

New Publications

'St Joseph's College Annual,' issued by St. Joseph's College, Hunter's Hill, Sydney, conducted by the Marist Brothers, is a bulky publication of over 100 pages, with nearly two score of illustrations. The contents are varied and interesting, consisting of, in addition to the usual record of school happenings, several poems, essays, and a full account of the jubilee celebrations held during this year. The annual is admirably printed and illustrated, and does much credit to the institution from which it emanates.

The Christmas issue of our progressive Catholic contemporary, 'The Freeman's Journal,' of Sydney, consists of over eighty pages of prose, poetry, and illustrations. The readers of our contemporary must feel deeply grateful for the generous store of light and wholesome reading provided for the festive season, whilst at the same time the proprietors are to be congratulated for their enterprise. The number before us is the largest ever, we believe, published of any religious organ in the Southern Hemisphere, and is highly creditable in every way to the office from which it was issued.

Our Catholic contemporary of Brisbane, 'The Age,' is to be highly complimented on its Christmas number of 68 pages, the reading matter of which is of a nature to suit all tastes. Among the original articles, stories, etc., written specially for 'The Age,' are 'The Church and the World,' by the Bishop of Rockhampton; 'A Christmas Lesson,' by the Rev. Clement Caine; 'Christmas Time,' by the Rev. M. O'Flynn; 'Death,' by the Rev. P. Hickey; 'The Fall of the Hammer—a story of the land boom,' by Mr. C. Moy-nihan; 'Forbearance,' by the late T. C. Timbury; 'Jack Dalton's Oath,' by Mr. Joseph Lenehan. In addition to the original matter there are several pages of selected stories, verse, etc., the reading of which cannot fail to instruct, and to amuse.

Messrs. Mills, Dick, and Company's 'Otago, Southland, and South Canterbury Almanac and Directory' for the current year is now so well known in the districts for which it is intended that little is required to commend it to the notice of the general public. It is a publication which is indispensable to the merchant, shopkeeper, and settler, each and all of whom will find in its 250 pages a good deal of interesting and useful information in a compact form.

The 'Almanac of the Diocese of Maitland,' a copy of which is just to hand, is one of the best of its kind published. Not only is it full of information regarding religious matters generally, but it also contains information on public affairs which will be found most useful. It can be truly called a 'family and home annual.' It should find a place in every household in the diocese for which it is intended, and even beyond it. From it we learn that there are now in the diocese 77 churches, attended by 42 secular and 6 regular priests; 30 monasteries and convents, 216 nuns and 14 Brothers. There are 40 primary and 16 secondary schools, attended by 3799 pupils. The Catholic population is 30,000.

We have received from the Mines Department a copy of the Mining Handbook, edited by Mr. P. Galvin, Secretary of the Mining Bureau. The handbook is a very comprehensive work on our mineral resources, and contains a large quantity of most useful and interesting information regarding mining in all its branches. The value of the handbook is considerably enhanced by the inclusion of two maps showing the principal mineral localities in the Colony. In his preface to the work the Hon. J. McGowan, Minister of Mines, states that as some twenty years have elapsed since the publication of 'The Handbook of New Zealand Mines,' it has been deemed fitting at the present time, when New Zealand has embarked on the largest exhibition of her industries in the history of the Colony, to give a review of its metalliferous and mineral resources; to give an account of what has been done, and of what are the prospects for the future. As an aid to the reader's right understanding of the Colony's mineral resources and the difficulties to be overcome before these can be worked with profit, the work contains a number of papers by Government officials and experts—men of practical experience and scientific knowledge—who write in a straightforward manner, and whose sole aim is to present a truthful picture of what has been done in the past, and to denote where combination of capital, labor, and professional skill may secure the rewards of enterprise in the future. The work, which consists of nearly 600 pages with index, is copiously illustrated. It is full of useful information, and even a partial study of its contents will convince any reader that, in addition to its agricultural and pastoral interests, the Colony has

in its minerals a vast asset which, at some future date, will enable it to take its place among the manufacturing countries of the world.

The Telephone System of To-day

Since its first invention, the only alteration in the telephone itself (says 'Indian Engineering') has been the substitution of a new form of transmitter: instead of relying solely upon the energy contained in spoken sound, an electric battery supplies the current while vibrations initiated by the voice simply cause fluctuations in this current by varying the pressure between contacts in the circuit, and thereby altering its resistance. The usual form taken by these contacts is that between granules of hard carbon resting between two carbon discs; but this arrangement may be varied in almost any manner without affecting qualitatively the essential result: piles of nails, plumb-bobs touching mercury, streams of conducting solutions, and the arc light itself, have served by way of experiment; while in place of the ordinary diaphragm, boiler heads an inch thick, and even the sides of steamships have been used. These, taken especially in connection with the most surprising fact that variations in pressure between two surfaces in contact affect resistance in the same ratio as do fluctuations in the distance of an armature affect the strength of a magnet, are most highly suggestive concerning the nature of magnetism itself; but, resisting temptation to theorise on the subject, we would rather turn towards those developments which have rendered the telephone system of to-day one of the most successful among engineering enterprises. The lesson here taught is highly moral: results have not been obtained by fortunate guesses or by lucky inventions, but have followed the certain reward of sound administration—and the concentration of many minds on one object.

The Switchboard

—without which the commercial success of the system would be impossible—is the product of nearly as many minds as it has terminals. The cost of a switchboard, of course, increases much more rapidly than does the number of subscribers for which it provides: clearly the number of connections required for n subscribers varies as $n^2 - n$; and with all our present methods of special machinery and the organised application of skilled labor, it requires as long to make and install a large switchboard as it does to build and equip a merchantman. A minute glow lamp has replaced the old drop-shutter as signal; and a 'click' heard by the operator on inserting the second plug serves to indicate that the desired line is in use elsewhere.

A switchboard for 10,000 telephones has two and a half million soldered connections and 10,000 miles of wire.

Turning to the telephone line, perhaps our most important invention in this respect is that of Mr. Doolittle—the production of hard-drawn copper wire: which alone has rendered possible self-supporting aerial wires of copper. Interference by induction in the case of overhead wires is minimised by transposing the telephone wires to various positions on the cross-arms, while the wires of underground cables are laid in twisted pairs so as to be immune to inductive influence. An army of workers exposed to every vicissitude of climate, and one-third of the gross revenue of a telephone company are devoted to maintenance alone. It was estimated that during a recent winter in North America damage done to aerial lines of all sorts in the New England States exceeded the whole loss from shipwreck on the corresponding coast line.

Most of the troubles of the telephone linesman are shared by his elder brother in the telegraph department. The first lines erected in Mexico were quickly wrecked by parrots and ring-tailed monkeys who nightly visited them in great numbers for gymnastic exercise. The line run by the King of the Belgians across his territory in Central Africa was carefully supported on iron poles so as to be safe against the attacks of white ants, but the sportive and humorous elephant exhibits a lively curiosity concerning the roots of these strange trees: doubtless—being an optimistic gentleman—he concludes from the non-edible nature of the insulators and wires that the succulent portion of these plants must be situated near their lower extremities.

Bears have been known to gnaw down wooden poles in search of that hidden hive from which proceeds the ceaseless humming; and along the South Atlantic coast fish-hawks build upon the poles and fiercely attack intruders, while in some countries wasps find homes beneath the hollow insulators. Truly the linesman's lot, though lively, is not a wholly happy one.