

THE SEVENTH ANNUAL EXHIBITION of the NEW SOCIETY OF PAINTERS in WATER COLOURS, (FIFTY-THREE, Pall Mall, next the British Institution,) is NOW OPEN, from 9 o'clock till dusk. Admission, 1s.; Catalogue, 6d. JAMES FAHEY, Sec.

THE ROYAL POLYTECHNIC INSTITUTION, REGENT-STREET.—The First Exhibition of CARY'S DISSOLVING ORRERY, illuminated by the Oxyhydrogen Light, with 38 beautiful illustrations, Mondays, Wednesdays, and Fridays, at a quarter-past Two o'clock, and on the alternate Evenings at Eight o'clock. The DISSOLVING VIEWS, with appropriate Music, every Morning and Evening. The Lecture on BARWISE and RAIN'S ELECTRIC CLOCKS, and other Popular Lectures and Experiments. The PHOTOGRAPHIC PORTRAITS, and numerous Works, which display eminent art, science, and ingenuity. The Diver and Diving Bell. Open at Half-past Ten in the Morning, and Seven in the Evening. Admission, 1s.

SCIENTIFIC AND LITERARY

ROYAL SOCIETY.

THE following noblemen and gentlemen have been elected Fellows since our last report. Lord Montague, Earl de Grey, Lord Wrottesley, C. Woodward, Esq., the Rt. Hon. G. S. Byng, M.P., R. Liston, Esq., H. H. Spry, Esq., H. Davis, jun. Esq., the Rev. J. F. Denham, M.A., the Rev. J. Hoppus, L.L.D., H. G. Knight, Esq., M.P., Lieut.-Colonel T. Wood, M.P., the Earl of Carnarvon, and Ardaseer Cursetjee, Esq.

The following papers have been read:—

'On the proportions of the prevailing Winds, the mean Temperature, and depth of Rain in the climate of London, computed through a cycle of eighteen years, or periods of the Moon's Declination,' by L. Howard, Esq.—In this paper the author investigates the periodical variations of the winds, rain, and temperature, corresponding to the conditions of the moon's declination, in a manner similar to that he has already followed in the case of the barometrical variations, on a period of years extending from 1815 to 1832 inclusive. In each case he gives tables of the average quantities for each week, at the middle of which the moon is in the equator, or else has either attained its maximum north or south declination. He thus finds that a north-east wind is most promoted by the constant solar influence which causes it, when the moon is about the equator, going from north to south; that a south-east wind, in like manner, prevails most when the moon is proceeding to acquire a southern declination; that winds from the south and west blow more when the moon is in her mean degrees of declination, going either way, than with a full north or south declination; and that a north-west wind, the common summer and fair weather wind of the climate, affects, in like manner, the mean declination, in either direction, in preference to the north or south, and most when the moon is coming north. He finds the average annual depth of rain, falling in the neighbourhood of London, is 25.17 inches. From his observations on the temperature, he deduces the following conclusions:—

1. That the pressure of an atmospheric tide, which attends the approach of the moon to these latitudes, raises the mean temperature 0.35 of a degree. 2. That the rarefaction under the moon in north declination lowers the temperature 0.13 of a degree. 3. That the northerly swell following the moon as she recedes to the south further cools the air 0.18 of a degree. 4. That this cold continues while the moon is away south, reducing the mean temperature yet lower by 0.04 of a degree.

'A new Method of solving Numerical Equations,' by Mr. T. Weddle, of Stamfordham.—The object of this paper is to develop a new and remarkably simple method of approximating to the real roots of numerical equations, which possesses several important advantages. After describing the nature of the transformations which are subsequently employed, the author proceeds to develop the process he uses for obtaining one of the roots of a numerical equation. Passing over the difficult question of determining the limits of the roots, he supposes the first significant figure (R) of a root to have been ascertained, and transforms the proposed equation into one whose roots are the roots of the original, divided

by this figure (or $\frac{x}{R}$): one root of this equation lying between 1 and 2, the first significant figure (r) of the decimal part is obtained, and the equation transformed into another whose roots are those of the former, divided by $1 +$ this decimal (or $1 + r$). This last equation is again similarly transformed; these transformations being readily effected by the methods first given. Proceeding thus, the root of the original

equation is obtained in the form of a continued product. After applying this method to finding a root of an equation of the 4th, and likewise one of the 5th degree, the author applies it to a class of equations to which he considers it peculiarly adapted, namely, those in which several terms are wanting. One of these is of the 16th degree, having only six terms; and another is of the 622nd degree, having only four terms.

'Additional Note on the Contraction of Voluntary Muscles in the living body,' by W. Bowman, Esq.—This communication contains a short account of some recent examinations made by the author on the human muscular fibre affected by tetanus. The author is led from his observations to the conclusions,—1st, that the contraction of a muscle is the essential cause of its rupture; 2ndly, that there is no repellent force between the contractile elements of muscular fibre; and, lastly, that the contraction of voluntary muscle is not a sustained act of the whole congeries of contractile elements composing it, but a rapid series of partial acts, in which all duly share, becoming by turns contracted and relaxed.

'Investigation of a New and Simple Series, by which the Ratio of the Diameter of a Circle to its Circumference may easily be computed to any required degree of accuracy,' by W. Rutherford, Esq.—Among various formulæ for the rectification of the circle discovered by the author, he has found the one given in this paper to be that best fitted for computation: and he has been enabled by means of it, with comparatively little labour, to extend the number, expressing the ratio of the diameter to the circumference, to 208 places of decimals, a degree of accuracy hitherto unattainable, without a great amount of labour, by means of any of the series which have yet been employed. The celebrated series of Mr. John Machin, for the rectification of the circle, is derived from the formula

$$\frac{\pi}{4} = 4 \tan^{-1} \frac{1}{5} - \tan^{-1} \frac{1}{239},$$

which converges with considerable rapidity, but gives rise to tedious computations, in consequence of the divisor 239 being a prime number. But by converting the above formula into the following,

$$\frac{\pi}{4} = 4 \tan^{-1} \frac{1}{5} - \tan^{-1} \frac{1}{70} + \tan^{-1} \frac{1}{99},$$

a series is obtained by which the extended computation above mentioned was readily effected. The methods of computation are then stated in detail, and the resulting value of π is given to 208 places of decimals, which is presumed to be accurate to the last figure, the computations having been actually carried as far as 210 figures.

'On the Phenomena of thin plates of Solid and Fluid Substances exposed to polarized Light,' by Sir D. Brewster.—From a theoretical investigation of the phenomena described in this paper, the author deduces the important law, that when two polarized pencils, reflected from the surface of a thin plate, lying on a reflecting surface of a different refractive power, interfere, half an undulation is not lost, and white-centred rings are produced. When the inclination is exactly 90° , the pencils do not interfere, and no rings are produced.

'Meteorological Observations for August, September, and October, 1840, taken on board H.M.S. *Erebus* and *Terror*,' by and under the direction of Capt. James Clark Ross, R.N.

'Hourly Meteorological Observations made at Plymouth, in lat. $52^\circ 36' 12''$, long. in time $6^m 55^s$ east, on the 22nd of March, 1841,' by A. Utting, Esq.

'Barometrical Observations taken at Naples at 9 A.M. on each day during the months of January and February, 1841,' by Sir Woodbine Parish.

'Memoir of the case of a gentleman born blind, and successfully operated upon in the eighteenth year of his age, with Physiological Observations and Experiments,' by J. C. August Franz, M.D.—The young gentleman who is the subject of this memoir had been affected from birth with strabismus of both eyes; the right eye was amaurotic, and the left deprived of sight by the opacity both of the crystalline lens and of its capsule. At the age of seventeen, an operation for the removal of the cataract of the left eye was performed by the author with complete success. On opening the eye for the first time, on the third day after the operation, the patient described

his visual perception as being that of an extensive field of light, in which everything appeared dull, confused, and in motion, and in which no object was distinguishable. On repeating the experiment two days afterwards, he described what he saw as a number of opaque watery spheres, which moved with the movements of the eye, but when the eye was at rest remained stationary, and their margins partially covering one another. Two days after this the same phenomena were observed, but the spheres were less opaque and somewhat transparent; their movements were more steady, and they appeared to cover each other more than before. He was now for the first time capable, as he said, of looking through these spheres, and of perceiving a difference, but merely a difference, in the surrounding objects. The appearance of spheres diminished daily; they became smaller, clearer, and more pellucid, allowed objects to be seen more distinctly, and disappeared entirely after two weeks. As soon as the sensibility of the retina had so far diminished as to allow the patient to view objects deliberately without pain, ribands differently coloured were presented to his eye. These different colours he could recognize with the exception of yellow and green, which he frequently confounded when apart, but could distinguish when both were before him at the same time. Of all colours, gray produced the most grateful sensation: red, orange, and yellow, though they excited pain, were not in themselves disagreeable; while the effect of violet and of brown was exactly the reverse, being very disagreeable, though not painful. Brown he called an ugly colour: black produced subjective colours; and white gave rise to a profusion of *musca volitantes*. When geometrical figures of different kinds were offered to his view, he succeeded in pointing them out correctly, although he never moved his hand directly and decidedly, but always as if feeling with the greatest caution. When a cube and a sphere were presented to him, after examining these bodies with great attention, he said that he saw a quadrangular and a circular figure, and after further consideration described the one as being a square, and the other a disc, but confessed that he had not been able to form these ideas until he perceived a sensation of what he saw in the points of his fingers, as if he really touched the objects. Subsequent experiments showed that he could not discriminate a solid body from a plane surface of similar shape; thus a pyramid placed before him, with one of its sides towards his eye, appeared as a plane triangle. Two months after the above-mentioned operation, another was performed on both eyes, for the cure of the congenital strabismus, by the division of the tendons of the recti interni muscles, which produced a very beneficial effect on the vision of the left eye; and even the right eye, which had been amaurotic, gained some power of perceiving light, and from being atrophied, became more prominent. Still it was only by slow degrees that the power of recognizing the true forms, magnitudes, and situations of external objects was acquired. In course of time the eye gained greater power of converging the rays of light, as was shown by the continually increasing capacity of distinct vision by the aid of spectacles of given powers.

'Catalogue of Geological Specimens procured from Kerguelen's Land during the months of May, June, and July, 1840.'

'Catalogue of Birds collected on board H.M.S. *Terror*, between the Cape of Good Hope and Van Diemen's Land.'

'Description of Plants from Kerguelen's Land, collected in May, June, and July, 1840.'

The above papers are by J. Robertson, Esq., Surgeon of H.M.S. *Terror*.

'On the Fossil Remains of Turtles discovered in the Chalk Formation of the South-East of England,' by G. A. Mantell, Esq.—In this paper the author gives a description, accompanied with drawings, of a remarkable fossil turtle, referable to the genus *Emys*, and named from its discoverer, Mr. Bensted, the *Emys Benstedii*, which has been lately found in a quarry of the lower chalk of Kent, at Burham, which is situated near the banks of the Medway, between Chatham and Maidstone. The specimen discovered consists of the carapace, or dorsal shell, six inches in length and nearly four inches in breadth, with some of the sternal plates, vertebrae, eight ribs