

Athenæum, the Literary Society, The Club, &c. ; he was for many years in the House of Commons, has been Under-Secretary for India, Under-Secretary for the Colonies, Governor of Madras, &c. He has thus had great opportunities, of which he has made the most. As was said of Archbishop Williams, he has "read the best, heard the best, conferred with the best ; excribed, committed to memory, disputed ; and had some work continually upon the loom."

Moreover, he has not only striven, and successfully, to know the ablest statesmen, literary men and men of science in our own country, but abroad also—V. Cousin, Hubner, B. de St. Hilaire, J. Simon, Taine, and many others were among his friends. The diary of such a man could not but be most interesting.

He has acted on the motto from Renan, which he places at the head of his first volume : "On ne doit jamais écrire que de ce qu'on aime. L'oubli et le silence sont la punition qu'on inflige à ce qu'on a trouvé laid ou commun dans la promenade à travers la vie."

Several of his reviewers have expressed the opinion that there are parts of the book which might have been spared, but I doubt whether they would have agreed which should be left out. The botany has been more than once suggested for omission ; but to that I for one should, of course, demur. Sir Mountstuart has always loved natural history, and as a statesman has rendered valuable services to botany. He quotes with natural pleasure Sir J. Hooker's dedication to him of the 117th vol. of the *Botanical Magazine*, "as a slight acknowledgment of the valuable services which you rendered to botany and horticulture when Under-Secretary of State, first for India and then for the Colonies, and lately when Governor of the Madras Presidency ; to which I would add, in memory of our long friendship, and our delightful rambles at home and abroad, in pursuit of our favourite science."

The whole book is full of good stories, of wise and witty sayings, of which, of course, we can only give a very small sample ; for instance,

"— is forty years old, Gladstone is eighty years young."

"Talleyrand remarks that 'Les affections lointaines sont un asile pour la pensée.'"

"Lady Alwyne Compton 'divided biography into autobiography, and ought—not to biography.'"

"Evarts, being asked if he was going to the funeral of a man whom he very much disliked, said, 'No, I shall not attend, but I quite approve of it.'"

"Woman was made after Man, and has been after him ever since."

"Two young ladies discussed for some time the colour of the Devil, when at last one said, 'I think you will find that I am right, dear.'"

"As Lady Blennerhassett left the dining-room she asked me, 'Do you like women's votes?' and supplied the answer, 'I like women who de-vote themselves.'"

"Mrs. Montgomery said of a friend, 'She gives me the impression of having been in the garden of Paradise before the Fall, but, having got a hint of what was about to happen, escaped before the coming of Original Sin.'"

While imbued with the scientific spirit, and thoroughly sympathising with the most liberal views of Stanley, Jowett and Renan, Sir Mountstuart Grant Duff has a deep feeling of reverence for the mysteries of existence. We meet again and again evidence of the profound im-

pression made upon him by the récit d'une sœur ; he speaks with affectionate veneration of Newman, and he tells us how much he valued the benediction which he sent him when he was starting for his Madras Government.

In his view of our religion he seems (though he does not expressly say so) to agree with Renan that

"Il ne sera remplacé que par un idéal supérieur ; il est roi pour longtemps encore. Que dis-je ? Sa beauté est éternelle, son règne n'aura pas de fin. L'Eglise a été dépassée, et s'est dépassée elle-même ; le Christ n'a pas été dépassé."

The diary ends with an admirable address to the girls of the High School, Oxford. He gives them excellent advice : "Remember that to live a great and beautiful life is a far higher achievement than anything that can be done in life save by the very rarest genius."

He dwells first on what they should not learn—no higher arithmetic, no mathematics—no learning by heart, except some masterpieces, which should be kept up—no English grammar. Latin and Greek only as rewards.

Next what they should learn—reading, writing, drawing, book-keeping, needlework, cooking, enough French and German to read an ordinary book, some short treatise on logic, and enough music to enable them to enjoy the work of others, and some knowledge of the world in which we live. Lastly, he recommends them all to read four books—the "Meditations of Marcus Aurelius," the "De Imitatione," Gracian's "Oraculo Manual," and "Joubert's Pensées."

No one, I think, will put Sir Mountstuart's book down without a kindly feeling for the author, and a hope that he might have his characteristic wish to "come back every ten years, say for three weeks, just at this season, when the lilac, laburnum and wild hyacinth are out, to see how you are (the world is) getting on."

AVEBURY.

FIELD EXPERIMENTS ON WHEAT.

Cultura del Frumento, 1899-1900. *xiii Anno di cultura continua del Frumento e del Granturco*. By Prof. Italo Giglioli. Pp. xx+159. (Portici : Premiata Stab. Tipografico Vesuviano, 1901.)

IN the year 1887 Prof. Italo Giglioli, director of the R. Scuola Superiore Agraria di Portici, commenced a series of experiments on the growth of wheat under various manurial conditions at Suessola, in the Province of Caserta. The experiments are maintained by the Neapolitan Association of Landowners and Farmers, assisted, during the last few years, by grants from the Department of Agriculture.

The experimental field covers nearly two acres, and is divided by paths into 123 plots of about 45 square metres each. In most cases two or more plots (sometimes six or even twelve plots) receive the same treatment, and in this way the actual number of distinct experiments is reduced to forty-five. The produce of each of the 123 plots is, however, separately cut and weighed.

In the first year of the experiments wheat alone was grown, but owing to very favourable climatic conditions, and the character of the soil, it was subsequently found

possible to grow two cereal crops each season—wheat from November to July and maize from July to October. The results show that the average yield of wheat is a good deal lower than in England, for instance; but the two crops taken together furnish an amount of grain in excess of the yields of the single crops obtained in England, Germany and the north of France. The character of the climate of Suessola is further illustrated by the fact that Rabi wheat from Oudh tends to give increased crops when grown in this district. English wheat, on the other hand, was found to deteriorate.

As regards the effect of the different manures on the wheat crop, horse-dung with sulphate of ammonia, applied in the spring, gave the highest yield, both of grain and straw. Sulphate of ammonia alone, applied in the spring, gave a higher yield of grain, but less straw than when applied partly in the autumn and partly in the spring; this result is attributed to the excessive rainfall during the winter months. With nitrate of soda there was a much lower yield of grain and rather less straw than with sulphate of ammonia. In accordance with what has been observed at Rothamsted and at Woburn, Giglioli obtained a greater weight per bushel under the influence of sulphate of ammonia than with nitrate of soda. Both these manures proved to be very effective when applied in conjunction with horse-dung. In this connection it may be mentioned that, quite recently, Hiltner has found that when humous sandy soil and heavy soil were inoculated with certain denitrifying organisms an increased production of oats was obtained. These results lend support to the view, now very generally accepted, that, in practice, the danger of any considerable loss of nitrogen under the influence of denitrifying organisms has been a good deal over-estimated.

Basic slag alone very considerably increased the yield of wheat grain; a still further increase in grain and also in straw was obtained when horse manure, or a mixture of sulphate of ammonia, nitrate of soda and potassium chloride were applied in addition to basic slag. Exclusively nitrogenous manures in addition to basic slag yielded about the same amount of grain, but more straw, than basic slag alone. Mineral superphosphate gave less satisfactory results than basic slag. Leucite, which occurs in large quantities in Italy, especially Roccamonfina, increased the yield of wheat when applied along with nitrate of soda; in conjunction with basic slag and nitrogenous manures, it produced about the same effect as potassium chloride under the same conditions.

Some interesting results are recorded on the effect of manganese dioxide, applied with various manures. These experiments, which have now been continued for three years, tend to show, in the majority of cases, that manganese dioxide in some way benefits the wheat crop. Further experiments on the subject, in which other crops, such as mangels, might be included, are desirable.

Electro-culture experiments with wheat manured with horse-dung showed a distinct gain both in grain and in straw when atmospheric electricity was employed, the increase in grain being relatively the greater. Voltaic electricity produced a still more marked effect, and increased the yield both of grain and straw by about 10 per cent.

It has not been possible within the limits of this short
NO. 1653, VOL. 64]

notice to give much more than a general indication of the lines of Prof. Giglioli's carefully conducted series of experiments, which, as time goes on, cannot fail to gain in interest and value. The present Report is well arranged for reference, and contains excellent bibliographies of some of the subjects investigated. The second Report, dealing with the results of the maize experiments, will, it is hoped, be ready before very long. N. H. J. M.

EARTH CURRENT MEASUREMENTS.

Die Erdströme im Deutschen Reichstelegraphengebiet und ihr Zusammenhang mit den Erdmagnetischen Erscheinungen. By Dr. B. Weinstein. Pp. vi + 78, and Atlas to ditto. (Brunswick: Friedrich Vieweg and Son, 1900.) Price, Mk. 4.

OF late years, when the interests of the electric railway and tramway have clashed with those of the observatories in which magnetic and earth current measurements are made, it has frequently been urged by the opponents of the observatories that they continue year after year accumulating data of which no use is ever made. Unfortunately, in most cases, owing, no doubt, to the very inadequate staff and multitudinous duties they have to perform, there is a certain amount of truth in this contention. It must, however, not be forgotten that the material is always available and can be worked up at any future date, while if the observations are interrupted, for however short a time, no amount of money or trouble expended at a subsequent time can replace the missing measurements. In this connection it is, therefore, with considerable pleasure that we welcome this pamphlet of nearly eighty pages, together with a quarto volume of curves, which give an account of the measurements made of the earth current curves obtained in two lines, one running between Berlin and Dresden, and the other between Berlin and Thorn during the epoch 1884-1888.

The author considers, in the first place, the manner in which the earth currents change, and in the second place to what extent these changes are connected with simultaneous changes in the terrestrial magnetic field.

In order to investigate the periodic changes in the earth currents, the ordinates of the photographic curves were measured for every hour and the means were used to calculate the coefficient of a Fourier expansion. The agreement between the values of the coefficients derived from the means for the various years is quite surprising considering the irregularity which one associates with all earth current phenomena.

The two lines being very nearly at right angles, and making the supposition that the current measured in the line is proportional to the current which traverses the earth, the author is able to calculate for each hour of the day the azimuth in which the current is flowing through the earth's crust. He compares the azimuth of this resultant current with the azimuth of the trace of the vertical plane passing through the sun. The results of these measurements, as well as a consideration of the way in which the earth currents change in magnitude and direction for the various months of the year, are all most clearly shown by means of vector diagrams. Vector diagrams are also given to show the changes in the earth's magnetic field for various stations, and a com-