united by means of a piece of copper strap or wire, the chemical action, which results in the generation of what is known as electricity, commences. I come now to the varieties of instruments in use for the transmission of messages, by means of a system or code of signals. The instrument first invented and of necessity the simplest was Wheatstone's single needle instrument. This instrument is chiefly used on the various railways in Great Britain, where its simplicity of construction and the fact that a large number of stations can be grouped together on one wire, render it of great service on a circuit where there are several small stations, the business at which would not justify the expense of a single wire to each. The next we come to is also Wheatstone's, the A B C, so called from the fact that its signals are denoted by a system of lettering on a dial somewhat similar to that of a clock. This instrument, though rather costly and very complicated in its construction, requires no technical skill whatever to enable any person to work it. Its use is principally confined to small country villages and post offices. It is now, however, dying out, and is being superseded by more suitable instruments. The next instrument in its order of invention we come to is the Morse, so called after its inventor, Professor Morse. This instrument can be worked in two ways—by sound, and by what is called the tape system, by means of which its signals are recorded on a piece of tape worked by internal machinery. It was at one time a good deal used, but is now going out of date and is being replaced by the Sounder. After the Morse comes the Sounder, which is merely an adaptation of the Morse, and, as its name denotes, can be read by sound only. This instrument is comparatively simple in its construction, and is also less costly than any other, with the exception of the needle. It is used at all the more important stations and offices on account of the speed at which work can be transmitted by it, and where the amount of business is sufficient to warrant the employment of skilled labour. It is gradually superseding all other instruments, with the exception of the automatic, both in Great Britain and on the Continent. The fifth and last instrument we come to is Wheatstone's automatic instrument. This instrument is most complicated in its construction, and is used only on long wires between large cities, for the transmission of press and other long messages which would block the wires if sent by the ordinary methods. The instrument used for cable communication is called the Mirror instrument, on account of its signals being read from a reflection obtained from a small mirror placed beside the receiver, which is a kind of needle instrument, of very slight construction—so slight, indeed, that the mirror and receiver together weigh only 1½ grains! All these are, of course, receiving instruments and cannot be utilised for the forwarding of messages. The instrument in use for this purpose is called a key, and is of very simple construction, consisting as it does of a brass lever worked on a pivot and connected with the different wires. This key, with slight alterations, is used for all the different receivers with the exception of the automatic. The forwarding apparatus of this instrument consists of the perforator, which prepares each message for the transmitter by punching holes in a paper ribbon, and the transmitter which sends the message under the control of the punched paper when passing through it. I now come to the relative speed of working the various instruments. The useful speed of a non-recording instrument, such as the Sounder, is in reality limited to the speed at which the forwarding clerk can send and the receiving clerk write; but in recording instruments, such as the automatic, this is not so, because if one clerk cannot write as fast as the instrument records another can be appointed to follow him, and as many as three or four clerks are engaged in deciphering the signals of one instrument. Very expert manipulators sometimes attain a speed of as many as 20 words per minute, working with the A B C; but the ordinary rate of working on this instrument rarely exceeds 10 words per minute, and the average does not exceed 5. The single needle in expert hands frequently attains a speed of 35 words per minute, and the average rate at which an ordinary needle circuit works is 25 words per minute. The Morse instrument, under similar circumstances, attains a speed of 40 words per minute, and the average is about 35 words. The Sounder attains the same speed as the Morse, and practically can be read much faster than any clerk can write, but there is no advantage in this except in conversation, and, therefore, for all ordinary purposes the Sounder attains an average rate of working, in experienced hands, of 40 words per minute. But the number of words per minute which an instrument can transmit is no criterion of its value as a fast working apparatus. The following may be taken as giving a fair idea of the number of messages of ordinary size which each instrument transmits in an hour and in a day:—A B C, 15 per hour, 60 per day; needle, 30 per hour, 125 per day; Morse, 45 per hour, 175 per day; Sounder, 60 per hour, 250 per day. I have omitted the automatic instrument on account of its belonging to a special class of transmitters. However, it can be regulated to send as many as 130 words per minute on comparatively short lines such as between London and Manchester, but as we increase the length of the wire so we decrease the working speed of the instrument. To illustrate the great speed of this instrument I may mention that at a race meeting at Goodwood, on one occasion, as many as 613 messages were forwarded in one continuous stream between that place and London, without a single stop, in something over 2 hours. If the ordinary apparatus used in land telegraphy were used on the cables, a speed of one word per minute could scarcely be obtained, but with the instrument used, the mirror instrument before described, a speed of 15 words per minute is easily attained, and as many as 24 words have been sent in the same time, under favourable circumstances. I now come to the instruments in use in New Zealand, and of all those I have described, only two are in use here, viz, the Morse and the Sounder. The reason for this is that the business here is not sufficient to warrant the employment of the automatic, and the other instruments are gradually going out of date. I may mention that the Sounder may be worked in what is called the Duplex system, by which two messages can be sent over the one wire at the same time, and the Quadruplex, by which four messages can be similarly transmitted. The former method, however, is the one in use in the colonies. In concluding my paper, I do not think it is necessary for me to attempt to point out the immense advantages we have in the electric telegraph as compared with our forefathers of even three-quarters of a century ago. We need not now have to wait for a month or six weeks, though even that is a comparatively short time, for any important news from distant places; but if any great change takes place in the constitutional course of the world—a British Government introducing a Bill to provide for the pacification of Ireland! a petty rebellion in some remote African State, or even if the price of wheat or frozen mutton has gone up or down, we are fully informed of all the facts on reading the daily paper at breakfast the next morning.

ST. JOSEPH'S SCHOOL, DUNEDIN.

THE annual distribution of prizes took place in this school on Wednesday, June 25. The Most Rev. Dr. Moran presided, and there were also present the rev. clergy of the mission and several of the relatives and friends of the girls. The following was the programme caried out:—Chorus, "O Paradise"; duet, "Home to our Mountains"; solo, "La Pensive"; chorus, "O where hath Erin"; duet, "Morning Star Waltz"; solo, "The Mossy Dell"; duet, "Heather Wreath"; chorus, "Buds and Bells"; duet, "Der Freyschütz" Distribution; chorus, "Home Rule." The music was remarkably well performed, and it is especially deserving of notice that, with the exception of two, the children who played the piano had begun to learn within the year. The progress made by them was truly astonishing.—On the conclusion of the programme the Bishop addressed the children to the following effect. He announced that the holidays would terminate on July 14. He hoped the children would enjoy their vacation very much, but in a rational way. He would be pleased to see them all again punctually at the beginning of the next term, refreshed by the short rest and determined to work well till the end of the year. He was pleased to hear favourable accounts of the diligence of the scholars. The examination showed that, in arithmetic especially, considerable progress had been made. He exhorted the children to be attentive in school and industrious at home. It was of the utmost importance that home lessons should be properly attended to. If parents saw that their children studied carefully at home the lessons given in the school, complaints about the backwardness of pupils would be less frequent. He must express his gratification that the forwardness in Christian Doctrine was marked in a school where it has always been carefully looked to. Knowledge, however, should be reduced to practice. He hoped, therefore, that during their holidays and afterwards through life their works would correspond with their knowledge of the catechism.—The show of work was also very good and comprised several handsome specimens of fancy work as well as a large number of more useful articles. On the whole the results of the year's labour, including maps, exercises, and everything shown, fully bore out the praise bestowed upon the schools by the local daily Press during the time of the late Exhibition. The Dominican Nuns deserve warm congratulations on the success attained by them.

DUNEDIN CATHOLIC LITERARY SOCIETY.

THE weekly meeting of this Society was held in the Christian Brothers' School on Wednesday, the 25th ult. The chair was occupied by the President (the Rev. P. Lynch), and the attendance of members was up to the average. Mr. John Cousins was duly elected a member of the Society, and Messrs. A. Court and A. McIlroy were proposed for membership.

Mr. M. English read a paper on "Electric Telegraphy—Its Growth and Developments" (which appears elsewhere in this issue), and created a very favourable impression, as it was his first appearance before the Society.

In proposing a hearty vote of thanks to Mr. English for his instructive paper, Mr. J. Eager characterised it as a clear and concise history of electricity as applied to telegraphy. The literary style of the paper was admitted to be excellent, while all stupid technical terms were rightly avoided.

Mr. George Sullivan recited "A Slave's Dream," by Longfellow, in good style, and

Mr. W. Woods selected for his initial performance before the Society a reading on "Syllogisms," which was much appreciated.

As the St. Vincent de Paul concert takes place on the 2nd inst., at which several members of the Society assist, there will be no meeting on that evening.

Mr. John F. Perrin has very kindly consented to read a paper on "Ruins" before the Society on Wednesday, the 9th inst., when it is hoped there will be a large attendance.

The meeting was brought to a close with the usual vote of thanks to the chair.

During the year 1889, 70,477 Irish emigrants left Ireland. This is less than in 1888 and 1887, but more than in 1886 and 1885. The point of sad significance in it, however, is that 79.7 per cent. of the emigration was of young men and women between fifteen and thirty-five years of age. Since 1851, the number of emigrants, natives of Ireland, leaving Ireland for various foreign lands, is 3,346 580, or three-fourths of the present population of that country.