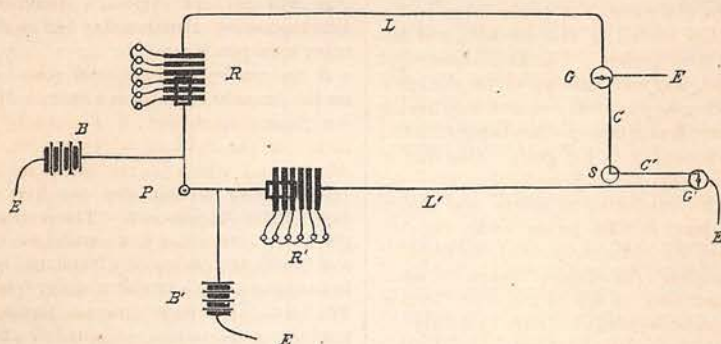


plished in various studies and professions. In fine weather, the classes will meet in the orchard or the grove, near Mr. Alcott's house, which is pictured in SCRIBNER for February, and which stands on the Lexington Road, next to Hawthorne's "Wayside."

Possibly this experiment, which Mr. Alcott has long intended to try, may result in a permanent school during a portion of the year for the prosecution of those studies that have so long given Concord a name in the world.

THE WORLD'S WORK.



The Writing Telegraph.

COPYING and autographic telegraphs have already been made the subject of experiment, but in all the apparatus already tried the mechanism is too complicated to be of much practical value in ordinary telegraphy. A more recent invention, called the writing telegraph, reproduces at the distant end of a telegraph line marks, letters and words by means at once simple and ingenious. The mechanical principle upon which the new writing telegraph is founded is the familiar law of resultant motion when two opposing forces are combined. The electrical part of the invention consists of suitable apparatus for transferring over wires these two forces and recomposing them into a resultant motion that shall exactly resemble the original motion. To make this clear it must be observed that the action of a pen or pencil in writing is twofold. There is the up-and-down stroke and the lateral movement of the pen along the paper, the curved letters being the resultant of these two opposing motions. In the writing telegraph we have an upright pen fixed in one position, but with the point free to move in two directions, up and down and from side to side.

The above figure is an ideal sketch of the apparatus. The writing pen, P, is held in the hand and is used in forming the letters on a strip of paper that moves under it. To P is fastened at right angles two arms or rods, bearing at the ends metallic plates. At R and R' are sets of metal plates standing on edge and isolated from each other by layers of paper soaked in paraffine, each plate being connected by wire with a resistance coil. The flat plates at the ends of the rods rest on the edges of these upright plates and are

free to slide to and fro covering a greater or less number of them as they move. At B and B' are batteries with lines to earth and at L and L' are the line wires. It will be seen that as the pen is moved in writing, the rods pull the plates to and fro, and as these plates slide they short-circuit the current in the resistance apparatus, cutting out a greater or less number of the coils and thus continually altering the electrical resistance in the line wires. The up-and-down strokes of the pen alter the resistance in the line, L, and the lateral strokes change the resistance in the line, L', and as the movement of the pen in forming a curve is the resultant of two motions, each motion is given to the line in its exact proportion; in other words, the resultant mechanical motion is expressed in electrical resistances of more or less value. At the receiving end of the double line are two galvanometers, G and G', the line, L, being connected to G, and the line, L', to G', and from each to earth. The needle of each galvanometer is balanced, and from the point of each needle is taken a delicate cord, marked c and c'. At S is a self-inking style, or pen, suspended by a thread and free to move in any direction. The cords, c and c' are fastened to the style, S, and opposite to each are delicate springs not shown in the figure. These springs exactly balance the strain on the cords from the needles as long as the resistance in the lines is constant and the needles remain at rest. The operation of the apparatus may now be easily understood. The movement of the pen changes the electrical resistance in each of the lines, the up-and-down stroke affecting one line, the lateral strokes the other. The needles of the galvanometers swing to and fro under these changes in

Telegram from our own correspondent.

SAMPLE OF WRITING BY TELEGRAPH.

electrical resistance and pull the style in opposite directions. If, now, the pen describes a curve that is the resultant of two motions, the resistance in each line is changed in corresponding degree, precisely as if the curved motion had been split into its two right-angled motions and translated into electrical resistances of equal or unequal value. The needles pull the style in two directions at the same time, and as it cannot follow both motions, it takes a path between them that is the result of the two forces and reproduces the original curve made by the pen. The strip of paper under the style moves by clock-work, ink flows from the style and traces the curves and marks made by the pen; in fact, reproduces the message written by the pen at the other end of the line. The details of this remarkable invention have been worked out in a simple and tolerably successful manner.

We present a sample of the writing as received on two wires at a distance of forty miles. The writing is sufficiently clear for all practical purposes, and though the apparatus works rather slowly, it may yet reach a valuable practical position in telegraphy. At its present stage it has demonstrated that hand-writing can be transmitted with precision over long distances, and the further development of the invention may be awaited with considerable interest. The invention is English in origin and was first used between London and Brighton.

Tubular Piles.

In sinking tubular piles in deep water and in putting down driven wells it has been the custom to drive the pile or pipe by striking on the top of the tubes. This answers very well for short tubes, but in sinking deep wells and long piles it has been found better to deliver the blows of the weight or hammer at the bottom of the pile. A long cylindrical weight designed to strike on the flat head of the steel point, or toe, of the pile is suspended inside the tube and let fall on the point, the tube itself acting as a guide for the weight. It is claimed that by this method long piles are driven with facility and precision, all danger of bending the pipe or driving it out of perpendicular being avoided. This method of driving tubes in the ground has suggested a very useful form of iron base for lamp, signal, tent and telegraph poles. An iron tube with steel point and heavy flange at the top is driven into the ground by means of the cylindrical weight till the flange is level with the surface. The telegraph, lamp, or other post of iron, has a similar flange designed to fit the flange on the tube, and the two may be screwed together. For wooden posts a cast-iron socket may be provided and screwed to the flanged tube. Such an iron tube driven in the ground would be useful for a variety of purposes when a firm and permanent base is wanted.

New Preservative Agent.

DURING some experiments in separating sugar from molasses a double salt of borate of potassium and sodium was found that proved to have valuable antiseptic properties. This salt is now manufactured

on a commercial scale, and costs about ten cents a kilogram. It is obtained by dissolving in water equal quantities of chloride of potassium, nitrate of sodium and boric acid, filtering and evaporating to dryness. The salt is said to be quite deliquescent and must be kept in tight bottles. It is quick in action, retains its qualities for a long time and has no injurious effect on the taste, smell, or healthfulness of the substances to which it is applied. It has already found a use in making sausages, in preserving meats, in tanning and in butter-making. A small quantity of the salt added to milk will preserve it in good condition for a week. It is also used in preserving beers and wines and is being made the subject of experiment in several other directions.

Memoranda.

CARBON desulphide has been tried with success in extinguishing fires in chimneys and other confined places. A few kilograms burned on the hearth of a chimney that is on fire has been found sufficient to extinguish the fire without injury to the house or furniture. The combustion of the carbon desulphide produces great volumes of carbonic and sulphurous acid gases which rise in the chimney and smother the fire. From experiment it has been found that out of 319 burning chimneys, 251 were extinguished in this manner without other assistance and without even disarranging the furniture of the rooms where the fires occurred.

A new form of thermo-regulator employs the varying tension of a saturated vapor under the influence of changing temperature as a means of controlling the flow of gas in a gas-stove and thus maintaining a fixed temperature. A small vessel containing methylic ether and connected with a mercury manometer is attached to a gas-stove intended to be kept at a fixed temperature, the movements of the manometer controlling the flow of gas. So sensitive is the apparatus that a stove has been maintained within one-tenth of a degree of a given temperature, this precision being obtained by the small mass of the vapor and the rapidity with which its tension changes under slight variations of the temperature.

The patent law restrictions laid on the use of the common process of nickel-plating have led to experiments in other directions to secure the same end, and a new process is announced by Professor Stratbo that is said to be both simple and effective. To a solution of from five to ten per cent. of chloride of zinc, sufficient nickel sulphide is added to give it a decided green color, when the solution may be raised to a boiling point in a porcelain vessel. The articles to be plated, thoroughly cleaned from oxide and grease, are suspended in the boiling solution for from thirty to sixty minutes, or till well covered. They may then be taken out, washed in water in which a little chalk is suspended, dried and polished. By employing a cobalt salt in place of the nickel, a plating of cobalt may be obtained. This process is not patented.