

APPARATUS TO ILLUSTRATE THE PRESSURE OF SOUND WAVES.

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AS is well known the radiometer of Crookes was originally designed to demonstrate the Maxwellian pressure of radiation, and though it was a failure from this point of view, it has become a classical piece of apparatus for showing the reaction pressure of the gas molecule.

The renewed interest in the long sought for pressure which has come up since the beautiful experiments of Nichols and Hull in America, and of Lebedew in Russia, together with the recently published method of demonstrating the tangential component of the pressure by Professor Poynting, makes any piece of apparatus capable of showing wave pressure of considerable value in the lecture room.

While experimenting recently with spark images at the focus of a concave spherical mirror, I was struck with the large amount of mechanical force exerted by the sound waves. These waves could be distinctly felt when the finger was held at the focus, and it occurred to me that a mill-wheel or radiometer driven by these waves would be useful for purposes of demonstration in treating of radiation pressure.

A small wheel was made of aluminum foil and provided with six vanes of thin mica, the whole thing being built up in a few minutes with sealing wax. The bearing was turned out of a small bit of aluminum rod, but the better plan would have been to use the cup bearing of a small compass. The whole was poised on the point of a needle mounted vertically on a small wooden stand.

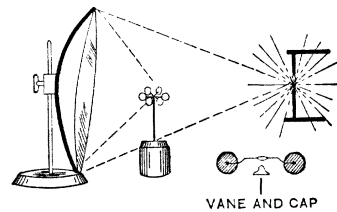


Fig. 1.

The wheel spun with great velocity when the sound waves were concentrated on one side by means of the reflector, and by moving the mirror a trifle the motion could be stopped and reversed. I have found that the best plan is to use the discharge of a large coil driven by an alternating current of 110 volts, suitable resistance being included in the circuit. A large Leyden jar is put in parallel with the secondary, and the torrent of very noisy sparks passed between suitable electrodes. The best form of mirror to use is that commonly employed to demonstrate the reflection of radiant heat, a pair of which are to be found in almost every physical laboratory.

The arrangement of the spark, mirror and mill-wheel is shown in the accompanying figure.