Now why cannot something of this sort be attached to a railway car? It can be made of larger or smaller capacity, so as to have one under every seat or every other seat; they are all connected by a covered copper wire; they would not leak, the water would not freeze up and break the pipes and it requires a great deal less power to generate the electricity than it would to generate heat enough to heat water and then, by secondary radiation warm the car. There is no reason why houses, offices and factories cannot be warmed by electricity cheaper than by steam. The matter is an actual fact; has been patented, and other patents are now pending. It will not be a strange thing if, within another year, this little apparatus is put into operation. It has only been shown twice, and in each case has been a source of much surprise and gratification to men who are usually considered well up in mechanical and other matters.—*Boston Jour. Com.*

THE ELECTRIC LIGHT IN AKRON OHIO.

A novel, and thus far successful experiment in electric lighting was inaugurated in Akron, Ohio, April, 9.

The town is lighted by two groups of lamps, one supported by an iron tower rising 208 feet above the street, the other by a wooden mast on the observatory of Buchtel College, about 40 feet higher than the tower lamps. Each group consists of four lamps of 4,000 candle power each, or an aggregate light of 32,000 candle power.

The chief novelty of the system is the tall tower, made of boiler plate in 55 sections, each 50 inches in length. At the bottom the diameter of the tower is 3 feet; at the top, 8 inches. The tower is steadied by six wrought iron guys reaching to the top. Over the lamps is a five-foot copper reflector which serves also as a hood. Thirty feet from the street is a wrought iron balcony, to which the lamps are lowered for trimming.

The entire electric circuit is 9,110 feet, the conducting wire being of copper. The total cost of setting up the system, including boilers, engines, etc., was $11.317. and the cost of running the lights a year is estimated at $1,580. The cost of the iron tower was $1,609.

The light promised from these two centres is to be equivalent to bright moonlight over a circuit of half a mile radius from each group of lights, or two circular areas each one mile in diameter. It is thought that four more centres of illumination would supply the entire city. From 300 to 400 or more street gas lamps will be displaced by the electric lamps now in operation.

THE TELEPHOTOGRAPH.

An apparatus has been devised by Mr, Shellford Bidwell which he calls the "telephotograph," and which, though still crude, makes an important step forward towards a solution of the problem of transmitting images by electricity. The instrument is described in the *Iron Age* as follows: The positive pole of a battery is connected, through a set of adjustable resistance coils, to a platinum stylus which rests its marking point on a plate of zinc, covered with a sheet of paper moistened with a solution of iodine of potassium. The circuit of the battery is completed through a galvanometer by a wire from the zinc plate to the negative pole of the battery. This is the receiving part of the apparatus. The transmitter consists of a second battery, the negative pole of which is connected to the platinum stylus through a sensitive selenium cell, the circuit being completed also through the zinc plates and the galvanometer. Now, if the selenium cell be exposed to a strong light, or, in other words, if a beam of light be focused on it, and the variable resistance be so adjusted that the opposing currents in the two battery circuits exactly neutralize each other, no current will flow from the stylus to the plate across the iodised paper, and hence no stain of liberated iodine will mark the paper if the stylus be drawn across it. But if the light be shaded off the selenium, the resistance of the latter will increase, and the current from the first battery, will, therefore, predominate, so as to cause a flow of electricity down the stylus. When the stylus is drawn across the paper it leaves its trace as a brown mark of liberated iodine; and this trace is strong or faint, according as the current is strong or feeble—that is to say, in proportion as the light is less or more intense. The galvano-metre serves to indicate when the balance of currents is exact; and the connecting wires which correspond to the telegraph line between the two stations, where the transmitter and receiver are placed, may of course be of any length. With an apparatus having substantially these elements, Mr. Bidwell, before the physical society, succeeded in transmitting simple designs.

Natural History.

THE STAG BEETLE AND CHAMPION BEETLE.

The common stag beetle (*Lucanus servus*) must have been known to the ancients, for Pliny says in one of his books on natural history: "Beetles (he calls them scarabei) have hard covering over their feeble wings, but none of them have a sting. There, is, however, a large family, which have horns, on whose points are two-pronged forks, which can be closed at will and are capable of pinching. They are hung on the necks of children as a charm." Rigidius calls them Lucanus. Moufet, who, in his "Insectorum sive Minimorum Animalium Theatrum," has collected with great industry all that was known about insects up to his time, describes the stag beetle, but believes that the same description will apply to the female; while Aristotle asserts that in insects the males are always smaller than the females. Now every boy who is acquainted with beetles and lives in a region abounding in oaks, where the stag beetles make their appearance, knows that those having horns are males, while the females have simply short curved mandibles in no way conspicuous. The most recent observations on other kinds of stag beetles have taught us that according to the scanty or abundant nourishment of the larvæ, the beetles turn out small or large, and this is especially true of the males. The horn-like mandibles of the smaller beetles through small development confers upon the whole beetle a changed appearance, in comparison with a fully developed one. We may, therefore, see in a single family medium and smaller forms, without bestowing on them special names, as in earlier times.

The stag beetle is the largest of the European beetles. The male has enormous horn-like jaws or mandibles, the tips being armed with antler-like projections, slender antennæ, the upper lip is bent downward, and the tongue is deeply slit. The color is a dull black, the wing covers and horns are a glistening chestnut brown.

In June these beetles are found in the oak forests, where on beautiful evenings the males fly with a loud humming noise about the tops of the trees, while the females keep themselves concealed. In the day-time they run among the dry leaves on the ground and betray their presence by their rustling, or they sit on the bleeding trunks of the oaks and lap up the sap. Chop gives an interesting account in his "Garten-laube" of their behavior at these feasts.

In June, 1863, while lying under the cooling shade of an old oak tree on a very warm afternoon, a peculiar rustling sound attracted his attention. A soft snapping or grating was heard at short intervals, as if small dry twigs were being broken. Shortly a blackish object fell from the tree to the ground; it proved to be a stag beetle, which he found after a long search in the act of creeping up the rough bark again. The rustling did not cease, and when the observer looked upward he saw, seven or eight feet up the trunk, a peculiar brown mass. In the course of half an hour eleven stag beetles, of both sexes, had fallen down one after another, and because the crackling sound was still heard Chop procured a ladder in order to examine this remarkable appearance. A curious sight met his view. Upon a small surface the sap was flowing down from the old bark. To this dainty meal a very mixed company of insects had invited themselves as guests.

Large ants climbled busily up and down, dainty flies of all kinds sat together in crowded heaps, and hornets swarmed fiercely humming around the trunk. But the most conspicuous guests were undoubtedly the stag beetles. There were twenty-four individuals of them counted, those already captured not being reckoned. They played apparently the most important character at this banquet, and in spite of the sweet food did not seem to be in very good humor. Even the bold hornets avoided coming too near the powerful nippers of their clumsy companions, and held themselves at a respectful distance. The beetles fought a furious battle with one another, and certainly two-thirds of them contended together. The females, with their short, strong teeth, angrily bit each other in their struggle for the food. The contest between the males was especially interesting. Their horns were interlocked and projected over the neck shields of their antagonists, and they fought furiously together until one of the combatants dropped to the ground from sheer exhaustion. Sometimes a skillful fighter would succeed in seizing his opponent about the body, and with his head erected let him struggle in the air for a little while, and finally drop him. The observer, although near, was unnoticed, the fighters struggling

Continued on page 190.