rate of flow of the air past the fabric was reduced to as low a value as 2.4 litres per hour.

It was noted in the experiments on the transfusion of hydrogen through soap films that as soon as the film became thinner than the red-green stage the rate of diffusion rapidly increased. It is evident, therefore, that the rate of diffusion depends very largely on the thickness of the films used. In the case of the wet cotton fabrics the thickness of the water films filling up the interstices was very much greater than that of the soap films investigated.

XIII. Summary of Results.

1. The rate of diffusion of hydrogen through a series of balloon fabrics has been determined.

2. The permeability of soap films whose thickness corresponds to the red-green stage has been found for helium to be 670 litres per square metre per day and for hydrogen 960 litres per square metre per day at 20°C .

3. The rate of transfusion of helium through soap films has been shown to be 0.70 of that of hydrogen through similar films.

4. The diffusion of hydrogen through water films filling the interstices of a wet cotton fabric has been shown to be very low; with soap films showing interference colours the rate of diffusion of both hydrogen and helium was found to be considerable.

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