molecules by their mutual encounters, which vibrations would rapidly be extinguished by the energy they radiate, did they not also receive radiant energy from external sources.

Should any difficulties be felt as to admitting that the mean value of the last term but one in (16) vanishes, as was done in obtaining (17), it is to be noticed that whenever two of the moments of inertia of the molecule are equal, as for example $M = N$, then (17) hold from this consideration also, for then must the corresponding mean angular velocities be equal by symmetry, which with the equality of the two moments, M and N , is sufficient to insure the equalities expressed in (17).

The hypothesis that $M = N$ must in many cases be correct, and it may perhaps be shown in all cases not to be far from the truth, when, as stated, (17) will hold for this reason alone.

(To be continued.)

SECOND LAW OF THERMO-DYNAMICS.

By DE VOLSON WOOD, M.A.

In the last number of this JOURNAL is an article by Professor Eddy, in which he attempts to show how radiant heat may be made an exception to the second law of Thermo-dynamics; but it appears to us that the assumptions involve fallacies which are fatal to the proof.

We hold that it is *impossible* for a series of projectiles, or a train of projectiles, or a ray of light, or a ray of heat to pass from the body *A* freely through the opening of the screens and reach the body *B* as

claimed, and at the same time prevent those from B reaching A ; and unless Professor Eddy can show that our position is erroneous, the supposed proof fails.

First, suppose that the mill is so constructed that the screen c will intercept all the rays from B passing through the openings b_1, b_2 , etc., and are reflected back by the solid part of c .

Let all the spaces and openings be equal, and the screen c midway between a and b . The spaces in the screen c will not be exactly on the line of the openings a_1, b_1 , but will be a little below that line, so that when all the screens are moved upward with the velocity and in the manner assigned by Professor Eddy, the spaces c will be on the line AB when the wave from B reaches c . Under these conditions no ray from B can pass the screen c . The rays being normal to the screens, it follows for the same reason that none of the rays from A can pass the middle screen if the openings in a are directly opposite those of b . If the openings in a are higher or lower than those in b , some or all of the rays passing through the openings in a will also go through c and pass on to the screen b , but there they will be intercepted by the solid part of the screen b . It follows then that *none of the rays from A can reach B if those from B are prevented from reaching A* . It scarcely requires any additional reasoning to show that *if the rays from A reach B , those from B will reach A* , and thus defeat the object of the inventor.

The *Second Law*, as stated by Clausius, is still valid, even with a finite velocity of propagation.

Stellar Photography.—By an exposure of 140 minutes, Draper has succeeded in photographing stars smaller than the fourteenth magnitude. He hopes to be able to photograph, ere long, stars which are too small to be seen in his nine-inch telescope.—*Les Mondes*. C.