current in the arms a and d , which correspond to the bolometer strips, is constant. With connection made at A the usual arrangement of the bolometer connections is given, but when not made at that point we have the second case of Reid's theory. The resistances were carefully balanced, both when the connection at A was made and when it was broken. Then a slight increase was given to the resistance d , and the deflections of the galvanometer noted when connection was made at A and when it was broken. In accordance with the theory the deflection was greater in the latter case than in the former. In fact there seems to be no doubt but that a gain of about 30 per cent in the sensitiveness of a bolometer is secured by changing the resistance from the form commonly used to one where the resistance of the arms not used for bolometer strips is large and the corresponding increase made in the electromotive force.

Theory indicates that the galvanometer should have a resistance $\frac{2lR}{1+l}$ where R is the resistance of one of the bolometer strips and l the ratio between this resistance and that of one of the arms not a bolometer strip. Often it is not practicable to change the resistance of the galvanometer. But for this case also, theory shows that the arrangement of resistances suggested in this article is preferable.

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DEMONSTRATION OF THE DOPPLER EFFECT.

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IN treating of the Doppler effect in the class room, it is usual to cite the example of the change in the pitch of a locomotive whistle in rapid motion. As a matter of fact scarcely one person in ten has any distinct recollection of ever having noticed the phenomenon, unless his attention has been directed to it, and it may be of interest to teachers to know that it can be shown by means of a very simple and inexpensive piece of apparatus.

A small pitch pipe such as is used by musicians is securely fastened to the end of a tapering stick six or seven feet long, such as a blackboard pointer. This can be blown with a piece of rubber tubing fastened along the rod, and by waving the device rapidly, it is possible to give the sounding pipe a to-and-fro velocity of twenty or thirty feet a second, which is sufficient to cause a marked rise and fall in the pitch. By waving the stick first in the direction of the "line-of-sight," and then at right angles to it, it can be shown that the effect occurs only in the former case. A bamboo fish pole with the partitions bored out, the pipe fastened into the tip by means of sealing wax, and a short piece of rubber hose inserted near the breach, would make a less clumsy piece of apparatus.