

of the unsatisfactory oil lamps a quantity of brilliant incandescent lamps illuminate every corner of the car, so that it is as easy to read by night as by day. The light in its satisfactory qualities compares with gas. The element of safety is also of importance. The danger of fire is the greatest dread attaching to a collision or upset of a train. This danger is greatly increased by kerosene lamps, and it is far from certain that a high pressure gas reservoir may not be an element of risk in a disaster of this class. The electric light would seem the safest of all. The danger of the production of an arc is certainly quite remote. The first action of a collision would be to break some of the electric light leads and cut off the current entirely. It would be very exceptional for the conditions for an incendiary arc to be brought about. At the same time, this is among the possibilities.

The electric light leads are connected between the cars by an extremely simple arrangement. Two half cylinders, whose faces form the contact plates, are held together in a spiral spring socket. This secures them so that no shaking can detach them; while a direct pull, as by the cars uncoupling, will draw them apart without injury. For the steam coupling a species of union or faced joint is employed, held together by a screw and yoke. The joint is a metal to metal one, packing being dispensed with. It is so well made that the faces can be turned or twisted upon each other while the steam pressure is on without an escape. A self-acting plate or valve drops over and above the opening when the line is uncoupled, to exclude sand and dirt. This coupling is of the simplest description, and does away with one of the difficulties of the problem.

The plant we have illustrated is now at work on one of the trains of the Connecticut River Railroad. It forms at least an interesting study of the subject of car lighting, and in its combination of storage batteries and dynamo indicates a distinct step in advance. Sooner or later the electric lighting of cars, like the block system of running trains and safe car heating, must be introduced on our leading roads. Once introduced, they will have come to stay.

A New Heat Measurer.

Mr. C. Vernon Boys exhibited an instrument which he terms the radiometer to the Royal Society, March 24. The instrument is a modification of one invented by M. D'Arsonval, and consists of a minute thermal junction forming one side of a parallelogram of which the other three sides are of copper. This thermo-electric circuit is suspended between the poles of a magnet. It is evident that when radiant heat falls upon the thermo-electric junction forming one side of the parallelogram, an electrical current is formed which turns in the magnetic field, where it is placed so as to include the greatest number of lines of force. The parallelogram made by Mr. Boys embraced one square centimeter. The thermo-electric junction consisted of a bar of antimony and of bismuth, each piece being 5x5x1/4 mm., soldered edge to edge. The circuit was supported by a torsion fiber and provided with a little mirror. With a magnetic field of only 100 units the instrument showed the heat which would be cast off a halfpenny by a candle flame at a distance of 1,168 feet. With a stronger magnetic field the instrument is capable of a much greater sensitiveness. The author calculates that an instrument can be made which would show a change of temperature at the junction of 1/100000 of a degree of heat. Mr. Boys also showed a motor which consisted of a cross, the center being antimony and the arms bismuth. To the ends of the arms are soldered four copper wires, the three ends of which are joined by a ring of copper. When the spark from a blown-out match is held near this arrangement, it rotates rapidly. If the spark is held on the right-hand side of the north pole, the motor revolves indifferently in either direction. If the spark is held on the left-hand side, the motor stops. "We have, therefore, an electro-magnetic motor which goes having neither sliding nor liquid contacts."—Nature.

The First Lightning Rod.

If we are to believe an Austrian paper, says La Lumiere Electrique, the first lightning rod was not constructed by Franklin, but by a monk of Seuffenberg, in Bohemia, named Prohop Diwisch, who installed an apparatus the 15th of June, 1754, in the garden of the curate of Prenditz (Moravia). The apparatus was composed of a pole surmounted by an iron rod supporting twelve curved up branches, and terminating in as many metallic boxes, filled with iron ore and closed by a boxwood cover, traversed by 27 sharp iron points, which plunged at their base in the ore. All the system was united to the earth by a large chain. The enemies of Diwisch, jealous of his success at the court of Vienna, excited the peasants of the locality against him, and under the pretext that his lightning rod was the cause of the great drought, they made him take down the lightning rod which he had utilized for six years. What is most curious is the form of this first lightning rod, which was of multiple points like the one which M. Melsen afterward invented.

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(Illustrated articles are marked with an asterisk.)

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RESTRICTED IMMIGRATION.

It is agreed all around that unrestricted immigration is becoming too much of a good thing for this country, and that the immigration laws should be thoroughly revised, with the view of regulating the coming of foreigners to our shores. The reasons urged against unrestricted immigration are, first, the great increase of crime which is directly traceable to that element in our population proved to be alien to our institutions and unused to our atmosphere of liberty. The statistics collated by Rev. Frederick H. Wines indicate an alarming increase of crime ever since immigrants began to come from Europe in great numbers. This authority has made it pretty evident that in seven States, containing nearly 15,000,000 of the population of the United States, there has been a proportional increase of commitments to State prisons and penitentiaries, from 1820 to 1880, vastly greater than the growth in population.

In New York City, where immigrants delight to herd together, instead of going westward, the police last year made 74,035 arrests, which gives 1 arrest for every 20 persons. Making allowance for those who were arrested more than once, we can still assume that 1 out of every 25 was arrested last year; while the number of persons who had committed crimes but have escaped the clutches of the law is not known. This is a record that should move the serious attention of every patriot to a consideration of an efficient and speedy remedy.

Secondly, the increase of the death rate in the United States, and especially in New York, is said to be largely due to unrestricted immigration. Dr. Eklund, of Stockholm, makes the startling statement that the infants dying under one year of age in the United States average fifty per cent of the number born, while in Europe the death rate of infants under one year of age is twenty-five per cent of all deaths. He attributes this high death rate in America to the fact that "the European defective classes, whose natality and infantile death rates are enormous, are forcibly exported in great numbers to this country."

The Medical Record virtually indorses his statement by acknowledging that "it is very true that the numbers of our sick and defective classes are enormously swollen by the immense tide of immigration. It is safe to say that four-fifths of the infant mortality is among the children of the immigrants."

Thirdly, it is said in favor of restricted immigration that the immigrants' opportunity for getting employment is now less than it was fifteen years ago, when there was much railroad building and great industrial expansion. This is not so easily proved as the first two statements. For it is absurd to say that a man's opportunity to obtain work is less now because fewer railroads are in process of construction, when there is plenty of capital lying idle waiting for good investments, and an immense tract of country ready to receive the plow of the sober and industrious husbandman. The reason why a laboring man has not the same chance to make a living now as he did fifteen years ago is because of the disturbances in the labor market—the strikes, the boycottings, and the attacks on others' right to work, of which labor organizations have been guilty. The fault, then, lies in the character of workingmen themselves, and not in the supposed industrial decline of this growing country. But, as the lately arrived immigrant is generally the most discontented of laborers, the conclusion is easily reached that unrestricted immigration is chargeable with most of the labor troubles, which have resulted disastrously for laborer and capitalist alike, although the latter can stand it much longer than the former.

In view of these facts, there can be hardly any difference of opinion concerning the necessity of building a breakwater to resist the tide of immigration by legislative enactments and rigorous execution of the same. But in regard to the minor details, the modus operandi, there is likely to be much diversity of opinion. We do not wish to exclude those industrious and sober people whose intention is to seek honest work in America. On the other hand, Uncle Sam decidedly objects to having his substance eaten up, and the safety of his house threatened by organ grinders, beggars, tramps, socialists, anarchists, and other parasites of society. We must draw the line somewhere. It is not hard to determine where we ought to draw it, but how to make the rule work is another matter. It would be the wiser part to leave the details to those who have given the subject the most careful consideration. We would simply and humbly suggest that our consular service can be expanded so as to include among its duties that of ascertaining and certifying to the condition, character, and intentions of all who desire to come to America in the quality of immigrants.

BRITISH NAVAL MANEUVERS.

The recent maneuvers of the British fleet did little to encourage those who pin their faith to monster ships and heavy armor. Indeed, even the unbelievers in this type were scarcely prepared for the sorry spectacle presented by the mightiest fleet afloat, for in the Irish Channel, where Admiral Baird essayed to defend the shore line against the assault of Fitzroy, and again in the English Channel and North Sea, when Hewitt