proportional to the rate of supply of air and spray ($N$). The measurements showed this to be the case.

The above deduction would only hold strictly true in case there were no recombination between salt ions and flame ions within the flame. The fact that one gets such consistent results by treating the flame conductivity and the salt conductivity as simple additive quantities would indicate that within the flame there is no recombination between the two kinds of ions.

## The Optical Properties of Exceedingly Thin Films.[1]

By Wm. B. Cartmel.

THIS work which was mostly done during the summer of 1905 was undertaken to determine the behavior with regard to light of films whose thickness was very much less than a wave-length. I experimented upon five fuchsine films varying in thickness from about a wave-length to $\frac{1}{600}$ of a wave-length. Wishing to determine the thickness by other than optical means I dissolved films whose area was known, in a definite quantity of alcohol and knowing the specific gravity of solid fuchsine, I could determine from the concentration the amount of fuchsine in solution and hence the thickness of the film.

The th nnest films had scarcely a measurable absorption for any color, but the amount of light reflected could be measured with a considerable degree of precision. The changes of phase produced by the thick films I have already measured, and I am engaged in measuring this from the thinner films.

The paper contains also a theoretical discussion of the reflection and refraction by thin films.

## On the Velocity of Sound in Gases at Low Temperatures and the Ratio of the Specific Heats.[1]

By S. R. Cook.

THE purpose of the experiments set forth in this paper was primarily to determine the velocity of sound in air and oxygen at temperatures at which these gases would be in their vapor condition. Greely had made a series of experiments on the velocity of sound at temperature as low as $-79°$ F. Within the limit of accuracy of his experiments,

[1] Abstract of a paper presented at the New York meeting of the Physical Society, Dec. 29–30, 1905.