

2. The velocity of the sound decreases as the intensity diminishes.
3. The velocity approaches a limiting value, which is higher, the greater the diameter of the tube. The mean value in dry air at 0° in a tube of diameter 1.00 m. is 330.6 m.
4. The velocity is not affected by the mode of producing the sound wave.
5. The velocity in a gas is independent of the pressure.
6. The ratio of the velocities in air and any other gas is $\sqrt{\frac{1}{\delta}}$,

where δ is the density of the gas, supposed perfect.

7. The average of the results of all the experiments in the open air is $v=330.7$ m. at 0° .

Regnault was also the first to attempt direct experiments for determining the velocity of musical sounds. In this case, however, the electric signals and the graphical recording apparatus were not sensitive enough to respond to the front of the wave, and it became necessary to resort to the ear alone. In these experiments Regnault had the co-operation of Koenig as observer, with whose assistance it was shown that :

1. A note does not change sensibly when it traverses long distances in tubes of large diameter.
2. When the sounds are observed by the ear the velocity of high notes appears to be less than that of low ones. This may be due to the more ready response which the tympanum makes in the case of low notes.
3. In traversing tubes of great length, a note does not preserve its timbre, being resolved into its simple components.

Regnault's experiments have recently been repeated by M. Violle in the large sewers near Grenoble and Argenteuil, some of Regnault's apparatus being employed for the purpose. The results of these experiments have not, however, been yet published.

Diffraction.—The phenomenon of the diffraction of sound was first experimentally shown by Lord Rayleigh in 1880.

Pitch.—Before the last century, as already mentioned, Mersenne had attempted to determine the vibrations of a cord by deducing them from very slow vibrations of the same cord when lengthened. Chladni's tonometer, which consisted of a vibrating metal rod of variable length, was based on the same principle. In 1819 Cagniard de la Tour invented the siren, a much superior instrument, but incapable of giving very exact results, notwithstanding the simplicity of its mechanism. The same remark may be made of the toothed wheel invented by Savart in 1830.