

that the metal sleepers will last sixty years or six times as long as the wooden ones.

In the science of iron-making, while a few years ago the United States did not produce annually one-fourth as much iron as Great Britain, the American produce now exceeds that of Britain by 2,000,000 tons annually. In blast furnace practice Americans are far ahead. In Great Britain the output of one stack does not appear to exceed 750 tons per week, while in the United States in some cases 2,000 tons have been run from one furnace in a week.

The progress in telegraphy, telephony, electric light, etc., is shown from the fact, that by the multiplex system of working six messages can now be sent along a single wire instantaneously in each direction. The length of conducting wires laid in England for public telegraphic purposes is 174,633 miles, and the number of instruments is 13,740. In London 5,750,000 messages, and in Great Britain 66,500,000 messages were received in 1890. Speech had been maintained with perfect clearness by telephone between London and Paris, a distance of 311 miles. There are about 48,600 miles of submarine cable now in use.

The advances made in sanitary engineering are, perhaps, best shown by the statement that, owing to improved drainage in London, the death rate has decreased from a mean of 24.8 per 1,000, during the decade ended 1850, to 22.5 in that ended in 1880, and to 21.4 in 1882, while during the past eight years it has averaged 19.52 per 1,000.

The list might be indefinitely added to, but the above indicates the rapidity with which the world is moving forward.—*Iron Trade Review*.

#### UNION TRADE MARKS.

THE Supreme Court of Pennsylvania last week handed down a decision, which has brought out considerable comment and denunciation from trade unionists. This was in reference to trades union ownership of trade marks. A branch of the Cigarmakers' International Union, in Lancaster county, by bill in equity restrained a cigar manufacturer from using the union label on his goods. The manufacturer then proceeded to issue a similar trade mark and appealed to the Supreme Court. Judge Williams reversed the decision of the lower court. He held that the Cigarmakers' Union, formed for the "mental, moral and physical welfare of its members," is a personal and social organization, not a commercial one, and so, under the law of Congress, cannot own a trademark. In his decision Judge Williams very clearly outlines the object of trade unions in adopting labels. He says of the case in point:

"This is an attempt to use the public as a means of coercion, in order to find a market for their goods or labor. A first-class workman is one who does first-class work, whether his name is on the rolls of any given society or not. Filthiness and criminality of character depend on conduct, not of membership of the union. Legitimate competition rests on superiority of workmanship and business methods, not on the use of vulgar epithets and personal denunciations. The International Union in this case has an avowed purpose to do harm to non-union men; to cover them with opprobrium, and they ask a Court of Equity to say they have a right to do it. We decline to say so."

The sentiments quoted above have been denounced by the labor press, and the decision itself has been termed an invasion of the right of trade unions. To the unprejudiced observer, however, it is plain that labor organizations in their rules regarding trade marks and labels, often show a decided disposition to invade the rights of others in the same line. In the case mentioned, the union declared that all goods not bearing its label were of inferior workmanship. This was plainly unjust to the workers not in the union, and brought forth the straight and strong statement made by Judge Williams. If a trade union wished to place some distinguishing mark upon goods made by its members the right to do so is unquestioned, but when that mark is used as a means of stigmatizing all workmen outside of the union lines, the law calls a halt.—*American Manufacturer*.

#### CONTINUOUS RAILWAY BRAKES.

A RETURN on the subject of Continuous Brakes furnishes in satisfactory evidence that the time is rapidly approaching when the only effective mode of readily stopping a train will be use all over the United Kingdom. The act for the Regulation of Railways passed in 1889 rescued the Board of Trade from the undignified position of continually recommending without the power of enforcing. The continuous brake is now becoming obligatory,

and at the close of last June was in use, in its most approved form—of which there are nominally three varieties, but practically only two—on eighty-six per cent. of the vehicles running in passenger trains. Including half a dozen continuous brakes which appear to comply with only some of the conditions laid down by the Board of Trade, the proportion of carriages thus fitted amounts to ninety-six per cent., subject to some deduction for partial fitting. Six years earlier less than half the passenger carriages possessed the approved brake, but it is remarkable that nearly one-third were fitted with a continuous brake of an imperfect description, thus making a total of seventy-nine per cent. The imperfect brake has, therefore, been giving way to the approved type, its present proportion being only ten per cent. Doubtless the least effective of the continuous brakes far excels the old system of a brake in the guard's van. But the weeding out of the isolated brake is to be followed—unless in some few cases of little importance—by the disappearance of all those continuous brakes which fail to comply with the requirements of the Board of Trade. The expense of this change is doubtless considerable, but it carries with it many advantages which may be held to compensate for the outlay. It is obvious that when a train can be kept well in hand the risk of accident is diminished, especially where the traffic is crowded and the speed is high. Even when a mishap occurs—as in the recent case of the Brighton express, at Norwood Junction—the instant application of an effective brake often reduces what might be a colossal disaster to one of comparative insignificance. How promptly a continuous brake can be made to act is shown by some particular cases mentioned in this return. In one instance a driver pulled up within half a yard of a party of children who would infallibly have been run over had the brake been other than one of the best. But to most good things there is some drawback, and there are instances in which continuous brakes have proved troublesome, delay in the working of trains being caused by some defect in the action of the apparatus. This has not always been the direct fault of the brake, but has occasionally been due to neglect or inexperience on the part of the Company's servants. Of the general value of the invention there can be no doubt. It is now fully recognised in England, it is being learned by our Continental neighbors, and it is evidently destined to be universally used.—*London Standard*.

#### LIGHTNING RODS.

In the *Electrical World* is an article by Elihu Thomson on the use of lightning rods and how best to arrange them. As the subject is one of vast interest to all, we quote as follows:

The following queries were sent out by one of the metropolitan journals:

Do lightning rods really afford any protection?

What is the nature of the electrical discharge?

What is the correct theory of its cause?

What is the correct theory of the action of lightning rods? Should they be insulated or not?

Does their effectiveness depend on their cross section or surface?

Do you agree with the ideas advanced by Mr. N. D. C. Hodges in his paper on this subject, read before the Institute of Electrical Engineers, April 21st, and reprinted in part in the *Electrical World* of May 2nd.

In regard to the utility of lightning rods I think there can be no question that a properly constructed and arranged lightning rod will afford complete protection of buildings from the effects of lightning discharges. In the first place, in my opinion, the lightning rod, contrary to the opinions put forward and even advocated in the books, does not have any considerable effect in conducting off discharges from the clouds silently, for the reason that the development of the conditions of the discharge from the cloud to the earth is oftentimes too sudden to allow any rod or rods to effect this work of conduction in a silent manner. The cloud ordinarily during thunder storms is moving rapidly and the lightning strokes are found most frequently where the densest rain exists, and it is easy to see that a building may suddenly be drenched with rain and the conditions for a stroke brought about at such a rate that a lightning rod or rods could not ward off a discharge by conducting the electricity silently to the earth. In such cases what is more likely to happen is this, that the highly charged cloud existing over the neighborhood of the building provided with a rod will, if the conditions are favorable, suddenly discharge itself into the rod and the discharge be thus carried to ground. On the same reasoning it must be admitted that the presence of a lightning rod may, and perhaps often does, conduce to a building being struck by lightning, but it is much better to have the building struck a number of times