

from sulphites and thiosulphates (the latter of these substances being decomposed into sulphites and sulphur, and the sulphites acted on as in the first case); fourthly, by the reduction of sulphates. From the common reducing bacteria which turn nitrates into nitrites, and these into ammonia salts, which produce from litmus, indigo-blue, methylen-blue, &c., the corresponding leucoids, none has the power to attack sulphates. This is done by a specific ferment, a very small *spirillum*, which is perfectly anaerobic, and which is common in the black mud of polluted waters, as also in these waters themselves. It grows with very small quantities of organic nutriment, as malates, peptone, sugar, and phosphates added to common water, rendered alkaline by sodium carbonate. Temperatures from 25° to 30° are the best for reduction. For the determination of the H<sub>2</sub>S the iodometric method can be used. Common water with the addition of  $\frac{1}{10}$  per cent. sodium malate,  $\frac{1}{10}$  per cent. asparagin,  $\frac{1}{10}$  per cent. potassium phosphate, and  $\frac{1}{2}$  per cent. sodium carbonate, infected with mud containing the ferment, and secluded from the air, and with forty-five milligrammes SO<sub>2</sub> per litre, was in three days quite free from this substance, containing nearly 10.2 milligr. H<sub>2</sub>S, the cause of the deficit (twenty-one milligr. SO<sub>2</sub>, not transformed into H<sub>2</sub>S) being not yet quite clear. Mohr's salt (ferrous ammonium sulphate) is very well adapted for reduction experiments, the smallest trace of reduction being indicated by the formation of black FeS. The spirillum has been named *Spirillum desulfuricans*. It seems to be of geological importance, inasmuch as the deep ground water of the province of South Holland is quite free from sulphuric acid, which, being abundant on the surface, is apparently reduced by the sulphide ferment, and rendered insoluble as FeS and FeS<sub>2</sub>.—On Kerr's magneto-optic phenomenon, by C. H. Wind. The author supposes that, in a metal placed in a magnetic field, both the conduction and the displacement current give rise to a *Hall-effect*, the intensity coefficient being different in the two cases. In this way the discrepancy, which exists between the experimental results, and the theory of Lorentz and Van Loghem, may be removed.—Prof. Kamerlingh Onnes read a memoir, in which Dr. Kuenen gave a graphical representation of the condensation of a mixture of two substances with  $\pi$  and  $\lambda$  taken as co-ordinates. His conclusions are contradictory to those of Duhem, but in accordance with the theory of Van der Waals and his own experiments. All mixtures of two substances must show retrograde condensation.—Prof. Onnes also communicated the results of an investigation, by Dr. Borgesius, on the molecular refraction and dispersion of some salts in solution, made with an interferential refractometer especially constructed for this purpose, and giving the small differences of refraction of two fluids by a single reading of verniers and counting of striæ.

#### BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Lehrbuch der Experimental Physik: A. Willner, Erster Band (Leipzig, Teubner).—Elements of Metallurgy: W. J. Harrison and W. J. Harrison, Jun. (Blackie).—A Text-Book of Organic Chemistry: Dr. A. Bernthsen, translated by Dr. G. M'Gowan, 2nd English edition (Blackie).—The Rise and Development of Organic Chemistry: Dr. C. Schorlemmer, edited by Prof. A. Smithells (Macmillan).—Geometrical Conics: C. Smith (Macmillan).—Amphioxus and the Ancestry of the Vertebrates: A. Willey (Macmillan).—The Life and Correspondence of Wm. Buckland, D.D., F.R.S.: Mrs. Gordon (Murray).—Die Maschinellen Hilfsmittel der Chemischen Technik: A. Parnicke (Frankfurt a/M., Bechhold).—Arithmetic for Schools: C. Smith, 2 pts. (Cambridge University Press).—Practical Physiology of Plants: F. Darwin and E. H. Acton (Cambridge University Press).—A History of Epidemics in Britain: Dr. C. Creighton, Vol. 2 (Cambridge University Press).—An Elementary Introduction to Mineralogy: R. H. Solly (Cambridge University Press).—Report of the Commissioner of Education for the Year 1890-91, Vol. 1 (Washington).—Index Kewensis: J. D. Hooker and R. D. Jackson, Part 3 (Oxford, Clarendon Press).—An Introduction to Comparative Psychology: Prof. C. Lloyd Morgan (Scott).—Théorie de l'Ondulation Universelle: B. Conta (Paris, Alcan).—Smithsonian Institution Report to July 1892 (Washington).—Mineral Resources of the United States, 1892-93: D. T. Day (Washington).—U.S. Geological Survey Monographs:—The Penokee Iron-Bearing Series of Michigan and Wisconsin: K. D. Irving and C. R. van Hise (Washington).—Tertiary Rhynchophorous Coleoptera of the U.S.: S. H. Scudder (Washington).—A Manual of Topographic Methods: H. Gannett (Washington).—Tenth Annual Report of the Bureau of Ethnology, 1888-89: J. W. Powell (Washington).—Involution and Evolution according to the Philosophy of Cycles: Kalpa, 1st part: The Universe (Eyre and Spottiswoode).—A Monograph of the Land and Freshwater Mollusca of the British Isles: J. W. Taylor, Part 1 (Leeds, Taylor).—The Life and Inventions of Thomas Alva Edison: W. K. L. Dickson and A. Dickson (Chatto).—Physiology for Beginners: Drs. M. Foster and L. E. Shore (Macmillan).—Les Chronomètres de Marine: E. Caspari (Paris, Gauthier-Villars).—Die Lebensweise der Meeresthiere, Zweiter Theil einer Einleitung in die Geologie als Historische Wissenschaft: Prof. J. Walther (Jena, Fischer).—The Construction of the Modern Locomotive: G. Hughes (Spon).—Commercial Geography: Prof. Gonner (Macmillan).—Horse-Breeding for

Farmers: A. E. Pease (Macmillan).—A Treatise on Hygiene and Public Health, Vol. 3 (Churchill).—The Deserts of Southern France, 2 Vols.: S. Baring-Gould (Methuen).—Sir Victor Brooke, Sportsman and Naturalist: O. Leslie Stephen (Murray).—The Mountains of California: J. Muir (Unwin).—Illustrated Catalogue of Microscopes &c., manufactured by R. and J. Beck, Ltd. (68, Cornhill).—A Text-Book of Mechanical Engineering: W. J. Lineham (Chapman and Hall).—Royal Natural History, Vol. 2 (Warne).—Geotektonische Probleme: A. Rothpletz (Stuttgart, Koch).—Morphologie der Erdoberfläche, 2 Vols.: Dr. A. Penck (Stuttgart, Engelhorn).—Twelfth Annual Report of the Fishery Board for Scotland, 1893, Part 3: Scientific Investigations (Edinburgh).—Lectures on the Darwinian Theory: Prof. A. Milnes Marshall (Nutt).—Album von Papúa-Typen: A. B. Meyer and R. Parkinson (Dresden, Stengel).

PAMPHLETS.—National Health: C. Scott (Belfast, Mullan).—Report on Experiments on the Manuring of Hay, Oats, and Turnips (Glasgow).—The Pamunkey Indians of Virginia: J. G. Pollard (Washington).—Bibliography of the Wakashan Languages: J. C. Pilling (Washington).

SERIALS.—Physical Society of London. Proceedings, Vol. xiii. Part 1 (Taylor and Francis).—Journal of Anatomy and Physiology, October (Griffin).—Journal of the Royal Microscopical Society, October (Williams).—Longman's Magazine, November (Longmans).—English Illustrated Magazine, November (198 Strand).—Mineralogical Magazine, September (Simpkin).—Sunday Magazine, November, (Isbister).—Good Words, November (Isbister).—American Journal of Mathematics, Vol. xvi. No. 4 (Baltimore).—Bulletin of the American Mathematical Society, October (New York, Macmillan).—L'Anthropologie, tome v. No. 5 (Paris, Masson).—Beiträge zur Biologie der Pflanzen, vii. Band, 1 Heft (Breslau, Max Müller).—Morphologisches Jahrbuch, 21 Band, 4 Heft (Leipzig, Engelmann).—Bulletin of the U.S. Geological Survey, Nos. 97-117 (Washington).—Transactions of the Leicester Literary and Philosophical Society, Vol. 3, Parts 4 to 8 (Leicester; Gibbons).—Zeitschrift für Wissenschaft Zoologie, lviii. Band, 3 Heft (Leipzig, Engelmann).—Contemporary Review, November (Isbister).—Natural Science, November (Macmillan).—Humanitarian, November (Hutchinson).—Quarterly Journal of the Geological Society, Vol. 1, Part 4, No. 200 (Longmans).—Geological Magazine, November (Stanford).—Journal of the Chemical Society, November (Gurney and Jackson).—Geological Magazine, November (Paul).—Scribner's Magazine, November (Low).—Natural History of Plants: Kerner and Oliver, Part 7 (Blackie).—Fortnightly Review, November (Chapman and Hall).

#### CONTENTS.

PAGE

Ancient Meteorology. By W. E. P. . . . .	25
Two Books on American Antiquities . . . . .	26
Watts' Dictionary of Chemistry . . . . .	27
Diseases of Trees. By Prof. W. R. Fisher . . . . .	28
Our Book Shelf:—	
Brunache: "Le Centre de l'Afrique. Autour du Tchad" . . . . .	29
A Foreman Pattern Maker: "Helical Gears."—N. J. L. . . . .	30
Dixon: "The Nests and Eggs of Non-Indigenous British Birds" . . . . .	30
Gonner: "Commercial Geography" . . . . .	30
Flather: "Dynamometers and the Measurement of Power."—G. . . . .	30
Guy: "Electric Light and Power" . . . . .	30
Letters to the Editor:—	
Prof. Boltzmann and the Kinetic Theory of Gases.—G. H. Bryan . . . . .	31
Instinctive Attitudes. (Illustrated).—S. S. Buckman James Parkinson, the Author of "Organic Remains of a Former World."—Spencer George Perceval . . . . .	31
On Chinese Beliefs about the North.—Kumagusu Minakata . . . . .	32
The Planting of Timber Trees.—Alfred W. Bennett Rhynchodemus terrestris in England.—F. W. Gamble . . . . .	33
Tan-Spots over Dogs' Eyes.—J. Shaw . . . . .	33
A Criticism of the Astronomical Theory of the Ice Age. By Edward P. Culverwell . . . . .	33
Notes. (Illustrated.) . . . .	35
Our Astronomical Column:—	
A Comet on the Eclipse Photographs of 1893 . . . . .	40
The Transit of Mercury . . . . .	40
Mira Ceti . . . . .	40
Return of Encke's Comet . . . . .	40
Two Variable Stars . . . . .	40
Observations of Mars . . . . .	40
The Electric Conductivity of Pure Water. By J. W. Rodger . . . . .	42
Neo-Vitalism. By Frances A. Welby . . . . .	43
Science in the Magazines . . . . .	44
University and Educational Intelligence . . . . .	45
Scientific Serials . . . . .	45
Societies and Academies . . . . .	46
Books, Pamphlets, and Serials Received . . . . .	48