

of or additions to the substances of which they were originally composed. This paper, of course, bears indirectly on the vexed question of the nature of *Eozoon*.

Poggendorf's Annalen der Physik und Chemie, No. 11. The first paper in this number is by A. Wüllner, being a continuation from vol. cxliv. of his researches "On the Spectra of the Gases in Geissler's Tubes." The present paper gives an account of some researches undertaken by the writer along with Dr. Winkelmann to account for the origin of the different kinds of spectra, the band spectrum, the line spectrum, and the continuous spectrum. The spectrum experimented on was that of nitrogen, the media being air, hydrogen and oxygen respectively. The next paper is an abstract of a memoir by Prof. Lemström, of Helsingfors University, on the intensity of the flow of a voltaic current, which is followed by one in the department of acoustics, by J. J. Oppel, on two remarkable circumstances in connection with what he in a former paper called "Reflexionstöne" or "Gittertöne." The next paper is the first portion of the second part of Herr W. Sellmeier's paper on the subject of the vibration of molecules, which is followed by the continuation of E. Ketteler's elaborate memoir on the influence of astronomical movements on optical phenomena. The next paper is an attempt by L. Lorenz, of Copenhagen, to discover the means of determining in absolute terms, degrees of heat, and to show more clearly the relation in which heat and electricity stand to each other, which is connected to some extent with the paper which follows by S. Subic, on temperature constants. A few short papers conclude the number.

No. 12. The first article in this number is a long one by Dr. R. Börnstein, on the theory of Rühmkorff's induction apparatus, which is followed by the conclusion of the second part of Sellmeier's paper on the vibration of molecules. The next article is a criticism, by F. C. Henrici, on a paper read by Tomlinson to the Chemical Society, on the action of solid bodies on supersaturated solutions. E. Reusch contributes an article on the doctrine of twin-crystals, and J. Hervet one on transverse vibrating flames. V. Dvůrák contributes an account of some experiments to test Airy's theory of the Talbot bands. Among the shorter papers is one by F. Zöllner on the reversion spectroscopie.

Mittheilungen der Naturforschenden Gesellschaft in Bern aus dem Jahre, 1871.—The first part of this goodly sized volume is occupied with the proceedings of the Scientific Society of Bern for 1871. The following are some of the longer papers which make up the bulk of the volume. The first is the continuation from a former volume of Dr. Cherbuliez' Historical Résumé of Researches on the rate at which sound is propagated through the atmosphere; and the same gentleman contributes some historical notices concerning the mechanical theory of heat. Considerable space is given to the continuation and conclusion of Dr. H. Wydler's contributions to a knowledge of the indigenous plants of Switzerland; and L. Fischer contributes a long list of the cryptogamic plants to be found in the neighbourhood of Bern. One of the longest and most interesting articles is by E. Schaer, being contributions to the chemistry of the blood and of ferments; the first part treating of the influence of cyano-hydrogen and phenol on certain properties of the blood corpuscles and various ferments; and the second part on the action of cyano-hydrogen and phenol on yeast and on mould-fungi. This is followed by a paper by Dr. A. Forster on the colouring of smoky quartz or topaz. The concluding paper in the volume, which is accompanied by a well-constructed map and graphic tables, is by A. Benteli, who attempts to estimate the amount of moisture precipitated by the atmosphere in the seven chief river-districts of Switzerland. The volume is altogether highly creditable to the Society whose transactions it records.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, Jan. 16.—A "Note on an Erroneous Extension of Jacobi's Theorem" was read by Isaac Todhunter, M.A., F.R.S.

Sir G. B. Airy read an additional note to his paper "On a supposed Alteration in the Amount of Astronomical Aberration of Light produced by the Passage of the Light through a considerable thickness of Refracting Medium."

Some months since, he said, I communicated to the Royal Society the result of observations on γ Draconis made with the water-telescope of the Royal Observatory (constructed expressly for testing the quality of the coefficient of sidereal aberration, whether the tube of a telescope be filled with air, as usual, or with water) in the spring and autumn of 1871. Similar observations have been made in the spring and autumn of 1872, and I now place before the society the collected results. It will be remembered, from the explanation in the former paper, that the uniformity of results for the latitude of station necessarily proves correctness of the coefficient of aberration employed in the Nautical Almanac.

Apparent Latitude of Station

1871. Spring	.	.	.	.	51° 28' 34".4
Autumn	.	.	.	.	51 28 33.6
1872. Spring	.	.	.	.	51 28 33.6
Autumn	.	.	.	.	51 28 33.8

I now propose, when the risk of frost shall have passed away, to reverify the scale of the micrometer, and then to dismount the instrument.

Mathematical Society, Jan. 9.—Dr. Hirst, F.R.S., president in the chair.—Papers were read by Mr. S. Roberts, V.P., on parallel surfaces; Prof. H. J. S. Smith, on the greatest common divisors of the minor determinants of a rectangular matrix of which the constituents are integral numbers, and on an arithmetical demonstration of a theorem in the integral calculus (these two communications were founded upon a paper by the author, published some few years since in the "Philosophical Transactions." Prof. Wolstenholme, on the summation of certain series (read in the author's absence by the secretary). This was concerned with the obtaining of a series closely related to Vandermonde's well-known series; and thus, Vandermonde's series being—

$$(a + b)_n = b_n + n b_{n-1} a_1 + \frac{n(n-1)}{1 \cdot 2} b_{n-2} a_2 + \dots + a_n$$

then the series discussed might be written—

$$(a + b)_n = b_n + n(b-1)_{n-1} a_1 + \frac{n(n-1)}{2} (b-2)_{n-2} (a+1)_2 + \frac{n(n-1)(n-2)}{3} (b-3)_{n-3} (a+2)_3 + \dots + (a+n-1)_n$$

Amongst the presents received were three War Department weather maps, Signal Service, U.S. army, Washington, Friday, November 22, 1872, constructed for 7.35 P.M., 4.35 P.M., and 11 P.M.

Chemical Society, Dec. 16, 1872.—Prof. Frankland, F.R.S., president, in the chair.—"Notes on various Chemical Reactions," by Dr. Davies, contained observations on the formation of the sulphides of copper and barium, also some notes on the separation of nickel and cobalt.—Mr. H. Grimshaw communicated the results of his researches on ethyl-amyl and its derivatives. After the president had made some remarks on the thoroughness with which this research had been carried out, a communication from Dr. Schorlemmer on "The heptanes from Petroleum," was read. This paper contained, among other matter, an interesting account of the separation of isomeric heptylenes by means of hydrochloric acid.—A paper by Mr. T. Cornelley on the "Vanadates of Thallium," was then read. It contained descriptions of several new and complex vanadates of Thallium.—Mr. Kingzett communicated to the society the results of his experiments on the conversion of sodium chloride into sodium sulphide by the action of hydrosulphuric acid; and finally, Mr. P. Braham exhibited some ingenious apparatus which he had arranged for the prosecution of physical researches under the microscope.

Photographic Society, Jan. 14.—James Glaisher, F.R.S., president, in the chair.—The President delivered a lecture on the application of photography for registering magnetical and meteorological phenomena, pointing out that no other method of registration was sufficiently delicate for the purpose; the lecturer explained that the magnetical records were obtained by a mirror arrangement fitted to the moving magnet, and in this way a pencil of light was reflected upon sensitive paper wound round a cylinder, which revolved once in twenty-four hours, thus securing a wave line representing the magnetical currents of the earth during the day. Meteorological records required less complicated apparatus. The photo-chemical process employed was also explained. Dr. E. J. Gayer read a paper "On In-

s'antaneous micro-photography," and exhibited pictures of live animalculæ in water.—Dr. E. J. Gayer also read a paper "On a cause of fading in albumenised pictures."

PARIS

Academy of Sciences, Jan. 6.—This was the annual general meeting of the Academy, and M. Faye, after delivering an address mainly devoted to the transit of Venus expeditions, vacated the chair, where he was succeeded by M. de Quatrefages.—M. Le Baron C. Dupin read a note on the French population, which, allowing for the ceded provinces, shows a decrease of 1,279,451. The decrease the Baron asserts to have been directly and indirectly caused by the late war.—M. Boussingault gave an account of his experiments on the formation of nitric compounds by the soil. He finds that these bodies are not formed from the nitrogen of the air, as he had been inclined to think.—M. A. de Caligny read an interesting paper on the effects of certain kinds of waves on sand-banks.—Further observations of 128 by M. Borrelly were received, and also M. Bossert's Elements and Ephemerides of the same planetoid.—A paper on orthogonal surfaces, by M. G. Darboux, was then read, and followed by an answer to M. Gernez's criticisms by M. G. Van der Mensbrugge, who defends his and Mr. Tomlinson's theory of the action of films on saturated solutions.—A note on certain phosphorus compounds, in which that body appears to exist in the amorphous (red) form, by M. A. Gautier followed.—M. A. Houzeau sent a paper on the estimation of ammonia in coal gas.—MM. Estor and Saint-Pierre sent a short note on respiratory combustion. They have made experiments which prove intra-arterial as against pulmonary combustion.—M. Sanson sent a paper on the horse of the quaternary fauna, which was followed by a note by M. Diamilla Müller on the absolute magnetic declination at Tiflis, at Sevrova, and at Paris.—M. de Rouville sent a paper on the upper Jurassic formations of the department of L'Herault.

January 13.—M. de Quatrefages, president, in the chair. M. Jamin presented his fourth note on a magnetic condenser, a description of an apparatus he has contrived, by which the power of magnets is much increased.—M. E. Mouche read a note on the rising of the Algerian Coast.—M. H. Resal sent a note on Savart's observation of the mutual influence of two pendulums.—MM. Troost and Hautefeuille read some researches on the Allotropic forms of phosphorus; they point out the similarity of the changes of vapour density in phosphorus when undergoing allotropic modification to those of cyanic; they also state that the sudden development of heat in the case of phosphorus when at the point of change has an exact analogy in the case of the acid mentioned.—MM. F. Bagault and Roche sent a note on a new process for the manufacture of steel. The process consists of decarbonising cast iron by means of rich iron oxide ores.—An interesting mathematical paper on orthogonal surfaces was received from M. G. Darboux.—M. Gernez controverts some assertions of Van der Mensbrugge as to the effects of liquids of high surface tension on liquids of low tension. Van der Mensbrugge asserts that when such liquids are in contact, if the first contains a dissolved gas it is compelled to liberate it.—M. Melsen sent a note on sulphurous and chlorosulphuric acid and on the combination of chlorine and hydrogen in darkness. The author saturated charcoal with chlorine, and then introduced it into an atmosphere of hydrogen. The two gases completely and quietly combined in absolute darkness.—M. Prehier sent a note on "Polypropylenic Carbides." These bodies are formed by acting on propylenic bromide by nascent hydrogen; their general formula is $C^{2n}H^{2n}$.—M. J. Chaulard sent a note on the spectroscopic examination of the chlorophyll in residues of digestion. This body does not seem to be broken up in the stomach, as its absorption bands are distinctly recognisable in the excrements of animals fed on vegetables.—M. Stan. Meunier sent a note on "The increase of mechanical forces in the star (now destroyed), from whence the meteorites are derived.—M. P. Fischer sent a note on the Jurassic formations of Madagascar.—M. Pisani sent a paper on the analysis of Lanarkite from Leadhills, Scotland; he asserts that the mineral is a basic lead sulphate.—M. Chapelas's note on the aurora of January 7, was then read, and followed by a note from M. Poirée, on the levelling of the zero of the flood gauges of the Seine.—A letter from M. P. Bert to the President concerning M. Faye's recent defence of the Bureau des Longitudes was next read. M. Bert says that he did not propose the total suppression of the Bureau, but that he said that as it had not answered the expectations of science, it ought to be replaced by

a bureau whose duty (like that of the "Nautical Almanac" office in England), would be to publish the *Connaissance des Temps*, and this office should receive not more than 40,000 francs (per annum?)

DIARY

THURSDAY, JANUARY 23.

ROYAL SOCIETY, at 8.30.—Contributions to the History of the Orchids: Dr. Stenhouse.—On the Fossil Mammals of Australia: Prof. Owen.—Notes on the Wide-slit Method of Viewing Solar Prominences: W. Huggins.
ROYAL SOCIETY CLUB, at 6.
ROYAL INSTITUTION, at 3.—On Oxidation: Dr. Debus.
SOCIETY OF ANTIQUARIES, at 8.30.—Implements of the Bronze Period: John Evans.

FRIDAY, JANUARY 24.

ROYAL INSTITUTION, at 9.—Analogies of Physical and Moral Science: Prof. Birks.
PHILOLOGICAL SOCIETY, at 8.15.
QUEKETT CLUB, at 8.
OLD CHANGE MICROSCOPICAL SOCIETY, at 8.30.—On the Senses of Insects: T. Rymer Jones

SATURDAY, JANUARY 25.

ROYAL INSTITUTION, at 3.—Comparative Politics: Dr. E. A. Freeman.
ROYAL BOTANIC SOCIETY, at 3.45.

SUNDAY, JANUARY 26.

SUNDAY LECTURE SOCIETY, at 4.—The Glacial Period; a Chapter in English Geology.—An Account of the Physical Changes which Great Britain has undergone since Tertiary Times: A. H. Green.

MONDAY, JANUARY 27.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Sistan. With an Account of a Journey from Bander Abbas to Meshed, through that Province: Major Gen. Sir Frederick Goldsmid.—Note on the Comparative Geography and Ethnology of Sistan: by the President.
ENTOMOLOGICAL SOCIETY, at 7.—Anniversary.
MEDICAL SOCIETY, at 8.
LONDON INSTITUTION, at 4.—Physical Geography: Prof. Duncan.

TUESDAY, JANUARY 28.

ROYAL MEDICAL AND CHIRURGICAL SOCIETY, at 8.30.
CIVIL ENGINEERS, at 8.

WEDNESDAY, JANUARY 29.

LONDON INSTITUTION, at 7.—Musical Lecture.
SOCIETY OF ARTS, at 8.

BOOKS RECEIVED

ENGLISH.—The Gospel of the World's Divine Order: D. Campbell (Trubner).—Lectures on the Philosophy of Law: J. H. Stirling (Longmans).—The Botanist's Pocket-Book: W. R. Hayward (Bell & Daldy).—The School Manual of Geology. Second Edition A. J. Jukes-Browne (A. & J. Black).

PAMPHLETS RECEIVED

ENGLISH.—Scottish Naturalist, Vol. ii. No. 9.—Food Journal, Vol. iii. No. 36.—American Journal of Science and Art, Nos 24, 25, for Dec. 1872 and Jan. 1873.—The Astronomical Almanac, 1873: W. H. Hollis (Simpkin and Marshall).—Zoologist, No. 88.—Entomologist, No. 112.—Sermons in Sonnets: W. Whale.—Proceedings of the Zoological and Acclimatisation Society of Victoria, and Report of the Annual Meeting of the Society, held March 1, 1873, Vol. i.—Fifth Annual Report of the Executive Committee of the Manchester National Society for Women's Suffrage.—Journal of the Royal Horticultural Society of London, Part 11, 12, Vol. iii. 1873.—Practical Magazine, No. 1. 1873.
AMERICAN.—The Lens, Vol. i. No. 4.
FOREIGN.—Rendiconti, Vol. v. No. 19.—Bulletin de la Société Impériale des Naturalistes de Moscou.

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