

the subject than under such teaching? A gentleman of considerable experience in teaching, once remarked that he had taught Chemistry several years, but had never tried any experiments at all. Now it is true that many schools have no chemical apparatus; but it is also true, that with a few simple chemicals and a few glass dishes, a teacher may perform before his class one or two common but useful experiments, every week for a term of three months, and the expense of such experiments will hardly exceed as many shillings as he has fingers on both hands. Of themselves, they are of much more value to the pupil than the same number of recitations without experiments. The real defect in teaching the sciences is, that teachers do not become masters of their subject; they cannot go alone, and therefore they must lean upon the book. Of course, they teach the book, and not the subject. Enthusiastic they cannot be, for they are not thoroughly imbued with the matter in hand; and the class cannot be expected to be greatly interested in that which fails to enlist the interest of the instructor. When the text-book is so large that only a portion of it can be used, such teachers seldom have the knowledge, or the good judgment, requisite to make selections that will be profitable and interesting.

We need, then, text-books that are better adapted for the schoolroom. Let the attractive features of science be made prominent, so that while the book is constructed on scientific principles, it shall read like the *talks* of Agassiz. Let the next new edition be not enlarged, but reduced and pruned of all useless matter and form. Then let the teacher, having mastered his subject, teach what he really knows. The book may form the text for his instructions, but by no means the entire subject-matter. The teacher and the book together should be a kind of guide-board to point the learner onward in the pursuit of knowledge. Where the guide is intelligent, patient and companionable, the wayfarer passes pleasantly and successfully onward in his journey.—*Massachusetts Teacher*.

A. P. S.

## SCIENCE.

### Curious Applications of Electricity.

Robert Houdin, the greatest *prestidigitateur* of modern times, lives in a charming mansion called the "Priory," in the village of Saint Gervais, upon the right bank of the Loire, about one and a half miles from the city of Blois. His dwelling with the spacious grounds surrounding it, are believed by the common people of the vicinity to be controlled by some mysterious agent; and in their eyes the owner has an almost supernatural reputation. This impression has doubtless been produced, in no small measure, by the fact that M. Houdin has made extensive use of electricity to accomplish very many remarkable, and at the same time useful results. Some of these are exceedingly ingenious.

The main entrance to the Priory is a carriage-way closed by a gate. Upon the left of this is a door for the admission of visitors on foot; on the right is placed a letter-box. The mansion is situated a quarter of a mile distant, and is approached by a broad and winding road, well shaded with trees.

The visitor presenting himself before the door on the left, sees a gilt plate bearing the name of Robert Houdin, below which is a small gilt knocker. He raises this according to his fancy, but no matter how feeble the blow, a delicately tuned chime of bells, sounding through the mansion, announces his presence. When the attendant touches a button placed in the bolt, the chime ceases, the bolt at the entrance is thrown back, the name of Robert Houdin disappears from the door, and in its place appears the word "entrez," in white enamel. The visitor pushes open the door and enters; it closes with a spring behind him, and he cannot depart without permission.

This door in opening sounds two distinct chimes, which are repeated in the inverse order in closing. Four distinct sounds,

then, separated by equal intervals, are produced. In this way a single visitor is announced. If many come together, as each holds the door open for the next, the interval between the first two and the last two strokes indicates with great accuracy, especially to a practiced ear, the number who have entered; and the preparation for their reception is made accordingly. A resident of the place is readily distinguished; for knowing in advance what is to occur, he knocks, and at the instant when the bolt slips back he enters. The equivalent distant strokes follow immediately the pressing of the button. But a new visitor, surprised at the appearance of the word "entrez," hesitates a second or two, then presses open the door gradually, and enters slowly. The four strokes, now separated by a short interval, succeed the pressing of the button by quite an appreciable time, and the host makes ready to receive a stranger. The travelling beggar, fearful of committing some indiscretion, raises timidly the knocker; he hesitates to enter, and when he does, it is only with great slowness and caution. This the chimes unerringly announce. It seems to persons at the house as if they actually saw the poor mendicant pass the entrance; and in going to meet him they are never mistaken.

When a carriage arrives at the Priory, the driver descends from his box, enters the door by the method now described, and is directed to the key of the gate by a suitable inscription. He unlocks the gate, and swings open its two parts; the movement is announced at the house, and on a table in the hall, bearing the words, "The gate is——" appears the word "open" or "closed," according to the fact.

The letter box, too, has an electric communication with the house. The carrier, previously instructed, drops in first all the printed matter together; then he adds the letters, one by one. Each addition sounds the chime; and the owner, even if he has not yet risen, is apprised of the character of his dispatches.

To avoid sending letters to the village, they are written in the evening; a commutator is so arranged that when the carrier drops the mail into the box the next morning, the electricity, in place of sounding the chime in the house, sounds one over his head. Thus warned, he comes up to the house to leave what he has brought, and to take away the letters ready for mailing.

"My electric doorkeeper then (says Houdin) leaves me, nothing to be desired. His service is most exact; his fidelity is thoroughly proved; his discretion is unequalled; and as to his salary, I doubt the possibility of obtaining an equal service for a smaller remuneration."

M. Houdin possesses a young mare, whom he has named Fanchette. To this animal he is much attached, and cares for her with the greatest assiduity. A former hostler, who was an active and intelligent man, had become devoted to the art so successfully practiced by his employer in previous years. His knowledge, however, was confined to a single trick, but this he executed with rare ability. This trick consisted in changing the oats of his master into five-franc pieces. To prevent this speculation, the stable, distant from the house seven or eight rods, is connected with it by electricity; so that by means of a clock fixed in the study, the necessary quantity of food is supplied to the horse at a fixed hour, three times a day. The distributing apparatus is very simple, consisting of a square box, funnel-shaped, which discharges the oats in the proportions previously regulated. Since the oats are allowed to fall only when the stable door is locked, the hostler cannot remove them after they are supplied; nor can he shut himself in the stable, and thus get the oats, as the door locks only upon the outside. Moreover, he cannot reenter and abstract them, because an alarm is caused to sound in the house, if the door be opened before the oats are consumed.

This study clock transmits the time to two dial-plates. One, placed upon the front of the house, gives the hour of the day to the neighborhood; the other, fastened to the gardener's lodge, facing the house, gives the time to its inmates. Several smaller dials, operated similarly, are placed in the various apartments. They all, however, have but a single striking part, but this is