trifle longer than calculated, they may be finally adjusted by adding a little solder, as is done in adjusting expensive boxes. To eliminate as much as possible the resistance of the switches, one should adjust separately each wire, except the second 0.2 ohm, so that when the switch for short-circuiting it is the only one open, the total resistance between the spiral spring terminals is that marked for the wire. Then the second 0.2 ohm should be adjusted to give 0.3 ohm when combined with the 0.1 ohm. This makes it possible to eliminate the resistance of the switches in obtaining any number of tenths of ohms except six, eight, or nine, when the resistance will be too small by that of one switch. The second 2 ohms can, of course, be adjusted in the same way, though with the units this is hardly worth while, as the resistance of one or two switches causes only one-tenth the proportional error caused with the tenths. For the purposes of elementary work these refinements are, however, entirely unnecessary.

PARALLELOGRAM OF FORCES APPARATUS.

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This is a convenient piece of apparatus to illustrate the action of concurrent forces at right angles. It is very simply constructed out of wood. A vertical post, E, is fastened to the base board. It carries a horizontal arm, F. The handle, G, slides through E, and

carries the cross arm, H. A block, I, slides on this cross arm. The pencil, J, passes through a hole in the block and is held against the paper by means of an elastic band fastened to a hook on the block. The sliding block, I, moves by means of a cord fastened to it, and passing through a screw-eye at K and attached at L.

To operate, draw handle back and move slider, I, to A. Take in slack of the string. Then push handle forward and the block is at same time drawn along the arm, describing the resultant of the two motions of the block.

THE FORMULA OF WATER.

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A friend of mine was asked by a young man if he would tutor him in chemistry in preparation for an examination. "How much do you know about chemistry already?" said my friend. "Absolutely nothing," was the reply, "except that HO_2 is water." I will venture to say that nine out of ten (perhaps even ninety-nine out of a hundred) of the pupils studying chemistry in our high schools, and I might include the junior classes in our colleges, though they would laugh at the mistake of saying HO_2 instead of H_2O , could give no satisfactory reason for preferring the latter formula to the former.

The majority of pupils on being asked could suggest no reason at all. They have been taught it so, and if they have thought of the matter at all, which is unlikely, they may have some kind of hazy idea that a great chemist by a brilliant intuition hit upon the formula and that it is therefore right, of course. They do not know that even as late as twenty years ago some great chemists, such as Bunsen, wrote HO as the formula, and are not troubled by a conflict of authority.

Other pupils will attempt to give reasons for the formula they employ. Among the most sensible of the reasons will probably be that the molecule of water consists of two atoms of hydrogen and one atom of oxygen, or that the electrolysis of water gives two volumes of hydrogen for one of oxygen. But in the first reason the fact is overlooked that not only have we never seen atoms or molecules, but we can never hope to see them. Our ideas of atoms