

dependent not only on latitude, but largely on configuration of the land, and especially on the direction of moisture-bearing winds with reference to the trend of mountains.

The winds from the Pacific Ocean striking against the coast range are forced by the expansion and consequent cooling to give up much of their moisture on the windward side; a second impact and further condensation of the moisture takes place on the Cascade range and Sierra Nevada. On descending, with consequent compression, the wind becomes warmer and drier, so that the interior basin, without additional sources of moisture and no additional cause for condensation, is left without much rainfall and with a very low relative humidity, namely, below 50 per cent. The Rocky Mountains finally squeeze out whatever moisture remains in the air currents, which arrive proportionally drier on the eastern slope. This dry condition extends over the plains until the moist currents from the Gulf of Mexico modify it. Somewhat corresponding, yet not quite, to this distribution of moisture, the western slopes are found to be better wooded than the eastern, and the greater difficulty of establishing a forest cover here must be admitted; yet since the forest has the capacity of creating its own conditions of existence by increasing the most important factor of its life, the relative humidity, the extension of the same may only be a question of time.

Temperature extremes, to be sure, also set a limit to tree growth, and hence the so-called timber line of high mountains, which changes in altitude according to the latitude.

If now we turn our attention from the phyto-topographic consideration of the forest cover to the phyto-geographic and botanical features, we may claim that the North American forest, with 425 or more arborescent species, belonging to 158 genera, many of which are truly endemic, surpasses in variety of useful species and magnificent development any other forest of the temperature zone, Japan hardly excepted. In addition there are probably nowhere to be seen such extensive fields of distribution of single species.

These two facts are probably explained by the north-and-south direction of the mountain ranges, which permitted a re-establishment after the Ice Age of many species farther northward, while in Europe and the main part of Asia the east-west direction of the mountains offered an effectual barrier to such re-establishment, and reduced the number of species and their field of distribution; nor are the climatic differences of different latitudes in North America as great as in Europe, which again predicates greater extents in the fields of distribution north and south. On the other hand, the differences east and west in floral composition of the American forest are greater than if an ocean had separated the two parts instead of the prairie and plains. This fact would militate against our theory that the intermediate forestless region was or would be eventually forested with species from both the established forest regions, if we did not find some species represented in both regions and a junction of the two floras in the very region of the forestless areas.

(To be continued.)

SOCIETIES AND ACADEMIES.

LONDON.

Zoological Society, November 20.—Sir W. H. Flower, K.C.B., F.R.S., President, in the chair.—Mr. F. G. Parsons read a paper on the anatomy of *Atherura africana*, compared with that of other porcupines. In addition to the points mentioned by Drs. Gray and Günther, as differences between the skulls of *A. africana* and *A. macrura*, the arrangement of the fronto-nasal suture, the position of the maxillo-malar suture, and the frequent presence of an "os anti-epilepticum" were noticed.—A communication from Mr. J. T. Cunningham treated of the significance of diagnostic characters in the Pleuronectidæ.—Mr. A. Smith Woodward read a description of the so-called Salmonoid fishes of the English Chalk, dealing with the osteology of *Osmerooides lewesiensis*, *Elopopsis crassus*, and *Aulolepis typus*.—Mr. W. Garstang read a paper on the Gastropod *Colpodaspis pusilla* of Michael Sars. He described a specimen of this rare mollusk found by him at Plymouth in the early part of the year.—A communication from Mr. A. D. Bartlett gave an account of the recent occurrence in the Society's menagerie of a case of one boa swallowing

another of nearly equal size.—A communication from Prof. R. Collett contained a description of a new Agonoid fish from Kamschatka, proposed to be called *Agonus gilberti*.

Royal Meteorological Society, November 21.—Mr. R. Inwards, President, in the chair.—Dr. H. B. Guppy read a paper on suggestions as to the methods of determining the influence of springs on the temperature of a river as illustrated by the Thames and its tributaries. The methods suggested were (1) comparison of the curves of the monthly means of the temperatures of the air and of the water for the river under observation with those of a river beyond the controlling influence of springs; (2) comparison of the monthly means of the temperature of the river under investigation with that of a river beyond the control of the springs; (3) comparison of the range of the monthly means of the river temperature with that of the air in the shade; (4) comparison of the daily range of water temperature at different stations along a river's course; (5) comparison of sunrise observations made at different stations along a river's course; (6) comparison of observations made at different stations along a river's course at the hour of maximum temperature; (7) comparison of the results obtained from a single series of observations made in one day along the whole course of a small tributary like the Wandle, or along the upper course of a larger tributary as the Kennet; and (8) determination of the distance from its sources at which the river begins to freeze.—Mr. Eric S. Bruce exhibited and described some lantern slides showing the disastrous effects of the great gale of November 17 and 18, 1893, upon trees in Perthshire, Scotland.—Mr. Alfred B. Wollaston gave an account of the formation of some water-spouts which he had observed in the Bay of Bengal.

CAMBRIDGE.

Philosophical Society, November 12.—Prof. J. J. Thomson, President, in the chair.—On the inadequacy of the cell theory and on the development of nerves, by Mr. A. Sedgwick. The author pointed out that the cell-theory, in so far as it implied that the organism was composed of cell-units derived by division from a single primitive cell-unit, the oövicel, would not bear the scrutiny of modern embryology, and that in fixing men's attention too much upon the cell as a unit of structure, it had had a retarding influence on the progress of the knowledge of structure. He illustrated this latter point by reference to the current ideas on two important subjects: the structure of the embryonic tissue called mesenchyme, and the development of nerves. The mesenchyme is not composed of separate branched cells, but has rather a spongy or reticulate structure, and is continuous both with ectoderm and endoderm. Nerves do not develop as outgrowths of the central organ, but arise *in situ* from the mesenchyme.—Note on the evolution of gas by water-plants, by Mr. F. Darwin.

PARIS.

Academy of Sciences, November 19.—M. Lœwy in the chair.—After the reading of the *procès verbal*, the meeting was adjourned as a mark of respect to the late Czar of Russia.

AMSTERDAM.

Royal Academy of Sciences, October 27.—Prof. Van de Sande Bakhuyzen in the chair.—Mr. Franchimont, in presenting Mr. H. van Erp's thesis for the Doctorate in Chemistry at the University of Leyden, entitled "Studie over aliphatische nitraminen," described it as a summary of all the known acid and neutral nitramines and nitramides, and also of their modes of formation. In dealing with the action of water, acids and alkalis on these bodies, Mr. van Erp considers them as derived from the amide of nitric acid, and compares them to the analogous derivatives of nitrous acid, hypochlorous acid, &c. For experimental purposes he made the unknown butyl- and hexyl-derivatives: nine urethanes, seven nitro-urethanes, four acid nitramines with several salts, two mixed neutral nitramines. He failed, however, to obtain nitro-compounds of the tertiary butyl amidoformates. He has observed that while the potassium salts of the acid nitramines yield the neutral methyl-derivatives by the action of methyl iodide, the silver salts produce an isomeric methylated nitramine, or a mixture of the two. Similar observations in the case of the salts of phenylnitramine were made later by Bamberger. The behaviour of acid nitramines towards dilute sulphuric acid was studied on hexylnitramine, the result being N₂O, two hexanols, a primary and a secondary

(2?), hexene (1) and a dihexylic ether. Mr. van Erp has also observed the behaviour of neutral nitramines with alkalis. Dimethylnitramine gives nitrous acid, monomethylamine, formic acid (and methyl alcohol?). Diethyl- and dipropyl-nitramine seemed not to be changed. Normal butylmethyl-nitramine, less easily than dimethylnitramine, gives nitrous acid, butylamine, formic acid (and methyl alcohol?). It therefore seems that mixed nitramines give the amine with the greatest alkyl, or the methyl radical is most easily separated from the nitrogen.—On quadrinodal quintics, by Mr. Jan de Vries.—On the cranial nerves of vertebrates in amphioxus, by Mr. van Wijhe. The olfactory nerve represents a type of its own. The ventral nerves, or nerves of the myotomes, do not exhibit special characteristics. Among the dorsal or septal nerves, the trigeminal, facial, glossopharyngeal and vagus nerves could be recognised with more or less probability, chiefly by their relations to the branchial clefts, the first of which on the left side becomes the opening of the velum.

DIARY OF SOCIETIES.

LONDON.

THURSDAY, NOVEMBER 29.

SANITARY INSTITUTE, at 8.—Workers in Copper, Zinc, Brass, and Tin: Dr. R. M. Simon.

FRIDAY, NOVEMBER 30.

ROYAL SOCIETY, at 4.—Anniversary Meeting.
INSTITUTION OF CIVIL ENGINEERS, at 8.—Sub-aqueous Excavation at Newry: C. H. Olley.
SANITARY INSTITUTE, at 8.—Sanitary Law: Prof. A. Wynter Blyth.

SUNDAY, DECEMBER 2.

SUNDAY LECTURE SOCIETY, at 4.—Village Life in India: Mr. R. W. Frazer.

MONDAY, DECEMBER 3.

SOCIETY OF ARTS, at 8.—Modern Developments in Explosives: Prof. Vivian B. Lewes.
SOCIETY OF CHEMICAL INDUSTRY (Burlington House), at 8.—The Rational Sterilisation of Alimentary Liquids: Mr. E. W. Kuhn (of Paris).—An Investigation of the Natural Sodium Sulphate Lakes of Wyoming, U.S.A.: Dr. D. H. Atfield.—Specimens of India-rubber, and Petroleum Oil, Varnish, and Soap will be exhibited by Mr. Thos. Christy.
VICTORIA INSTITUTE, at 4.30.—Semitic Languages: Mr. T. G. Pinches.

TUESDAY, DECEMBER 4.

ZOOLOGICAL SOCIETY, at 8.30.—On some Points in the Anatomy of Ornithorhynchus paradoxus: Mr. T. Manners Smith.—On certain Points in the Visceral Anatomy of Ornithorhynchus: Mr. F. E. Beddard, F.R.S.—On some Remarkable Corals of Great Size from North-West Australia: Prof. F. Jeffrey Bell.—Second Report on Additions to the Lizard Collection in the Natural History Museum: Mr. G. A. Boulenger, F.R.S.
INSTITUTION OF CIVIL ENGINEERS, at 8.—The Machinery of War-Ships: Mr. Albert J. Durston.—Colliery Surface-Works: Mr. E. B. Wain.
ROYAL STATISTICAL SOCIETY, at 4.45.—The Eleventh United States Census: Hon. R. P. Porter.—Exhibition of the Hollerith Electrical Counting Machine: Dr. H. Hollerith.

WEDNESDAY, DECEMBER 5.

SOCIETY OF ARTS at 8.—Fire Protection: Mr. Edwin O. Sachs.
GEOLOGICAL SOCIETY, at 8.—Supplementary Note on the Narborough District (Leicestershire): Prof. T. G. Bonney, F.R.S.—The Tarns of Lakeland: Mr. J. E. Marr, F.R.S.—The Marble Beds of Natal: Mr. David Draper.—Description of a New Instrument for Surveying by the Aid of Photography, with some Observations upon the Applicability of the Instrument to Geological Purposes: Mr. J. Bridges Lee.
ENTOMOLOGICAL SOCIETY, at 8.—A List of the Lepidoptera of the Khasia Hills, Part III.: Colonel Charles Swinhoe.—A Monograph of British Braconidae, Part VI.: Rev. T. A. Marshall.—On the Longicorn Coleoptera of the West India Islands: Mr. Charles J. Gahan.—Notes on the Fungus Growing and Eating Habit of Sericomyrmex opacus, Mayr.: Mr. F. W. Ulrich.—An Apparent Case of Sexual Preference in a Male Insect: Prof. E. B. Poulton, F.R.S.

THURSDAY, DECEMBER 6.

ROYAL SOCIETY, at 4.30.—Experimental Researches on Vegetable Assimilation and Respiration. No. 1. On a New Method for Investigating the Carbonic Acid Exchanges of Plants. No. 2. On the Paths of Gaseous Exchange between Aerial Leaves and the Atmosphere: Mr. F. F. Blackman.
SOCIETY OF ARTS, at 4.30.—Roman and British Indian Systems of Government: Hon. W. Lee-Warner, C.S.I.
LINNEAN SOCIETY, at 8.—A New Revision of Dipterocarpeæ, with Lantern Slides: Sir D. Brandis, F.R.S.—On the Spinning Glands in Phrynus: Mr. H. M. Bernard.
CHEMICAL SOCIETY, at 8.—The Use of the Globe in the Study of Crystallography: J. Y. Buchanan, F.R.S.—Latent Heat of Fusion: Mr. H. Crompton.—New Method of Preparing Dihydroxytartaric Acid: Mr. H. J. H. Fenton.—Essence of Oil of Hucus: Mr. A. C. Chapman.
LONDON INSTITUTION, at 6.—The Fauna of Rivers and Lakes: Prof. Sydney Hickson.

FRIDAY, DECEMBER 7.

ROYAL INSTITUTION, at 5.—General Monthly Meeting.
GEOLOGISTS' ASSOCIATION, at 8.—Note on Megalosaurian Teeth, discovered by Mr. J. Alstone in the Portlandian of Aylesbury: Mr. A. Smith Woodward.—On the Geology of the St. Gothard Pass: Mr. H. W. Monckton.

SATURDAY, DECEMBER 8.

ROYAL BOTANIC SOCIETY, at 3.45.

BOOKS, PAMPHLETS, and SERIALS RECEIVED

BOOKS.—Imperial University of Japan, Calendar 1893-4 (Tokyo, Maruya).—Catalogue of the Snakes in the British Museum (Natural History): G. A. Boulenger, Vol. 2 (London).—The Flower of the Ocean, the Island of Madeira: Surgeon-General C. A. Gordon (Baillière).—Topographische Anatomie des Pferdes: Ellenburger and Baum, Zweiter Teil (Berlin, Parey).—Butterflies and Moths (British): W. Furneaux (Longmans).

PAMPHLETS.—Sulle Oscillazioni Elettriche a Piccola Lunghezza d'Onda &c.: Prof. A. Righi (Bologna).—North of England Institute of Mining and Mechanical Engineers: Report of the Proceedings of the Flameless Explosives Committee. Part 1. Air and Combustible Gases: A. C. Kayll (Reid).—Resultate der im Sommer 1893 in dem Nördlichsten Theile Norwegens ausgeführten Pendelbeobachtungen: O. E. Schiøtz (Kristiania, Dybwad).

SERIALS.—Cassell's Magazine, December (Cassell).—Proceedings of the Aristotelian Society, Vol. 2, No. 3, Part 2 (Williams).—Transactions and Proceedings of the Botanical Society of Edinburgh, Vol. xx, Part 1 (Edinburgh).—Proceedings of the American Academy of Arts and Sciences, new series, Vol. xxi. (Boston).—Brain, Part lxxviii. (Macmillan).—Kryptogamen-Flora von Schlesien, iii. Band, 2 Hälfte, 3 Liefg. (Breslau, Kern).—Journal of the Institute of Jamaica, September (Sothoran).—Longman's Magazine, December (Longmans).—Chambers's Journal, December (Chambers).—Natural Science, December (Macmillan).—Good Words, December and Christmas (Isbister).—Sunday Magazine, December and Christmas (Isbister).—Century Magazine, December (Unwin).—Humanitarian, December (Hutchinson).—Udgivet af den Norske Gradmaalings-Kommission, Vandstansobservationer, v. Hefte (Christiania, Fabritius).—Botanische Jahrbücher, &c., Zwanzigster Band, 1 and 2 Heft (Leipzig, Engelmann).

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