

shows that the American duty on Canadian lumber deprives the States of a large trade in manufactured lumber with the West Indies, South America, the Cape of Good Hope, Australia and other countries, which they carried on when, under the reciprocity treaty, Canadian lumber was imported free of duty. Whether Mr. Wells will be able to convince his countrymen that they ought to change their commercial policy towards Canada is the question. He is perfectly correct in stating that for the present state of commercial antagonism between the two countries, Canada is in no way responsible.

THE TELEPHONE.

The introduction into Canada of this latest wonder of electricity renders *apropos* a few words descriptive of the invention and bearing upon its probable utility.

The apparatus of Professor Bell is remarkable for its simplicity as well as for the results obtained from it. It consists of an ordinary horse-shoe permanent magnet, to the ends or poles of which are attached small electro-magnets. In front of the cores of the latter, and as close to them as possible without touching, is a disc of thin sheet iron. To complete the apparatus there is a mouth-piece, to concentrate the voice directly upon the disc, the whole being suitably enclosed in a shallow box about five by nine inches; on the outside is the mouth-piece and also a couple of screw cups in connection with the wires of the electro-magnets, to which the line wires are to be attached.

The action of the whole may be described as follows, plain and untechnical terms being used for the benefit of the general reader: At each end of a short telegraph line, say, for instance, a mile or two in length, is the machine above described; the telegraph wire is attached to one of the screw cups, and a wire connected with the earth to the other, as in an ordinary telegraph line. The speaker, with his mouth within an inch of the tube, speaks into it; at the other end the listener presses his ear close to the tube of his instrument; the speaker's voice causes the iron disc to vibrate more or less rapidly according to the pitch of his voice; these vibrations create an electrical excitement in the electro-magnets, it being a law that any change of the magnetic condition of the space near or within the helix of an electro-magnet induces in it a current of electricity. Thus when the voice imparts a vibrating motion to the disc, electric currents are produced corresponding in rapidity to the vibrations. These currents are transmitted over the line, and on arriving

at the other end affect the electro-magnets, which attract the disc and so produce an exact repetition of the vibrations caused by the speaker's voice at the end where he is placed, and his exact tones and words are reproduced to the listener's ear, sounding as if coming a long distance through a tube. The speaker can be recognized by those familiar with his voice. Music from a piano is transmitted very clearly and distinctly, sounding faint and distant, however; so also with whistling and similar sounds.

Several telephonic re-unions have recently been held at the offices and houses of our telegraphic friends which were connected by wires for the purpose, and the results cause considerable astonishment and delight. The particular fact that strikes the flective mind most forcibly in connection with the telephone is that a disc of thin iron is capable of reproducing the human voice, musical notes and other sounds, by being merely caused to vibrate.

Opinions are divided with regard to the usefulness of the telephone. The majority present on the occasions referred to appeared to think, so far as we can learn, that while it is a wonderful and astonishing invention and a great scientific triumph, the instrument has hardly yet been made sufficiently perfect for every day and business purposes. At present, it is necessary that there should be perfect quietness to enable one to hear it, owing to the low tone in which the speaker's voice arrives. However, this is a question which experience alone can determine, and whatever drawbacks may now be found to its practical utility are likely, in time, to be overcome.

The earliest experiments in reproducing sounds at a distance by electricity were made in 1861 by Phillip Reiss of Germany. The results then obtained were sufficiently encouraging to stimulate others to continue the investigation of the science of sound and its reproduction at a distance by the aid of electricity. It is gratifying to us as Canadians to be informed that Professor Bell, the patentee of the telephone, is a Canadian, hailing, we believe, from Brantford. He has for some years held a chair in a Boston University as professor of acoustics, and has made the telephone a special study.

Several American electricians, notably Elisha Gray, of Chicago, and Edison, of New York, have been experimenting for several years with a view to discover a method of applying the reproduction of musical sounds by telegraph to ordinary business telegrams, and have so far succeeded as to be able to transmit *simul-*

taneously from eight to sixteen musical tones. If this can be done in a satisfactory manner it practically means that that number of messages can be transmitted simultaneously over a single wire.

EXEMPTION BEFORE THE COURTS.

Two decisions have been given by Judge Gowan, on questions arising out of ecclesiastical exemptions. The appeals were against assessments made by the town of Barrie, one by a Roman Catholic priest, the other by a Roman Catholic community. The only point of interest decided was that a private chapel in a convent is not a church in the sense which entitles the property to exemption from municipal taxes. The chief effect of these decisions will be to direct public attention again to the question of exemptions, which the Ontario Government has promised to subject to legislative treatment next session.

The entire plan of assessment at present in vogue is radically wrong. The assessment is made on the actual or assumed capital value of the property, instead of being levied upon the revenue it produces; the only thing there is to be taxed without a partial confiscation of the property. Rent is a fair criterion of value, as it is the measure of the annual revenue which the property produces. The present mode of assessment will add to the difficulty of settling the question of exemptions. Here is a church which cost \$100,000; the assessor, let us suppose, ascertains the fact and puts down that figure for the building with an addition for the value of the land. Is that a true mode of assessment? By no means. The question should be, in every case, not what the property cost but what it produces—what taxable revenue there is to be assessed. It is of course difficult to say what a church would rent for, but it is easy to understand that capital may, in any case, be sunk in ornamentation, and capital sunk is capital lost, in an economic sense. A merchant, let us suppose, spends thirty thousand dollars in ornamentation on a warehouse, which adds nothing to the capacity or convenience. The only value of the thirty thousand dollars which the assessor ought to recognize is what it is worth as a means of attracting customers—as a showy and costly advertisement—for in that way only is it productive. The question should be, after all, what the ornate warehouse will rent for, for that is the true criterion of its value for assessment. When that is ascertained, very little attention should be paid to cost. The assessors are at present