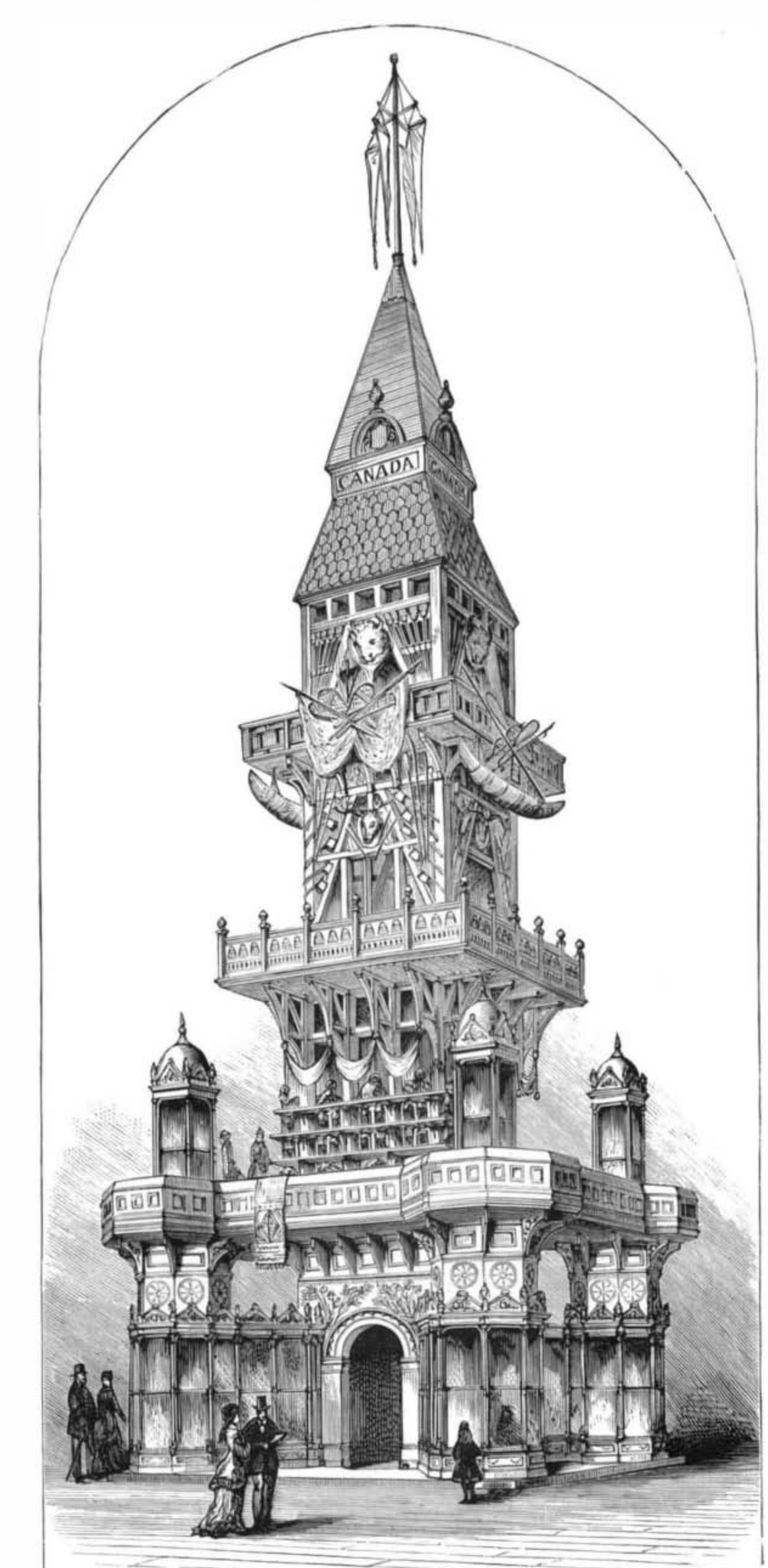
M. CLAUDE BERNARD.

M. Claude Bernard, whose portrait we present herewith, is justly entitled to the credit of having raised physiology to the dignity of a separate science. He it was who proved that the infinite variety of functional phenomena, with relation to the endless diversity of organic forms, is based on fundamental truths, which collect on common ground all living things, without distinction of classes or orders, whether vegetable or animal. The liver, he showed, made sugar the same as does the fruit; beer yeast is subject, the same as man, to anæsthesia when submitted to etherized vapor. For the physiology of animal mechanism he showed that anatomical deductions are insufficient and often erroneous; and that experiment only can conduct to certainty. The rules of such experimenting, he demonstrated, are the same in the sciences of life as in those relating to inanimate bodies, and that there are not "two contradictory natures, giving place to two orders of opposite sciences." He pointed out that the experimental physiologist not only analyzes and demonstrates, but dominates and directs, and that he may be a "conqueror of nature" as well as the chemist or the physicist. M. Bernard died in February last at the age of 65 years.

M. CLAUDE BERNARD.

THE CANADIAN TROPHY AT THE PARIS EXHIBITION.

This beautiful structure is erected under the northwest dome of the Exhibition Building in Paris. On entering the principal doorway from the left bank of the Seine, one finds one's self in a magnificent transept, over 800 feet long and about 80 feet wide, divided in the center by a tower 80 feet square, and at each end are towers covered by domes 111 feet square. The ceilings and walls of this immense transept and its domes are profusely and gorgeously decorated with mouldings, gilding, and carvings. It is probably one of the largest and richest galleries ever erected. Here the trophy is being put together. It is in the form of a tower, with a high pitched roof. The base occupies a space 30 feet square, from the center of which rises the main framework to a height of about 100 feet. This height is divided into four stages. From the angles of the framework, on the ground level, handsome glass cases radiate, designed for the exhibition of manufactured goods. The remaining three stages have projecting galleries, supported by ornamental brackets. These galleries will contain the productions of the mines and forests. Access to them is obtained by means of a circular wooden staircase of novel construction in the center of the trophy. The roof is divided in the center of its height by a band, on which the word "Canada" is cut out in fretwork. The roof is covered in part with slates and in part with shingles and bark. The exhibits will be so arranged that the framing timbers, which are of red pine, will be left exposed to view. The woodwork will be finished in oil, to bring out the natural grain of the wood, so that visitors may examine specimens of the different timber grown in Canada. We are indebted to the London *Illustrated News* for our engraving.



THE CANADIAN TROPHY AT THE PARIS EXHIBITION.

Dry Plate Developer.

When a dry plate is coated with a preservative principally or entirely consisting of gallic acid, it can be rapidly developed by the following solution: Distilled water, 100 c. c.; crystallized silver nitrate, 4 grammes; acetic acid, 4 grammes. Place the plate, film downwards, in a trough of rain water, so as to moisten the whole of the film without unequally removing the preservative, then pour all over it the above solution; the picture will quickly appear, and will generally be completely developed. It must be carefully watched, and washed as soon as it seems to be sufficiently intense.

All photographers who are in the habit of developing dry plates have observed that when too much silver nitrate has been added to the developer, the intense blacks of the negatives were riddled with small holes. The formula which I have given above does not produce this result, even though the proportion of nitrate be much larger; the reason of this apparent paradox I am not in a position to explain.

I have only tried this developer with stereoscopic positives on albumen or albumenized collodion, and I am bound to add that I have obtained very unequal results. I therefore introduce it to public notice with some hesitation, though I believe that by washing off the preservative and by modifying the proportion of the ingredients, a very rapid and energetic development will be obtained.—*M. Queval, in Bulletin Belge.*

Swiss Double Postal Cards.

We are indebted to M. Adolphe Eggis, of Fribourg, Switzerland, for a specimen of the double postal cards which have been in use in that country for more than a year. The material is paper of the same quality, but a little lighter than that of the postal cards of the United States. The card is folded into two leaves, which may be separated at the crease, each of which is $5\frac{1}{2}$ inches long by $3\frac{3}{8}$ inches wide—a size considerably larger and more serviceable than that of our postal cards. The printing on both cards is the same, and each has a five centime stamp, that on the return half of the card of course remaining uncanceled until remailed.

Bursting of Hose Pipe—A Remedy Wanted.

The bursting of hose pipe at fires is about as common an occurrence as a fire itself, and even more so, for not unfrequently it occurs several times at one fire, thereby causing a much greater destruction of property than would otherwise have happened. This was especially the case at the late fires in New York and Philadelphia, where the loss of hundreds of thousands of dollars' worth of property was wholly attributable to the bursting of the hose. And the great loss from that source has led the people of these cities, through their representatives, to call for a most thorough and rigid investigation into the quality of hose used, expecting thus to find a remedy. Undoubtedly some progress may be made in that direction by using a very superior article of hose, but as it will be impossible to ascertain what pressure it required to burst them, very little information of a satisfactory character will be attained.

This is a subject that has long engaged the attention of both firemen and mechanics, and various remedies have been suggested and various devices used, many of which were probably in the right direction. As yet, however, they have failed to accomplish the desired result. Among the most important of these improvements has been the introduction of a relief valve at the engine pump, to relieve the working pressure when it should exceed that required. This improvement has undoubtedly saved thousands of feet of hose and many thousands of dollars' worth of property. But still the bursting of hose goes on, and still the invisible foe remains, and is no respecter of persons or of hose. Whenever or wherever his forces are concentrated, a rent is made, the pipe is burst, the fires burn on unchecked, until another pipe is laid to take its place, when, far too soon, it shares, perhaps, no better fate.

Thus far, then, the problem remains practically unsolved, even by those who heed it most and understand it best. Several years ago the writer was called upon to aid in the perfection of a relief valve for fire engines, to prevent the bursting of hose pipe, when he discovered that it was only "locking the stable door after the horse had been stolen," for before the valve would be called upon to act, the mischief would be done—the pipe would be burst. It was not the static pressure consequent upon the working of the pump that burst the hose, for it will require usually more than double the pressure necessarily used in the pipes to cause them to burst. From these facts we are led to the conclusion that the static pressure is not the force that bursts the hose. Consequently, as that is not the real cause, a relief valve at the pump cannot be a certain remedy, though it may be useful and important as a relief from an over pressure, and to that extent valuable. If, then, as shown, it is not the static pressure that bursts the pipes or hose, what, then, is it, for the pipes are burst? It is the accumulated energy of the rapidly moving water within the pipe, backed by the static working pressure of the engine pump, and unless relief can be had at or near the point where this force is concentrated, the pipes, although abundantly strong enough for practical use, will not stand such concentrated force, and must necessarily yield to it. This force, under certain circumstances, becomes immense, and as water is a non-elastic substance, its whole energy is thrown upon some particular point of the pipe. The real wonder is not that the pipes frequently yield to its immense power, but that they stand it so well.

To illustrate more fully this power, let us take, for example, a pump working under a pressure of one hundred pounds per square inch of area, and forcing water through a pipe one hundred feet in length, with a moving velocity in the pipe of, say, thirty feet per second. The accumulated power of this water equals its weight multiplied by its velocity per second, and backed up by the static pressure of the pump. As the pump pressure equals one hundred pounds per square inch, the accumulated force of a body of water one hundred feet long, one inch square, equals 44·4 lbs. $\times$ 30 = 1,332 lbs. + 100 lbs. of pump pressure, = 1,432 lbs., the force that would be concentrated on the pipe. Should the pipe be straight and the flow of water instantly impeded, under such circumstances what pipe would stand the pressure? But as this, even, may not be the limit of this power, it must be apparent to every one familiar with this subject that pipes ever so well made must continue to burst unless relief can be had at or near the point where the flow of water is stopped, for the whole momentum of the water will be spent on the pipe before a relief valve at the engine would come into action. But a relief valve in each hose coupling would afford a relief once in every twenty-five feet, at least, and with relief valves thus arranged the bursting of pipe of reasonable strength would be nearly if not en-