AN ACCELERATION APPARATUS.

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The acceleration apparatus described below has given better satisfaction than any of the standard forms of the apparatus.

A weight of one kilogram is attached to the end of a string. A small metal ball weighing 11 grams and 1.5 cm. in diameter is attached to the other end. The string is placed over a pulley. The kilogram weight falls through a measured height. The small ball moves along the surface of a table horizontally.

At the instant that the kilogram weight strikes the floor, the small weight leaves the edge of the table and begins its motion as a projectile with both horizontal and vertical components. A small metal rod is placed at various heights, at various distances from the edge of the table. The collision of the small ball with the rod shows the path of the projectile. Figure 1 shows such a path and table 1 gives the values as measured and calculated. Figure 2 is a sketch of the apparatus.

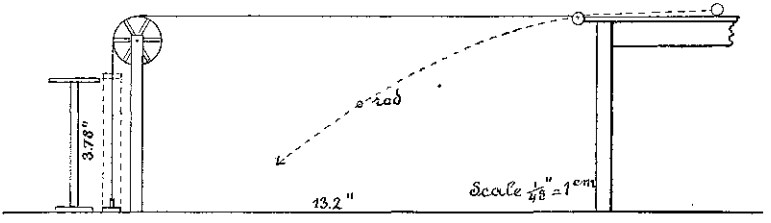

Fig. 1.

The kilogram weight fell through a height of 60.5 cm.

Column 1 gives the distance of the rod from the edge of the table measured horizontally. Column 2 gives the vertical distance of the rod from the floor. Column 3 gives the vertical fall. Column 4 gives the calculated values corresponding to column 1.

1	2	3	4
74.5	63.9	23.6	75.3
88	55.3	32.2	88.06
97.8	47	40.5	98.72
115	33	54.5	114.6
119.5	27	60.5	120.7
123.7	23.7	63.8	123.8

The string used should be a light one; cotton thread was used in this case. Careful adjustment must be made so that the small ball will leave the table at the instant the large weight strikes the floor. The mass of the small ball and that of the pulley are negligible in comparison with that of the large weight. The diameter of pulley is 20 cms.

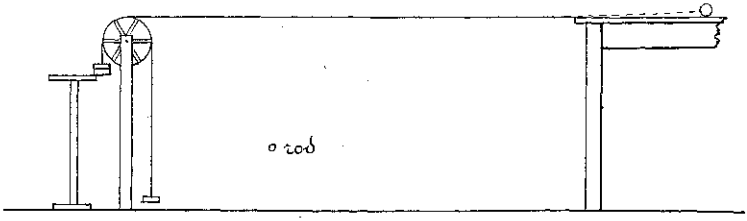

Fig. 2.

Advantages of this form of acceleration apparatus.

1. An inspection of the curve obtained with the apparatus will fix for the student some of the fundamental laws of motion preliminary to the deduction of the formula.

For example, an inspection of the curve in Figure 1 shows that at the point A the small ball has fallen through the same height, 60.5 cm., as that through which the large weight fell. The figure shows further that the direction of motion at this point makes an angle of 45 degrees with each axis. The horizontal and vertical components are therefore equal. The small ball has the same horizontal component to its velocity as it had when it left the table. In other words the horizontal component of the projectile's velocity is uniform. This makes it possible to treat the distances measured on the abcissas as proportional to the time of fall and an inspection of the curve will give the formula

$$S = \tfrac{1}{2}at^2.$$

Besides if the student sees that the motion at right angles to the moving force is a uniform motion he grasps the fundamental principle underlying the above formula, viz., that the moving body retains during each interval all the velocity imparted to it during preceding intervals.

Again allow the large weight to fall through a height of one meter. Place the rod so that when the ball strikes it, it will have fallen one meter. By a few trials the student finds that the rod must be placed at a distance of two meters measured

horizontally from the table. Other distances are taken and it is found that the horizontal distance in each case is double the vertical distance. In other words, the final velocity of a body falling from rest is double the average velocity during the fall. This result is certainly very useful in the discussion which should follow this experiment and the deduction of the laws of accelerated motion.

2. The apparatus also illustrates the motion of projectiles. The setting of the rod at calculated positions affords a very satisfactory confirmation of the laws governing the motion of projectiles.

3. The apparatus can be used equally successfully to illustrate the relations between force, mass and acceleration.

For this purpose a weight of 1½ kilograms can be placed on one end of a string and ½ kilo. on the other end. Both are placed over pulley. The third light string passes over pulley connecting the heavier weight with the light ball. The rod is struck by the ball just as in the former case.

Figure 3 shows the arrangement of apparatus. This gives results just as satisfactory as the former ones.

SOUTHERN CALIFORNIA ASSOCIATION.

The first meeting of the Southern California Science Association was held at Occidental College, Los Angeles, Saturday, December 12. The meeting was well attended and the enthusiasm created vouches for long life to the new association. The meetings were all held in the assembly hall of the main building. The first session was opened by an address of welcome from President John W. Baer, of the College; this was followed by an address by Dean A. H. Chamberlain, on the "Tendency of Science Instruction in College and Value of a Course in General Science in the Secondary School." An interesting general discussion followed, led by G. C. Bush, of South Pasadena, and Miss Mary Ross of Occidental Academy. After luncheon the laboratories were inspected. The afternoon session was opened by an address on "Correlating Science Teaching with Practical Experience," by R. C. Daniels, of the Los Angeles High School. The discussion was led by H. L. Twining, Polytechnic High School, and W. K. Gaylord, Throop Polytechnic Institute. At the close a business meeting was held.

The officers are: President, Professor W. A. Fiske, Occidental College, Los Angeles; Vice-president, Professor W. R. Bowker, University of Southern California, Los Angeles; Secretary-Treasurer, H. T. Clifton, Throop Polytechnic Institute, 871 Lake Ave., Pasadena.