world. The Gramme, Siemens, Edison, Brush, Wallace, Farmer, Weston, Maxim, and other machines of establisned merit. Then came the great arc-lamps, each of which has its special claims, the Siemens, Brush, Wallace-Farmer, Weston and Thompson & Huston. The Incandescent system of lighting and the Storage Battery or Accumulator are also there in great force, the first displaying extreme beauty and perfect steadiness of action, while the second illustrates what may be done for the lighting of street and railway cars, where it is not convenient to have the Dynamo erected and supplied with steady power. In the early days of Electric lighting, men thought themselves fortunate to get one arc light from one horse-power. Now, there are many machines exhibited which give the same volume of light for an expend ture of ·9, ·8, and even ·6 or about one half a horse-power.

In his presidential address to the British Association, Dr. C. W. Siemens suggested the adoption of a method of calculating electrical horse-power by multiplying the quantity of current by its strength, in terms of "Amperes" and "Volts." Thus, the current is multiplied by the electromotive force and the product gives the horse-power consumed in the lamps on the circuit. The unit of horse-power, Siemens has called "Watt" in honor of James Watt, the inventor of the steam engine. To illustrate, for the benefit of business men, we submit the following. Suppose a ten-arc-light plant to be in use in a saw mill or a skating rink, each lamp giving about five hundred candle power; the dynamo machine giving a current of 15 Amperes, and the consumption of Electromotive force per lamp being thirty-eight volts then

$$\underset{\text{C.}}{15} \times \underset{\text{V.}}{38} \times \underset{\text{W}}{10} = \underset{\text{W}}{5700} = \underset{\text{H. P.}}{7{\cdot}788}$$

horse power, 746 of these volts are equal to one horse-power.

In these exhibitions the business man has to determine for himself which is the most economical system to adopt from among the many which solicit his vote and patronage. The judges at these exhibitions have to decide not merely the steady quality of light but the cost of producing it. Besides this useful method of calculating power consumed in the circuit, there is another consumption of energy not yet noticed. Machines consume mechanical force before electrical energy is given out in the circuit, and this has to be reckoned and added to the electrical horse power consumed in terms of "Watt" A machine may consume, according to its size and lighting capacity, from ·5 to ·6 horse-power. Some machines consume much more than one-horse power per lamp for arc lighting currents running from 15 to 30 Amperes and from 35 to 45 Volts of Electromotive force.

The jurors will also determine the efficiency of arc lamps. Among the points to be considered in an arc lamp are: the simplicity of its mechanism, its efficiency as an electrical machine and the strength and steadiness of its light by photometric tests. When lamps are not steady their resistances vary, and as a consequence the consumption of the electromotive force will vary also. Resistance of lamps will vary within the length of the arc; and the business of the electrician is to work out the most efficient lamp he knows how to produce. There are many lamps of good make, but comparatively few of them are economical in their working results. Some of these even have the misfortune to be associated with a dynamo machine which is not economical; and thus it happens that many well-known systems of electric lighting before the public are about equally balanced in their commercial results.

We have no means of knowing on what basis the jurors will make their awards, but it seems just that the consideration of public safety ought to have some weight with them. It is but fair to state that where conductors are carried through the streets there should be some limit to the number of lamps on one circuit. From a machine giving a continuous current, the danger from a forty light circuit is not large; but with intermittent, and especially with alternating currents, the case is different. It is an important matter for cities to decide how electric light conducting wires shall be carried through the streets with due regard to public safety. We may expect that the Vienna Exposition jurors will aid in solving this question.

TRADESMENS' VIEWS OF LABOR.

The Trades and Labor Council of Toronto objects to some features in the emigration policy of the government, and to some things which that policy does not contain. Against pauper immigration a protest is uttered. Paupers are not invited by any body, if by that phrase is meant persons unable to make a living by their labor. But idleness is sometimes involuntary, and many a man who has received parish relief in the old country, would have maintained himself, even there, if he could have got work, and would have no difficulty in doing so here. The term "pauper" as applied to immigrants, needs to be used with precision. There must be in Canada and the United States a great many well-to-do people, who received parish relief on the other side of the water. Helpless poverty and vicious idleness should be kept where they are bred, not sent here; but paupers able and willing to earn their own living, if they get a chance, are not to be shunned as lepers.

If, as the Council states, there are at present more mechanics in the country than can make living wages, it would be folly to invite more. If other countries are willing to pay for sending away surplus labor, it would be folly in us to pay anything to entice here labor for which we have no present need. But what the Trades and Labor Council gives out as facts, where the interests of its clients are concerned, should not be accepted without scrutiny. The Council desires to lessen competition among mechanics. The North-West will be able to absorb a large number of agricultural laborers. But there is a limit, fixed by the capital available for their employment. They must either find some one to employ them or have the means to start on a free homestead on their own account. In either case, it is a question of capital, more or less. The tendency of wages is said to be downwards; and this, we think is true. It would be a good thing if farmers would build laborers' cottages, with a bit of land around them; but we can hardly say we have any well-founded hope that they will, in this particular, take the advice of the Council. It is a pity that they have done so without outside solicitation.

AN ARBITRARY OFFICIAL.

The action of the Massachusetts Insurance Department in the case of the Union Mutual Life Insurance Company of Maine, has called forth a burst of indignant comment from many respectable journals in all parts of the Eastern States and New York. The present occupant of that office in the Commonwealth, Mr. Tarbox, was appointed recently by Governor Butler, and at once proceeded to "magnify his office" by making it warm for outsiders doing business in Massachusetts. Among the outsiders which he examined were the City of London Fire, a French Insurance Company, a Pennsylvania Plate Glass Co., and so on. But the latest outsider to come under his eagle eye was the Union Mutual, which he has refused to allow to do business in the Bay State. The circumstances are thus described by the Boston *Advertiser:*

"The solvency of the company, or its ability to satisfy the Massachusetts law, is not now the question. The whole matter lies in a single brief sentence. Mr. Tarbox ordered the company to turn over its books and papers to Mr. Plympton, when these books and papers were undergoing examination by the Maine Commissioner; the Company could not comply, but did not refuse, and Mr. Tarbox cut off the company from Massachusetts business. Our officious Commissioner proceeded from the very beginning as though he meant to have trouble. His original orders implied suspicion of the company's real estate investments. His dealings with the Maine Commissioner were discourteous, and inevitably created ill-feeling. His final order to Mr. Plympton to proceed with the examination was an insult both to the Commissioner and to the company. The law of Maine requiring an an examination is as binding and as much entitled to respect as is the law of Massachusetts."

Although such precipitate and arbitrary action by a State officer is well calculated to arouse distrust of the company in the minds of those who learn only the bare fact of the revocation of its license, there is abundant evidence that the Union Mutual is in every way sound. But the mixing up of politics in such functions as those of the supervision of insurance is likely to lead, as in this case it has led, to grave injustice. We learn that President DeWitt of the Union Mutual Life, has requested Insurance Commissioner Smith to invite the Commissioners of such other States as he may see fit, to join with him in the examination into the affairs of the company now in progress.

THE STANDARD FIRE WINDS UP.

Since our last issue, it has been decided at a meeting of Directors of the Standard Fire Insurance Company, to withdraw from business, and to wind up the affairs of that company. The competition of larger companies, and the expense of procuring business, are among the causes which have led to the step on the part of the Standard. The sudden departure of its late president, too, was of evil moment to the company, even