

of the mountain, by way of Randazzo, Bronte, Adernò, Paterno, and Monte Ste. Anastasia, and so back to Catania. Reflections on the results of the journey are concluded by a fervid peroration, in which the author reminds us that from the top of Etna we may see nearly the whole of that beautiful island which the ancient poets symbolised as "La bionda e leggiadra figlia di Cerere e del sole," and the moderns yet more happily as "la fulgida perla dell' Italico diadema circondata da tre puri zaffiri; il Tirreno, il Jonio, l'Africano" . . .

The book is not illustrated, but it contains a clear and very accurate map of Etna, reduced from that of von Waltershausen, and with the addition of the eruptions subsequent to 1843. Prof. Silvestri's style, while it is accurate and precise from the scientific standpoint, is never dull or lagging. He carries his reader with him, and excites a genuine enthusiasm, which all who know him can well understand. G. F. RODWELL

OUR BOOK SHELF

Methods and Theories for the Solution of Problems of Geometrical Construction, Applied to 410 Problems. By Julius Petersen.

Text-book of Elementary Plane Geometry. By the same. (London: Sampson Low, 1880.)

SOME months since we noticed Prof. Petersen's "Theorie der algebraischen Gleichungen," and now we desire to draw attention to two more works by the same writer. The former, in its Danish garb, appeared so long ago as the year 1866, and having been tried and found to be a successful text-book, the author naturally desired to offer his work to a wider circle of geometers and students. The "Methods" has been rendered also into French; it is "an attempt to teach the student how to attack a problem of construction." Solutions in most cases are merely indicated, the following up the author's remarks being left to the student or teacher. The first chapter treats of "Locality" (method of similitude and inverse figures); the second of "Transformation of the Figures" (parallel translation, replacing, and revolution around an axis); the third of "The Theory of Revolution," with an appendix on systems of circles and on the possibility of solving a given problem by the straight edge and pair of compasses. It is a work of considerable merit. The "Text-book" we do not value so highly, though there are points of interest and novelty about it also; it contains besides 228 geometrical exercises. We hail Prof. Petersen as a valuable coadjutor in the work of improving geometrical teaching, and shall be glad if his little books meet with a fair measure of acceptance in this country. We could point out what we consider blemishes, but in the main commend both books. The respective translators (both, we presume, Danish students) have done their part intelligently, and English students will have no difficulty in understanding the language, though they may not be able to master the matter.

Practical Chemistry. The Principles of Qualitative Analysis. By W. A. Tilden, D.Sc. (Longmans and Co., 1880.)

OF making books on practical chemistry there is no end. If it were necessary that another should be added to the list, the publication of this little book by Dr. Tilden has surely removed the necessity.

There is no special feature to be noted in this book: it is clearly and accurately written, and proceeds on the well-beaten paths. The adoption of a general table printed on strong paper and protected by cloth backing is to be commended.

It is, we think, doubtful whether anything is to be

gained by attempting to teach mere outlines of the methods for analysis of mixtures; a more thorough grounding in qualitative analysis may, as a rule, be given by limiting the student's work for some time to simple salts—which is not such an extremely easy branch of analysis as may at first sight appear; then proceeding to mixtures of metals with one metal only in each group; then to mixtures of various metals of the same group; and lastly to complex mixtures.

The detection of acids—even of a simple acid—is made, as is usual in elementary text-books, to appear a much less difficult undertaking than it really is.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

A Rotatory Polarisation Spectroscope of Great Dispersion

I HAVE just had an opportunity of trying, on a fine aurora, an instrument for measuring the wave-length of monochromatic light in terms of quartz-rotation of its plane of polarisation. My apparatus is, as yet, very roughly put together, so that I got no measurements of any value, but to-night's experience has shown me that the method, while simple in application, is capable of very great accuracy.

The construction of the instrument will be easily understood from the annexed rough sketch. The course of the light is with the arrows. N is a Nicol, S an adjustable slit, L a lens at its focal distance from S, Q a plate of quartz cut perpendicularly to the axis, P a double-image prism, and E a small direct-vision spectroscope, which may be dispensed with when absolutely monochromatic light is to be examined.

When the instrument is properly adjusted by daylight the two images of S formed by P are parts of a straight line, so that E gives two spectra side by side. These are crossed by dark bands, which are numerous in proportion to the thickness of Q, and which move along the spectra as N is made to rotate.

In observing a bright-line spectrum the slit is to be made as wide as possible, subject to the condition that no two of the



differently-coloured images shall overlap. We have thus a pair of juxtaposed rectangles for each of the bright lines, and the angular positions of N, when the members of the several pairs are *equally bright*, are read off on a divided head. I find by trial that a division to 2° is quite sufficient.

A *first* set of readings is taken with a plate Q (permanently fixed in the instrument) 5 or 6 millimetres thick. Then an additional plate of quartz 100 millimetres or more thick is introduced between Q and L, and a *second* set of readings is taken. From the readings with the thin plate we find approximately the positions of the spectral lines, and the more exact determination is obtained from the readings with the thick plate.

This is the chief feature of the instrument. The actual error of any one reading is not more than 2° , but when a thick plate is used the whole rotation may be from ten to twenty or even thirty circumferences. By thus increasing the thickness of the quartz plate *very* little additional loss of light is incurred, while the inevitable error forms a smaller and smaller fraction of the whole quantity to be measured.

The graduation of the instrument is to be effected by very careful measurements upon a hydrogen Geissler tube, and comparison with the known wave-lengths of the hydrogen lines.

An observer furnished with this instrument (which is not much larger than a pocket spectroscope) and with a long rod of

quartz, will be able to make measurements of any required degree of accuracy.

P. G. TAIT

The Club House, St. Andrews, N.B., August 12

Dimorphism of "Nature" on June 17

WITH reference to the statement in an editorial note in *NATURE*, vol. xxii. p. 317, that one statement of mine "does not accord well" with another, I must request to be allowed to show that this observation is incorrect.

I was told by a friend on July 27 (five weeks after the event) that there had been apparently two issues of *NATURE* of June 17, and that Prof. Allman was intending to write to *NATURE* quoting the uncorrected issue (which was unfortunately the one which had been supplied to him) in support of his statement, in *NATURE*, vol. xxii. p. 218, which I had declared to be a misconception (*NATURE*, vol. xxii. p. 241), viz., that I differed from him as to the existence of a marginal canal in the new medusa. Accordingly I wrote on July 28 to the editor, requesting him to state, "if necessary," that there had been two issues, and expecting that this explanation would be inserted immediately after Prof. Allman's letter, published in *NATURE*, vol. xxii. p. 290. The explanation was not, however, given, and it was left to me to write my letter of two days later date (July 30), which was published in *NATURE*, vol. xxii. p. 316. I had in that two days interval "ascertained" by further evidence that there were actually two issues of No. 555 of *NATURE*, and my "great surprise" was due to the fact that the editor of *NATURE* should have allowed Prof. Allman's letter to appear without offering any explanation of the direct opposition between his quotation and mine—the cause of which was well known at the printing office of *NATURE*.

It is thus clear that my letter of July 30 is consistent with my letter of July 28.

E. RAY LANKESTER

[We willingly give space to the above letter, and, accepting the interpretation of the former one which Prof. Lankester now gives us, we regret having made the observation to which Prof. Lankester alludes. We may further add that the insertion of the reference to the letter in question was due to an oversight.—ED.]

Magnetic and Earth-Current Disturbance

It may be of interest to point out that a magnetic disturbance has just been experienced at the Royal Observatory greater in magnitude than any that has occurred for some years.

On August 11, at 10.30 a.m., active disturbance suddenly commenced, and continued until midnight, accompanied, as usual, by the exhibition of earth currents. The magnets were then generally quiet until about noon of August 12, when disturbances of still greater magnitude began to be shown, continuing till 6 a.m. of August 13. During the latter period the variations in the magnetic declination and horizontal force were frequent and large, especially between noon and 4 p.m., and between 7 and 9 p.m. Between noon and 4 p.m. there was also a considerable increase of vertical magnetic force. During the whole period, from noon of August 12 to 6 a.m. of August 13, earth-currents were continuous and strong, and especially strong at those times at which the magnets were most disturbed.

It seems well at the present time to warn telegraph engineers, and especially those concerned in the laying of submarine cables, that disturbances of the character of that described above may now become not unfrequent as compared with the quietness of recent years. I may perhaps be permitted here to refer to a short paper, "Note on Earth-Currents," to be found at p. 214 of vol. viii. of the *Journal* of the Society of Telegraph Engineers, as containing information on the question of magnetic disturbances and earth-currents, probably not without interest at this time.

WILLIAM ELLIS

Royal Observatory, Greenwich, August 14

P.S.—During the evening and night of August 13–14 large magnetic disturbances again occurred, accompanied as before by strong earth-currents.

Aurora Borealis and Magnetic Storms

THE epoch of grand auroras and magnetic storms has again returned, as was evident from the fine displays seen here on the evenings of the 11th and 12th, and these are as usual accom-

panied by an increase in the number and size of the sun-spots, and in the development of the solar prominences. The aurora on the 11th was grand, but that which followed it on the 12th recalled vividly the magnificent displays of 1869, 70, and 71.

On the 12th my attention was first called to the phenomenon at 10h. 25m. p.m., when the northern horizon was skirted by a bright white haze terminating in an ill-defined arch, from which sprang a large number of broad streamers stretching towards the zenith. The bank of white light on the horizon extended from about 15° E. of N. to 45° W. of N., and some of the streamers attained an altitude of fully 60° or 70°. The brilliancy of the individual streamers was varying rapidly, but there was little variety in the character of the phenomenon.

At 10h. 30m. the brightest streamer was 3° W. of N. Ten minutes later this brilliant white band of light had moved gradually westward, and was some 25° W. of N., when it faded away. Some streamers were still more W. of N., and others again were slightly E. of N.

At 10h. 46m. there was nothing remaining of the aurora except a cloudy whiteness in the north, the rest of the heavens being a deep blue. A minute later streamers were again appearing.

At 10h. 56m. a very bright streamer formed 2° E. of N., and then a similar band of light appeared 5° W. of N., followed in rapid succession by other streamers 10°, 20°, and 45° W. of N., each streamer fading away before the succeeding one became very bright.

At 11h. 0m. a single narrow band of intense white light stretched from the horizon towards the zenith, passing through Cor Caroli.

At 11h. 7m. the light in the N. and N.N.W. again brightened up, but there was no further appearance of streamers.

The magnetic storm that accompanied the aurora of the 12th was one of the most violent ever recorded at this observatory, and was very similar in character to the magnificent storm of 1869.

On the evening of the 11th the magnetic needle was very irregular in its movements, but it was only towards midday of the 12th that the storm really began. The oscillations from the beginning were very rapid and extensive. The first great movement began at 11h. 34m. a.m., and between 12h. 18m. and 12h. 24m. the declination magnet moved 1° 6' 45" eastward. It then returned westward, and at 1h. 4m. the reading had increased by 1° 18' 13". Between 7h. 9m. and 7h. 29m. p.m. the needle moved 59' 18" eastward, when it attained its minimum; it then returned quickly towards the west, and after a double sweep it reached its maximum at 8h. 13m., the change of declination in 46m. being 1° 27' 23".

The oscillations of the V.F. magnet were as great as those of the declination. The chief maximum occurred at 3h. 40m. p.m., and there were three decided minima at about 10 p.m. midnight and 2 a.m., the two latter of which were lost from the oscillation being too great to be recorded on the photographic cylinder, and the first showing a change of 1' 9" inch of ordinate in 5m.

The variation of the H.F. magnet was very large, but not so remarkable as that of the V.F.

On the 13th the magnetic storm continued greatly to disturb all the magnets, but it was less violent than on the preceding day.

Stonyhurst Observatory, August 15

S. J. PERRY

THERE was a beautiful display of the aurora here last night. Between ten and eleven o'clock the streaks extended from the horizon to the zenith. The colour was principally pale blue, but a reddish tinge was occasionally discernible. I observed what I thought was a lateral movement of some of the streaks. A bright spot suddenly made its appearance to the westward of a small black cloud, seemed to move slowly eastward and disappear. There was a slight breeze from the east at the time, but I do not think that the clouds were moving sufficiently rapidly to account entirely for the phenomenon.

Springburn, Glasgow, August 13

J. A. B. OLIVER

A FINE display of aurora was visible here on the night of Thursday, August 12, about 10.30. White streamers, stretching vertically from the horizon nearly to the zenith, occupied the north-west segment of the heavens from the pole to Arcturus. There was a narrow bank of cloud along the horizon, and I thought at first that the streamers might be shadow-phenomena from the sun; but the hour was too late, and the rapid variations of form and