not also just. It would appear, not only that this dog must have thought her plan through, but that she must also have held it definitely in mind for several days while she executed it, thus indicating quite unequivocally, it seems to me, that one animal at least, ranked lower than man, possesses the power of looking into the future and of executing plans deliberately laid with reference thereto; "man is the only animal which has the power of looking into the future," to the contrary notwithstanding. F. H. KING.

River Falls, Pierce county, Wis.

Method for making electrical signals.

When I first became connected with the Alabama agricultural and mechanical college, the recitation signals were made by means of electric bells, one in

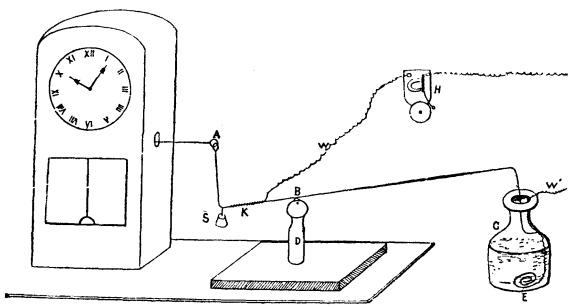

FIG. 1.

each professor's room. These were rung separately by pressing in succession as many push-buttons as there were bells. In order to complete the system, it was necessary to have one wire for each bell, and a return-wire running through the whole length of the system; and therefore only *one* bell could be rung at once. In the circuit there were twelve bells, about one-half mile of wire, and twelve one-gallon cells of Watson's battery. One of the cadets of the college was delegated to sound the signals at the end of each fifty minutes, which was the length of the recitation hours. Sometimes he would ring too soon, and at other times several minutes too late. This was frequently annoying, particularly when an interesting

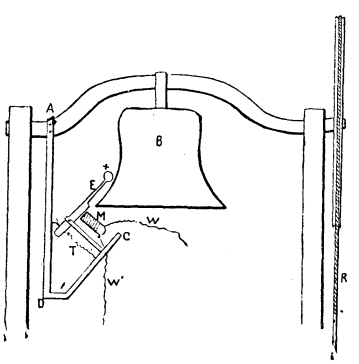

FIG. 2.

and important lecture was in progress. In the attempt to obviate this difficulty, the plan that I am about to describe was suggested to my mind.

We have an excellent compensated clock that can be made to strike twice any multiple of five minutes. After adjusting this clock so as to make it strike every fifty minutes, I insulated it on a square of plate glass. I then made an oblong opening in the side of the woodwork about one inch long. This slit was made on a line with the ball of the striker. Through this hole I passed a copper wire, and fastened it securely to the hammer of the gong. In the end of the wire outside of the clock I made a loop, as shown at *A*, Fig. 1.

A second wire, *A B C*, was attached to the first, as shown in the figure. A loop at *B* fits in a slit in the upright *D*, and a pin is inserted at *B* to hold the wire in position and at the same time allow the ends *A* and *C* to work up and down when the hammer of the clock strikes. The bottle *C E* is partly filled with mercury. From this mercury-cup a wire, *E W*, runs to one pole of the battery. The other pole connects at *K* with the wire *W*, after passing through all the bells of the system. *S* is a weight to counterbalance the arm *B C*. It will be readily seen that the outward stroke of the hammer will throw the end of wire *A B C* into the mercury, thus completing the circuit, and causing all the bells to ring. The blow of the hammer against the gong of the clock will raise the end *C*, and break connection. All but one of the bells must be single stroke: otherwise it will be impossible to obtain satisfactory results. By using one bell, with attachment for breaking and closing the circuit, the ringing will continue as long as the wire at *C* is in contact with the mercury.

The above system has been in operation for one year, and has given satisfactory results.

It has occurred to me that our large bell, weighing nearly two thousand pounds, can be made to strike the hours for the benefit of the town by placing it in the system just described, with the following adjustment. Procure a soft iron horseshoe magnet six or eight inches long, and secure it at *M* on the iron rod *A D C*, Fig. 2. This becomes magnetized when the clock completes the circuit. The armature *X Y* is attracted, and the ball *X* strikes the bell. The elasticity at *E* raises the ball immediately from contact, and allows a clear and distinct ring. The tension-spring *T* raises the armature from the magnet, and the current ceases to flow. If it is desirable at any time to ring the bell in the ordinary way by means of the rope *R*, the adjustment of the system may be sustained by making the supporting rod *A D C* secure to the bell-shaft at *A*, and thus permitting the magnet and fixtures to swing with the bell.

P. H. MELL, Jun.

Auburn, Ala.

GEIKIE'S GEOLOGY.

Text-book of geology. By ARCHIBALD GEIKIE, LL.D., F.R.S., director-general of the Geological survey of Great Britain and Ireland, etc. With illustrations. London, *Macmillan & Co.*, 1882. 971 p. 8°.

TEXT-BOOKS in science once held a rather low place in the estimation of scientific men. Labor of this sort was long relegated to the book-makers, who, copying statements and illustrations one from another, gave the student more of the errors of by-gone days than of the knowledge of their own. But in our own time all this has been greatly bettered. Now a man