

superintended by a large staff of officials. In the mountainous regions the maintenance of the forests is an absolute necessity, but, unfortunately, many slopes have become quite denuded through reckless cutting in the past. The actual extent of forest area has, however, increased since the sixteenth century, but energetic measures are now needed to prevent many of the woods deteriorating any further. Complaints are made by those who are anxious to preserve the forests that the peasants are not taught the value of them, and that in the elementary schools the principles of woodcraft and agriculture are never taught. Of the whole area under timber, the State owns only 3.42 per cent., while the *communes* possess 79.93 per cent., and private owners 16.63 per cent. As a rule the communal management is very reckless, and the forests have suffered so much that it has been seriously considered that the woods should be divided up amongst the peasants; but it is more than probable that this remedy would prove worse than the disease. The timber in the Cadore country is said to be the best in the world. Amongst the trees of the region are—the common Norway spruce, which flourishes at an altitude of 2400 metres above the level of the Adriatic, and grows to a height of about 30 metres; a variety of the Norwegian spruce, resembling the beech in its fibres, with harder wood, shorter leaves, and smaller cones than the common spruce; the common silver fir, which grows in the mountains 1500 metres above the Adriatic, and reaches a height of 25 metres; the common larch, the Scotch fir, the Mugho pine, the Swiss stone pine, the beech, and the walnut.

FROM the general results of the Swiss census of December 1, 1888, which have already been worked out, it seems that the total population is 2,934,055, against 2,846,102 in 1880. The German-speaking element increased from 2,030,792 in 1880 to 2,092,562, which, taking into account the normal growth of the population, was no relative increase, the proportion in both cases being precisely 71.3 per cent. of the whole. The French, on the other hand, increased from 608,007 to 637,940, which was also a relative increase of 21.4 to 21.7 per cent.; while the Italian declined actually as well as relatively, the numbers being 161,923 in 1880 and 156,602 in 1888, or 5.7 and 5.3 per cent. respectively. The decline of the Italians in the Cantons of Uri and Schwyz is explained by the return home of a large number of Italian workmen engaged in the St. Gothard Railway; but it is not so easy to explain why there is a large decrease in the Germans in the Cantons of Berne and Neuchâtel, while the French have increased. In general the French increase in Switzerland seems to be at the expense of the Germans, while the German element recovers its place at the expense of the Italian.

WE have received a "Guide to Technical and Commercial Education," drawn up by the executive Committee of the Dundee and District Association for the Promotion of Technical and Commercial Education. It is intended to fulfil one of the objects for which the Association was promoted, viz. "To draw up a syllabus for the district, in which shall be suggested such courses of education as shall be most suitable for particular trades; and further, to indicate (a) the number of years required for the complete education, (b) the total cost, and (c) the institutions in which the necessary instruction may be obtained." We draw special attention to this "Guide," as it cannot fail to be of the utmost use to similar Associations elsewhere, especially as it is drawn up with reference to the Science and Art examinations and those of the City Guilds. A definite order of study is suggested and recommended in a number of subjects, such as commerce, civil, mechanical, and electrical engineering, architecture, art industries, textiles, ship-building, gas manufacture, &c. The courses have evidently been compiled with great care and patience, and with the aid of practical men in the various subjects treated.

AMONGST the books to be published by Messrs. Crosby Lockwood and Son during the coming publishing season are:—"The Art of Paper Manufacture," by Alexander Watt; "A Hand-book on Modern Explosives," by M. Fissler; "Engineering Estimates, Costs, and Accounts," by a General Manager; "The Mechanical Engineer's Office Book," by Nelson Foley, second edition; "The Practical Engineer's Hand-book," by Walter S. Hutton, third edition; "Electric Light, its Production and Use," by J. W. Urquhart, third edition; "The Fields of Great Britain," a text-book of agriculture adapted to the Syllabus of the Science and Art Department, by Hugh Clements, second edition. And the following new editions in Weale's Rudimentary Scientific Series:—"Metallurgy of Iron," by H. Bauerman; "The Mineral Surveyor and Valuer's Complete Guide," by W. Lintern; "Stationary Engine Driving," by Michael Reynolds; "Irrigation and Water Supply," by Prof. John Scott.

MR. T. J. P. JODRELL, of Yeardsley, Cheshire, sometime of Stratton Street, London, whose death, as recently announced in the *Times*, took place on the 3rd inst., in his eighty-second year, was the founder of the Jodrell Fund, a capital sum of £6000 having been given by him to the Royal Society in the year 1876 for scientific purposes.

THE additions to the Zoological Society's Gardens during the past week include a White-fronted Lemur (*Lemur albifrons* ♂) from Madagascar, presented by Mr. C. O. Pelly; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. H. B. Wedlake; a Brown Bear (*Ursus arctus*) from Russia, presented by Mr. Frank Dugdale; a Crested Porcupine (*Hystrix cristata*) from Africa, presented by Mrs. Lucas-Shadwell; three African Iepidosirens (*Protopterus annectans*) from the River Gambia, West Africa, deposited; a Burchell's Zebra (*Equus burchelli* ♀), from South Africa, four Larger Tree Ducks (*Dendrocygna major*), three Indian Tree Ducks (*Dendrocygna javanica*) from India, a Tuberculated Iguana (*Iguana tuberculata*) from Brazil, purchased; a Red Kangaroo (*Macropus rufus* ♂), two Cockateels (*Calopsitta novaehollandiae*), a Crested Pigeon (*Ocyphaps lophotes*), a Nicobar Pigeon (*Columba nicobarica*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

COMET 1889 *ε* (DAVIDSON).—The following ephemeris for Greenwich midnight for this object is in continuation of that given in NATURE for August 29 (p. 424):—

1889.	R.A.	Decl.	Log Δ.	Log <i>r</i> .	Bright- ness.
	h. m. s.	°			
Sept. 29 ...	17 14 19 ...	32 6.5 N...	0.1635 ..	0.1940 ...	0.03
Oct. 3 ...	17 21 53 ...	32 38.5 ...	0.1829 ...	0.2064 ...	0.02
7 ...	17 29 28 ...	33 8.2 ...	0.2011 ...	0.2186 ...	0.02
11 ...	17 37 7 ...	33 36 1 N...	0.2182 ...	0.2306 ...	0.02

The brightness at discovery is taken as unity.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1889 SEPTEMBER 29—OCTOBER 5.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on September 29

Sun rises, 5h. 59m.; souths, 11h. 50m. 11.7s.; daily decrease of southing, 19.5s.; sets, 17h. 41m.; right asc. on meridian, 12h. 23.9m.; decl. 2° 35' S. Sidereal Time at Sunset, 18h. 16m.
Moon (at First Quarter October 2, 2h.) rises, 11h. 8m.; souths, 15h. 40m.; sets, 20h. 4m.; right asc. on meridian, 16h. 14.4m.; decl. 18° 29' S.

Planet.	Rises.		Sets.		Right asc. and declination on meridian.	
	h. m.	h. m.	h. m.	h. m.	h. m.	°
Mercury...	8 30	13 15	18 0	13 49.4	14	59 S.
Venus....	2 44	9 46	16 48	10 19.9	11	18 N.
Mars	2 49	9 51	16 53	10 24.8	11	18 N.
Jupiter...	13 35	17 27	21 19	18 1.6	23	30 S.
Saturn....	2 23	9 34	16 45	10 7.0	12	56 N.
Uranus...	7 22	12 46	18 10	13 19.8	7	48 S.
Neptune..	19 50*	3 39	11 28	4 11.2	19	24 N.

* Indicates that the rising is that of the preceding evening.

Oct.	h.	
1	11	Jupiter in conjunction with and 0° 39' south of the Moon.
1	13	Venus in conjunction with and 0° 22' south of Mars.
4	1	Mercury stationary.

Variable Stars.

Star.	R.A.		Decl.	h.	m.
	h. m.	°			
S Ceti ...	0 18.4	9 57 S.	Oct. 1,		M
U Cassiopeiæ ...	0 40.2	47 39 N.	„ 3,		M
U Cephei ...	0 52.5	81 17 N.	„ 5,	3 26	m
Algol ...	3 1.0	40 32 N.	„ 4,	3 45	m
λ Tauri ...	3 54.5	12 11 N.	„ 5,	0 59	m
U Boötis ...	14 49.2	18 9 N.	Sept. 30,		M
S Herculis ...	16 46.8	15 8 N.	„ 29,		M
U Ophiuchi...	17 10.9	1 20 N.	„ 29, 20	52	m
			Oct. 4,	21 38	m
Y Sagittarii ...	18 14.9	18 55 S.	Sept. 29,	21 0	m
R Scuti ...	18 41.6	5 20 S.	Oct. 3,		M
β Lyræ... ..	18 46.0	33 14 N.	„ 4,	0 30	M
R Cygni ...	19 33.8	49 57 N.	„ 4,		M
S Aquilæ ...	20 6.5	15 18 N.	„ 3,		m
R Delphini ...	20 9.6	8 45 N.	„ 1,		M
T Vulpeculæ ...	20 46.8	27 50 N.	Sept. 30,	23 0	m

M signifies maximum; m minimum.

Meteor-Showers.

	R.A.	Decl.		
Near η Aurigæ ...	75	41 N.	October 2.	Swift.
	225	52 N.	October 2.	Slow, bright.
„ δ Draconis ...	290	68 N.		Swift.

GEOGRAPHICAL NOTES.

ON the 12th inst. the administration of the Congo State received intelligence by way of Zanzibar that Mr. H. M. Stanley, on leaving the basin of the Albert Nyanza, endeavoured to make his way southwards by passing to the west of the Victoria Nyanza, but was unsuccessful. He then went northwards, and reached the eastern shore of the lake, Emin Pasha accompanying him. Mr. Stanley made a long stay on the borders of the lake, awaiting supplies from Msalala and Jabora, for which he had sent. He left Emin Pasha on the eastern shore of the lake several months ago, and proceeded in the direction of Mombassa. Mr. Stanley is expected to reach the eastern coast of Africa towards the end of October next.

ACCORDING to information received at Lloyd's from Tromsø, dated September 9, the German travellers Kukenthal and Walter, belonging to the Bremen Arctic Expedition, who were shipwrecked last spring in the *Bertina*, have arrived safely at Tromsø.

M. JOSEPH MARTIN, the French explorer, known in connection with his late expedition to Eastern Siberia, recently left Pekin with a small escort for Tibet, intending to proceed along the Great Wall, subsequently passing through the towns of Liang-Chow and Sining and the province of Koko-Nor, where he expects to arrive next spring. The object of the expedition is of a purely scientific character.

MR. FREDERICK JEPPE, of Pretoria, has recently issued, through Lulau and Co., an excellent map of the Transvaal and neighbouring territories on the scale of 15 78 miles to an inch. It includes not only the Transvaal, but the Orange Free State and all the countries between these and the coast, from Delagoa Bay down to Pondoland. It goes north to close on the

Zambesi, including Matabeleland, Bechuanaland, Griqualand West, and the northern parts of Cape Colony. There are, moreover, a number of special inset maps. The physical features, mountains, rivers, &c., are laid down clearly and in detail. The gold-fields are coloured yellow, the topography is almost exhaustive, and the map is really a gazetteer of the extensive and important region which it embraces. Mr. Jeppe gives a list of the various authorities which he has used in the compilation of his map, and these are the best and latest available.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 9.—M. Des Cloizeaux, President, in the chair.—On the fixation of atmospheric nitrogen, by M. Berthelot.—Observations on the formation of ammonia and volatile azotised compounds at the expense of vegetable earth and of plants, by the same. He traces the researches, initiated by him six years ago, establishing the fixation, by earth and plants, of free nitrogen of the air, with the aid of mineral matters and living organisms. Analysis of the liquid condensed within a bell jar inclosing earth, or earth with vegetation, proves the exhalation (of ammonia, &c.) above referred to; and like the ptomaines, &c., produced by animals in a closed space, the products are toxic to the organisms yielding them.—On the nitrification of ammonia, by M. Th. Schloësing. Small quantities of gaseous nitrogen (negligible in agricultural practice), are liberated during the oxidation of ammonia in soil. The author shows that the nitrification of ammonia put into a soil in the form of sulphate, may be effected very quickly, when favoured by the nature of the soil, its humidity and its temperature. In slow combustion of the organic matter of soil, through the agency of the nitric ferment, much more oxygen is used in burning the carbon and hydrogen, than in nitrification of the nitrogen. But in a soil enriched with ammonia, the activity of the ferment is much increased, in conveying oxygen to the ammonia, and it seeks from organic matter only the carbon needed for its development and multiplication.—On the bacteriological study of the lesions of contagious peripneumonia of the ox, by M. S. Arloing. He distinguishes a bacillus and three kinds of micrococci.—On some observations made at the Observatory of Algiers, by M. Ch. Trépiéd. The separation of the nucleus of Brooks's comet, affirmed by the Mount Hamilton observers, could not be certainly made out. This Observatory, begun in the spring of 1885, on a height (350 metres) overlooking Algiers, has now all its instruments except a photographic equatorial. M. Trépiéd notes that the telescopic image of a star, during the sirocco, becomes a continuous luminous spot, the intensity diminishing outwards; an effect, doubtless, of dust.—Observations of Brooks's comet and its companion, made at the Observatory of Algiers with the 0.50 m. telescope, by MM. Rambaud and Sy.—The spectro-photography of the invisible parts of the solar spectrum, by M. Ch. V. Zenger. He describes as advantageous combinations, prisms of quartz and anethol; of quartz and calcareous spar; of the latter and sulphide of carbon; and of rock salt and anethol. One prism of rock salt, with two of anethol, gives nine times more dispersion, and the red part is six times more dispersed between A and D, than by a 60° prism of rock salt.—Researches on sulphites, by M. P. J. Hartog.—On a new monobromized camphor; on the constitution of monosubstituted derivatives of camphor, by M. P. Cazeneuve. The new compound is obtained similarly to the chlorine compound, got by the action of hypochlorous acid, and has similar properties.—On phenoldisulphonic acid, by M. S. Allain-Le Canu.—Influence, on bare soil, of gypsum and clay, on the conservation of nitrogen, the fixation of atmospheric nitrogen, and nitrification, by M. Péchard. The sulphate of lime retains the ammonia in the state of sulphate, and contributes indirectly to the production of nitric acid, by keeping the nitrogen in a form easily nitrifiable; also directly, (in a way not well understood) by its power of deoxidation and reoxidation. Gypsum and clay, both added to sandy soil, concur in fixing ammonia; the former keeps the fixing power of the latter active by removing its ammonia in the state of sulphate easily nitrifiable (clay alone is rather adverse to nitrification).—Manufacture of red glasses for windows (twelfth and thirteenth centuries), by MM. Ch. Er. Guignet, and L. Magne. A microscopic examination of these old glasses shows.