PERSONALS.

Mr. James H. Armstrong, for many years principal of one of Chicago's largest high schools, the Englewood, has recently been promoted to Assistant Superintendent in charge of Chicago's high schools. This is a most important position, one which has for many years been vacant to the great detriment of the high schools. No one in Chicago is better qualified in every particular to fill this most important position than Mr. Armstrong. This journal predicts a new era and all-round improvement in these schools under his management.

Mr. Franklin T. Jones, editor of Science Questions' Department in this journal, lately with the Glidden Paint and Varnish Company of Cleveland, has after many years again connected himself with the Warner and Swasey Company of Cleveland. Among other matters Mr. Jones will have charge of the development of an apprentice school into a junior engineering college.

Professor M. E. Grober has been elected to the chair of mathematics in Heidelberg University, Tiffin, Ohio.

Dr. W. O. Mendenhall, who has been professor of mathematics in Earlham College, has been made president of Friends' University, Wichita, Kansas.

Dr. E. L. Packard of the geology department at the Agricultural College of Mississippi has accepted a position in his chosen subject at the University of Oregon.

Dean Albert R. Mann, of the College of Agriculture at Cornell University, has been appointed by Governor Whitman a member of the state food commission.

Dr. Veranus A. Moore, head of the New York State Veterinary College at Cornell University, was elected president of the American Veterinary Medical Association at the Philadelphia meeting.

Professor George F. Freeman, of the College of Agriculture in the University of Arizona, has moved to Cairo, Egypt, where he will be connected with the Société Sultamenne de Agricultur.

Professor O. P. Jenkins, of the geology department of the State College of Washington, has been made geologist to the Arizona State Bureau of Mines, Tucson.

Professor J. W. Young, of Dartmouth College, has been made director of mathematics instruction in war work, given under the management of the Y. M. C. A.

Professor Edwin E. Hill succeeds to the position of director of the Jefferson Physical Laboratory of Harvard University, due to the retirement of Professor W. C. Sabine.

Dr. William P. Brooks has resigned from the position of director of the Massachusetts Agricultural Experiment Station, a position which he has held for nearly thirty years.

A SIMPLE "FALL" APPARATUS.

By A. H. COOPER,

Grove Park School, Wrexham, Eng.

The need for a simple and direct method of demonstrating to junior students the fact that a freely falling body moves with a constant acceleration, has frequently been felt by teachers of physics.

The apparatus described below has been in use by the writer for some five or six years, and has been of great service in making clear the laws of falling bodies to elementary students. It possesses the advantages that the whole apparatus is simple; an experiment is quickly performed;

the motion of the falling body is traced absolutely from rest; from a single experiment it is easy to show with considerable accuracy that (a) the velocity is proportional to the time; (b) the distance fallen is proportional to the time squared; (c) the acceleration is constant, each of these being shown directly and independently; no assumption is made beyond that of the constancy of period of a vibrating spring; if the period of the spring is known, the value of g can be obtained with fair accuracy.

FIG. 1.

The essentials of the apparatus are shown in the diagram (Figure 1). The "falling plate," AB, consists of a board, 2 ft. by 4 in. by $\frac{3}{4}$ in. It is supported by a thread, with a loop passing under two screw-hooks in the upper edge of the board. The thread passes over long smooth nails at F, G, H, and terminates in another loop, which is placed over the brush-holder C, carried by the spring CD. On gently releasing the board, its weight, acting along the thread, deflects the spring slightly towards H. The spring is held in a clamp ED, screwed to the vertical back-board, and carries a small brush. The spring can be pressed over a little towards H, to give greater amplitude. A sheet of paper is previously pinned to the face of AB; the brush is now inked, and the thread burnt by a taper applied between G and H. Board and spring start moving at the same instant, and a curve similar to the one shown in Figure 2 is obtained. A frequency of from 15 to 20 is suitable for the spring, and this can be readily adjusted by means of the clamp.

The displacement, velocity, and acceleration of the falling body can now be obtained from the curve, for any stage of the motion; calling the period of the spring, for convenience, one second, the displacements after 1, 2, etc., seconds are given by AB, AC, AD, etc.; the corresponding velocities, however, are not given by AB, BC, etc., but by GH, HK, etc., since GH represents the distance traversed in one second, at the middle of which the body was at B, i. e., had been falling for one second; similarly, the velocity after two seconds is given by HK, and so on. The accelerations are given by GH, HK—GH, etc.

The following results are taken from an actual experiment:

t	s	v	a	s/t^2	v/t
1	1.6	3.35	3.35	1.60	3.35
2	6.6	6.7	3.35	1.65	3.35
3	14.9	10.1	3.40	1.66	3.37
4	26.6	13.4	3.30	1.66	3.35
5	41.8	16.85	3.45	1.67	3.37

It will be seen that these results show clearly that the acceleration is constant, that s is proportional to t^2 , and that v is proportional to t ; the two latter facts, though not independent of the first, being more usefully illustrated directly, for junior students, than deduced from the first, or *vice versa*.

The value of g can also now be at once found, if the period of the spring be known; a frequency of from 15 to 20 is suitable, giving, on a two-foot board, curves easily measured with sufficient accuracy with

a metre-scale, reading all lengths to the nearest millimetre, or at most, half-millimetre, as in the example given. In this case, the spring had a frequency of 17.14, and using the value of the acceleration obtained from the greatest displacement (41.8 cm., $t = 5$), we have

$$a = \frac{2s}{t^2} = \frac{83.6}{25} \text{ cm. per "t" per "t,"}$$

where t is the period of the spring, or

$$g = \frac{83.6}{25} \times (17.14)^2 \text{ cm. per sec. per sec.}$$

$$= 982.3 \text{ cm. per sec. per sec.}$$

In the example quoted, the frequency was measured by means of an auxiliary spring, fitted with inked brush also; it was adjusted so as to vi-

FIG. 2.

brate sufficiently slowly to admit of counting and timing with a stop-watch; its period was then compared with that of the spring in use by allowing the falling plate to move slowly down, both brushes making a trace on it. A comparison of the curves gave the ratio of the periods.

Various further illustrations of uniformly accelerated motion can be taken from the results; the equations $s = \frac{1}{2} at^2$, $v = at$, $v^2 = 2as$, for motion from rest, are at once verified, while by starting measurements from various points on the curve, the more general equations, $s = ut + \frac{1}{2} at^2$, $v = u + at$, $v^2 = u^2 + 2as$, can be readily shown to be applicable.

It is perhaps worthy of mention that the apparatus was worked out, and in use, before the Fletcher trolley was brought to the writer's notice. The trolley has added immensely to the science teacher's resources in the way of experimental illustration of motion, and the apparatus here described can only claim to deal with one case, but that case is of such importance that a simple method of demonstrating its features may prove of use.—[*School World*.]

ILLEGIBLE SIGNATURES.

"Can you decipher that written signature?" says the employer to his stenographer, handing her a letter with a signature that he had tried hard, but in vain, to read. The employee makes a protracted attempt, but is unsuccessful. The letter with the illegible signature goes the rounds of the office, but with no favorable result. The letter is an important one, and cannot be answered until the sender has sent several letters of inquiry, in the last one of which his signature has been written fairly legibly. Much valuable time is thus needlessly wasted.

To obviate any similar trouble, Rear Admiral Spencer S. Wood, commandant of the First Naval District, has issued an order that, hereafter, when any officer has to sign his name to an official document, he must first typewrite it and then write it underneath in his own hand.

We commend this practice to those who habitually write their names in characteristic but illegible fashion. An excellent substitute might be for the stenographer to typewrite, in conjunction with her own initials, the full name of the writer.—[*Photo-Era*.]