societies and by the communal authorities. Sixty-four students attended the lectures upon orchard cultivation; ninety-two farriers were taught at the various veterinary colleges and schools throughout the country. The winter evening agricultural schools, reading clubs, and local libraries all showed a considerable increase both in numbers and in attendance. Altogether some 23,400 persons attended agricultural schools or lectures on husbandry during the year. This is rather more than 1 per cent. of the total population of the country, and is good evidence that the people as a rule do not neglect the opportunities given them of becoming successful agriculturists.

Boron iodide, BI_3, has been prepared by M. Moissan, and its properties, which are of a somewhat remarkable nature, investigated. It may be obtained in three ways: (1) by leading gaseous hydriodic acid mixed with the vapour of boron chloride, BCl_3, through a porcelain tube heated to redness; (2) by the action of iodine upon boron at a temperature of 700°–800° C.; (3) by the action of hydriodic acid gas upon amorphous boron. The third method affords the best means of preparing the new substance in quantity. A current of gaseous hydriodic acid is first well dried by passage through porous calcium iodide; it is then led over amorphous boron contained in a hard glass tube heated to a temperature approaching that of the softening of the glass. At the commencement of the experiment a small quantity of iodine vapour makes its appearance, and is allowed to escape. When this ceases a dry receiver is attached to the end of the combustion tube, and a more or less deeply coloured crystalline product begins to collect. In a short time the reaction becomes very energetic, large quantities of the crystalline body being deposited, of a bright reddish-purple colour, and almost pure hydrogen escaping. The coloration is due to a small quantity of admixed iodine, for if the solid product is treated with carbon bisulphide it entirely dissolves, forming a solution of the same colour as that of iodine in carbon bisulphide, and which is rendered colourless by agitation with mercury. The solution in carbon bisulphide deposits on evaporation colourless transparent tabular crystals, somewhat nacreous in appearance, of pure boron iodide. The crystals are very sensitive to light; their colourless solution in carbon bisulphide becomes deep red in half an hour, owing to the liberation of iodine under the influence of diffused daylight. The crystals melt at 43° to a liquid which boils undecomposed at 210°, without any appearance of free iodine vapours. The crystals are exceedingly hygroscopic, attracting moisture with great rapidity, and thereby suffering decomposition. In contact with water itself the decomposition is instantaneous, boric and hydriodic acids being formed, $BI_3 + 3H_2O = H_3BO_3 + 3HI$. When heated in air or oxygen, boron iodide burns readily with a brilliant flame deeply coloured with iodine vapour, clouds of boric anhydride, B_2O_3, being also produced. Melted sulphur attacks it likewise with considerable energy, iodine volatilizing, and a substance being formed which on the addition of water yields a precipitate of sulphur and evolves sulphuretted hydrogen, presumably a sulphide of boron. Phosphorus reacts in the cold with incandescence. With oxychloride of phosphorus, $POCl_3$, a crystalline compound appears to be formed with considerable rise of temperature. Silver fluoride at once invokes incandescence, a violent evolution of gaseous fluoride of boron, BF_3, occurring together with formation of silver iodide. Ethyl alcohol likewise reacts with rise of temperature, a product being obtained which on distillation yields ethyl iodide, the residue consisting of boric acid, $3C_2H_6O + BI_3 = H_3BO_3 + 3C_2H_5I$. Ethyl ether forms with boron iodide a brown liquid, also with considerable evolution of heat, which appears to consist of ethyl iodide and boric ether: $3(C_2H_5)_2O + BI_3 = 3C_2H_5I + B(OC_2H_5)_3$; for on the addition of water to the product, ethyl iodide, boric acid, and alcohol are obtained.

The additions to the Zoological Society's Gardens during the past week include a Spiny-tailed Mastigure (*Uromastix acanthinurus*) from Algeria, presented by Mrs. W. Williams; two Chipping Squirrels (*Tamias striatus*) from North America, presented by Mr. A. W. Jutson; a Brown Milvago (*Milvago chimango*) from South America, presented by Mr. J. Mand; three Puff Adders (*Vipera arietans*) from the Cape of Good Hope, three Egyptian Cobras (*Naia haje*) from Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; a Tuatera Lizard (*Sphenodon punctatus*) from New Zealand, presented by Mr. Thos. E. Phillips; a Red-spotted Lizard (*Eremias rubro-punctatus*) from the Pyramids of Dashoor, presented by Dr. Drewitt; two Scorpions from Alexandria, presented by Mr. Sidney R. Carver; three Partridge Bronze-winged Pigeons (*Geophaps scripta*), a Brush Bronze-winged Pigeon (*Phaps elegans*), three Maned Geese (*Bernicla jubata*) from Australia, purchased.

OUR ASTRONOMICAL COLUMN.

The Solar Corona.—The fourteenth number of the Publications of the Astronomical Society of the Pacific contains several notes on the solar corona. Prof. Charroppin gives the results of an investigation into photographs of the corona, and recommends the following methods in order to obtain greater extension of coronal streamers: (1) to use orthochromatic plates; (2) the greatest precaution to guard from all foreign light; (3) short exposures to obtain the polar filaments and the inner corona; (4) long exposures to secure the extension of the outer corona; (5) photographing each wing separately, and keeping the brighter part of the eclipse out of the field. Prof. Frank H. Bigelow gives a brief summary of the result of a discussion of a photograph of the corona streamers of the eclipse of July 29, 1878, according to the law of equipotential surfaces. He shows that the repulsion of the surfaces of infinitesimally small particles, obeying this law, is all that is required as a fundamental conception, in order to arrive at a physical interpretation of the facts. Lastly, Mr. Schaeberle gives a short account of the principles and results of the mechanical theory of the corona, to which reference has been made in a previous number (Nature, vol. xlii. p. 68). The full account of the investigation will appear in a report to be issued by the State Legislature. Beginning with the theorems, that (1) the eruptions on the sun's surface are most active and numerous in the sun-spot zones; (2) the sun rotates about an axis passing through its centre; (3) this axis is inclined to the plane of the earth's orbit at an angle of about 82¾°, Mr. Schaeberle derives formulæ which give results showing "that the observed shapes of the equatorial extension or wings of the corona can be satisfactorily accounted for by supposing them to be the envelopes of systems of streamers ejected from the sun-spot zones with initial velocities of less than 380 miles per second (such velocities as have been observed in the higher regions of the prominences, for example)." He then shows on mechanical principles that the curious forms of the "polar rays," which are seen in any corona can be produced by the perspective overlapping of systems of nearly right line streamers originating within the sun-spot zones, and have therefore no objective existence. The *résumé* given by Mr. Schaeberle is a proof that he has thoroughly worked out his theory, and tested its capability of explaining the numerous coronal forms. We therefore look forward with interest to the publication of the Eclipse Report, containing the extended argument in favour of a theory which certainly rivals all others in simplicity.

The Photographic Chart.—A recently published *Bulletin du Comité international permanent pour l'exécution photographique de la Carte du Ciel* is distinguished by several interesting and important articles. M. Kapteyn and M. Gautier contribute notes on the construction and use of the apparatus for the measurement of the photographs, and Dr. Scheiner describes a simple method used at Potsdam for the exact orientation of the telescope. In a paper on the law of photographic diameters of stellar disks, Max Wolf compares the disks of Polaris and neighbouring stars, and the group G.C. 4410, obtained by exposures varying, in geometrical progression, from 1 to 1024 seconds, and deduces the conclusion that the increase in diameter gets smaller and smaller as the exposure increment is augmented. M. Dunér discusses the vexed question of the determination of the photographic magnitudes of stars by means of measures made on the negatives, and propounds the following definition :—"The relation between the light of two stars which differ from each other by a photographic magnitude is expressed by the factor with which the time of exposure of a given plate must be multiplied or divided in order to render the diameter of the image of a star on the new *cliché* equal to the image of another star on the given *cliché*." A paper by M. Prosper Henry, on the value of atmospheric refraction for different portions of the spectrum, has previously been noticed (NATURE, vol. xliii. p. 400).

COMET BARNARD-DENNING (*a* 1891).—Prof. Berberich gives the following elements in *Astronomische Nachrichten*, No. 3027, for the comet discovered by Mr. Barnard, of Lick Observatory, on March 29·695, G.M.T. and by Mr. Denning at Bristol on March 30·417 G.M.T.

Mean epoch = 1891 April 27·730 Berlin mean time.

Longitude of perihelion = 178° 14′·30 }
Longitude of ascending node = 194 13·14 } Mean Eq.
Inclination = 120 30·52 }
Perihelion distance = 0·40652 earth's mean distance.

On the 18th inst. the comet is in R.A. 1h. 42m. 9s., Decl. + 23° 41′·6, and is therefore not well situated for observation, although it is increasing in brightness.

THE PLANET MERCURY.—At the present time the planet Mercury is in a position most favourable for observation, and will continue so until about the 25th of this month. Appearing as an evening star, it will be found near the western horizon just after sunset, and those who have no optical means at their disposal should look out for it at about 8 o'clock on the 19th or 20th of this month, when it will resemble a star of about the first magnitude, and will be a little to the westward of the Pleiades. Although the planet Mars is also situated near this region, the detection of Mercury can easily be made, by reason of its colour, which is of a far whiter hue than that of the first-mentioned planet. During the latter end of the present month and the first week of May the planet will be almost invisible, being lost in the rays of the sun, and its next appearance will take place as it transits the disk of the sun on the 9th of the same month. At Greenwich the transit will only be partial, as the sun will rise at 16h. 19m. (Greenwich mean time), so that only the internal and external contacts at egress can be observed.

For the benefit of those wishing to observe the planet during the present week, the following extract from the *Nautical Almanac* may be useful :—

	Apparent R.A. Noon. h. m. s.	Apparent Declination. Noon. ° ′ ″
April 16	2 50 13·46	N. 19 2 59·0
,, 17	2 54 42·75	19 27 55·9
,, 18	2 58 52·66	19 50 6·0
,, 19	3 2 42·52	20 9 29·4
,, 20	3 6 11·74	20 26 5·4
,, 21	3 9 19·79	20 39 54·3
,, 22	3 12 6·27	20 50 56·5

NEW ASTEROID (308).—M. Borelly discovered the 308th asteroid on March 31.

THE WHEAT HARVEST IN RELATION TO WEATHER.

THE general law of wheat production in England was stated in the *Times* of August 30, 1881, as follows : "The yield of wheat is proportional to the summer temperature, with the modifying conditions of rainfall, prevalence of cloud, character of the weather at blossoming time and during the harvest, and the state of growth at the commencement of the summer" ; and it was added, "The growing influence of a high or low thermometer is established by the observations of many years." To test the law, superior and inferior harvests may be correlated with their summer temperatures and rainfall. For this purpose the meteorological records of the Royal Observatory, Greenwich, will be used. The mean temperature of June, July, and August, and the total rainfall for these months, will be taken for the summer.

I.—*Superior Wheat Harvests.*

Year.	Character.	Temperature.	Rainfall.
		°	inches.
1775	Plentiful	62·0	?
1779	Plentiful	62·3	?
1791	Abundant	59·5	Dry
1818	Most abundant	64·3	1·4
1819	Fine	60·3	4·6
1820	Productive	58·0	8·2
1825	Early and good	62·0	3·3
1826	Remarkably early and very great	64·0	5·1
1827	Good	60·0	2·9
1833 (*a*)	Abundant	59·4	6·7
1834 (*b*)	Early, very productive	62·5	11·3
1835	Good	62·6	4·5
1840	Fine yield	59·8	3·9
1849	Above the average	61·0	3·8
1851	Above the average	61·0	7·2
1854	Extremely good	59·0	5·6
1857	Above the average	63·9	6·0
1858	Above the average	62·5	5·7
1863	Abundant	60·3	6·6
1864	Good	59·6	2·5
1868	Productive	64·4	4·1
1874	Very good	60·9	6·4
1888 (*c*)	Above the average	58·4	13·8
	Mean	61·2	5·68

II.—*Inferior Wheat Harvests.*

Year.	Character.	Temperature.	Rainfall.
		°	inches.
1789	Very deficient	59·7	Wet
1792	Inferior	58·3	Wet
1795	Very defective	57·8	?
1800	Bad	60·7	Wet
1810	Scanty	60·0	?
1811	Very scanty	59·0	?
1812	Very defective	56·0	?
1816	Very great deficiency	55·2	8·4
1817	Deficient	57·4	7·9
1821	Inferior	57·8	7·0
1823	Deficient	57·8	7·1
1828	Bad	60·3	12·0
1829	Inferior	59·0	9·4
1838	Late, unproductive	59·1	7·3
1839	Damaged	59·3	7·6
1848	Very bad	59·5	10·6
1852	Below the average	61·7	11·4
1853	Bad	60·1	11·0
1860	Very deficient	56·7	11·6
1867	Deficient	59·8	10·2
1873 (*d*)	Very deficient	61·7	7·6
1875	Very unsatisfactory	60·3	9·8
1876 (*e*)	Unsatisfactory	62·7	3·7
1877 (*f*)	Unsatisfactory	62·0	6·0
1879	Worst known	58·5	13·3
1880	Deficient	60·6	7·1
1881	Deficient	61·1	7·9
1886 (*g*)	Deficient	61·0	4·1
	Mean	59·4	8·6

(*a*) May was very dry.
(*b*) The winter was very mild ; the spring very dry.
(*c*) The winter and early spring were very cold ; May was very dry, with much sunshine.
(*d*) Frost occurred at blooming-time.
(*e*) and (*f*) The spring was cold.
(*g*) The winter and early spring were very cold ; May was very wet.