

This oscillation of the current was first observed by Joseph Henry, in 1842. He found that when the wire joining the two coatings of the jar was bent into a helix, and a needle placed inside, the magnetization of the needle due to the discharge-current was not always in the right direction. Henry stated that "the phenomenon requires us to admit the existence of a principal discharge in one direction, and then several reflex actions backward and forward, each more feeble than the preceding, until equilibrium is obtained." Later, Thomson worked out a mathematical theory of the subject, which agreed with Henry's observations; and further experiments have substantiated the results.

Professor Lodge showed experimentally, but on a small scale, a case of the resonance of two Leyden-jar discharges, by causing sparks in one circuit by the discharge of a jar in a neighboring one. Another interesting experiment was the rendering audible of a Leyden-jar discharge as a musical note. The period of the oscillation in an ordinary discharge is many million vibrations a second. But this can be reduced in two ways, — by adding to the capacity of the circuit; or by increasing its self-induction, as one would increase the flexibility of a spring, and then load it in order to increase its period. On adding more jars, and on increasing the self-induction of the circuit by putting in a coil of wire, the period was reduced until a shrill whistle resulted from the discharge; on adding another coil, the one lowered again until the pitch was about that of the highest note of a piano; another coil brought it down to the octave above the middle C. The noise of the spark which is ordinarily heard is due to the sudden heating of the air. If the heat is oscillatory, the sound will be oscillatory too; and, by reducing the period of the electric oscillation, we bring the sound within the limit of audibility. On analyzing the spark that produced the lowest note, by means of a rotating mirror, a coarsely serrated band was seen. Another interesting experiment was tried with the jar discharge. If a polarized ray of light be passed through a piece of heavy glass around which a current is passed, the plane of polarization is rotated. Instead of a steady current, Professor Lodge used the oscillatory current from the jar; and a similar effect was obtained, even when the period was less than one seventy-thousandth of a second.

In concluding, Professor Lodge said, "The present is an epoch of astonishing activity in physical science. Progress is a thing of months and weeks, almost of days. The long line of isolated ripples of past discovery seem blending into a mighty wave, on the crest of which one begins to discern some oncoming magnificent generalization. The suspense is becoming feverish, at times almost painful. One feels like a boy who has been long strumming on the silent keyboard of a deserted organ, into the chest of which an unseen power begins to blow a vivifying breath. Astonished, he now finds that the touch of a finger elicits a responsive note; and he hesitates, half delighted, half affrighted, lest he be deafened by the chords which it would seem he can now summon forth almost at will."

A NEW ALLOY. — A new alloy has been made by Herr Reith of Bockenheim, Germany, which is said practically to resist the attack of most acid and alkaline solutions. Its composition is as follows: copper, 15 parts; tin, 2.34 parts; lead, 1.82 parts; antimony, 1 part. The alloy is therefore a bronze with the addition of lead and antimony. The inventor claims that it can be very advantageously used in the laboratory to replace vessels or fittings of ebomite, vulcanite, or porcelain.

A SERIES ELECTRIC TRAMWAY IN ENGLAND. — There has recently been tried, near the Northfleet Station of the South-Eastern Railway in England, an experiment on a system of electric traction, which, in its practical realization, has been imported from the United States. Indeed, it is curious that while the English technical papers claim with some pride that the work is a "distinctly English invention, due to the late Professor Jenkin and Professors Ayrton and Perry," yet the invention apparently lay dormant until it was practically worked out by two Americans, — Short and Nesmith, — applied on an extended scale in the United States, and finally introduced into England by the corporation controlling their patents. The track used for the trial seems to be considered a specially difficult one, since it has on it a three-

per-cent grade four hundred yards long; but if we compare it with the average line in this country, where eight and even ten per cent grades are the rule rather than the exception, it would seem a very easy trial. The car was propelled by a single motor, sleeved to the axle and flexibly suspended, according to the system introduced by Sprague. Current was supplied from a conductor carried in a conduit. The novel feature of the system lies in the fact that the cars are worked in "series" instead of in "parallel." This necessitates the interposition of the motors into the main line; and to effect this a special device is needed. In the main line, in the centre of the conduit, are a number of contacts made by two plates normally held together by springs. If these plates were pulled apart, the main circuit would be broken, unless at the same time some conducting circuit is joined across them. Attached to the car, and travelling in the conduit, is a long "arrow." There are metallic strips on either side of the "arrow," and between these strips is joined the circuit of the motor. As the car moves along, the "arrow" passes between the contact-plates, forcing them apart, and thereby introducing the motor into the main circuit. On passing through a distance equal to the length of the "arrow," another set of contact-plates is forced apart, while the set which is left closes, thus keeping the circuit intact. On the trial the system worked well, and every one was well satisfied, as is usually the case at an exhibition of a new system. It should be remembered, however, that in this country the system has not been uniformly successful. At Denver a great deal of trouble was experienced, to the detriment of electric traction in that section of the country, and the system is not being rapidly introduced. The large number of contacts required, the possibility of some of them failing, the great danger of burning out the motors, with other possible objections, tend to make an unfavorable comparison with systems of greater simplicity.

THE PRICE OF COPPER. — The collapse of the copper syndicate should have an excellent effect on the extension of electric lighting and power distribution. The high price that has ruled in the last year has been very unfavorable to electric-light people, especially those using the low-tension system of distribution. It is to be hoped, however, that the change in the cost of copper will not bring up again the fierce discussions as to the relative merits of high and low potential distributions which ruled about a year ago. We can expect, however, that this year will see more than double the amount of plant installed than did last year.

NOTES AND NEWS.

SEVERAL large textile manufacturers of Paterson and other manufacturing centres are reported by *Bradstreet's* to be inaugurating a movement for the founding of a textile technical school. The object of the movement is threefold, — to elevate the character and improve the style of the American fabrics, to render the domestic manufacturers independent of European art and skill in the production of high-grade goods, and to secure independence of trades-unions. Negotiations are reported to have already been opened with qualified teachers from abroad to assume charge.

— As summer approaches, and so many of our readers are considering the possibility of spending some of their vacation time in Europe, it may be well for them to investigate the merits of the Cheque Bank as a custodian of their funds while travelling. This institution was established seventeen years ago in London, for the convenience of the travelling public, and numbers among its trustees some well-known men. The bank aims to furnish the traveller with an immediately available security equal in value to a Bank of England note, only safer to carry. Letters of credit are done away with, while upwards of two thousand banks and bankers throughout Europe are now cashing the checks issued by the Cheque Bank. The British Government accepts them in settlement of customs charges, and railroad companies frequently accept them in payment of fares, as do also hotels and store-keepers in some cases. The bank issues check-books, each containing ten checks, which can be drawn for any amount the purchaser may desire. A branch office has recently been opened in New York under the management of Messrs. E. J. Mathews & Co., at No. 2 Wall Street.