

medicine, showing also clearly that to the remarkable and rapid development of this branch of chemistry during the past few years, is due the more scientific and complete system of therapeutics now obtained. He also points out in how many instances medicine has derived immense benefit from the discoveries of new compounds, which at first seemed only to possess a theoretical interest to chemists.—A paper on Anthracene and its derivatives, follows, by M. E. Kopp. It treats, in the first instance, of the formation from anthracene of dichloranthracene, and on the action of sulphuric acid on this body. This yields an acid called disulphodichloranthracenic, and which possesses in dilute aqueous solutions a most intense and beautiful fluorescence in the blue end of the spectrum. The salts of this acid, the soluble ones of which exhibit the same property, are here described. This acid, by simply heating or by the aid of oxidising agents, is converted into disulphanthraquinonic acid. Dibromanthracene may be made to yield an analogous series of compounds, which in some instances are also beautifully fluorescent. Disulphanthraquinonic acid, heated strongly with a caustic alkali, is converted into alizarin, which is identical with the colouring matter obtained from madder root. In this paper a description is given of the methods proposed by the various patentees in the matter, thus forming a tolerably complete history of this new branch of industry. Some space is also occupied with a discussion as to the state in which alizarin occurs in garancin; the balance of evidence seems to show that it is glucoside, which may be called ruberythric acid, and which by the assimilation of two equivalents of water, forms alizarin and two equivalents of glucose.—M. Blossum contributes another part of his memoir on Caoutchouc and Gutta-percha considered from a chemical standpoint. In this article he discusses the vulcanisation of caoutchouc, and the manufacture of the softened variety, giving Parkes' process for vulcanising, which consists in exposing the articles to the action of a mixture of carbonic disulphide and chloride of sulphur, after which treatment they are boiled in dilute soda solution; the same communication also deals with vulcanite and the vulcanite employed in dentistry.—Dr. Benrath has a paper on the Chemical Theory of Devitrification. The author has made numerous analyses which show reason to think that a part of devitrification is due to a separation of silica, which was previously held in solution by a silicate. The number finishes with a critical analysis by M. F. Papillon on the recent work of M. Ritter, "On the Relation between the Modifications of the Blood Corpuscles and the Modification of the Excretions," which appears to be a very valuable work.

THE *Journal of the Franklin Institute* for June contains, besides papers to which we have specially alluded, continuations of papers previously commenced, and the usual Editorial items and novelties, the Report of the Committee of Judges upon the Trial of Steam Boilers, American Institute, 1871; experiments on various coals of the Carboniferous and Cretaceous periods, an article on the gunpowder pile driver, by F. C. Prindle, C.E., with a plate; one on the great fires of 1871 in the North-west, by Prof. J. A. Lapham; and one on the utilisation of the light petroleum oils, by W. H. Wahl.

THE *Archives des Sciences physiques et naturelles* of Geneva, No. 174 for June 15, commences with an interesting article by Alph. De Candolle on the question whether modifications in vegetable species are caused by prolonged influence of climate. For this purpose he obtained from remote localities in Europe, Moscow, Edinburgh, Montpellier, and Palermo, seeds of widely-distributed plants, and sowed them in the same soil and at the same time in Geneva. Although the series of experiments was not sufficiently extensive for the conclusions to have any decisive value, the general result was that the seeds obtained from the more northern localities germinated somewhat earlier than those grown in more southern latitudes, and the plants resulting from them also came to maturity somewhat more rapidly, a difference which was more decidedly manifested in the second generation. If these results are confirmed by a more complete investigation, they will be of considerable importance in the question of acclimatisation.—The only other original articles in this number are by M. Ador on phtalyl, the radical of phtalic acid, and on the increase of intensity of voltaic induction currents, by Prof. Lemström.

In the *Journal of Botany* for July, Dr. Braithwaite continues his series of papers, "Recent Additions to our Moss Flora," this instalment being illustrated by two plates, of *Splachnobryum Wrightii*, and several species of *Grimmia*; and the Rev. Eugene

O'Meara contributes further researches on the Diatomaceæ. Two useful local lists of flowering plants are also given, by Dr. M. M. Bull, of the Island of Sark, and by Mr. J. F. Duthie, of the Islands of Malta and Gozo.

THE *Quarterly Journal of Science* for July contains four original articles. The first is a short one, entitled "The Music of Speech," by the Rev. R. W. Higgs, consisting chiefly of an epitome of "The Philosophy of the Human Voice," by Dr. James Rush, of Philadelphia, who claims to have shown that "the sentiment and the logic of our speech have a distinct mode of expression apart from the subject matter." The article is interesting; but we must protest against the introduction into our language of such barbarisms as an "orotund," compounded from *ore rotundo*, and a "vocality," to express a vocal sound.—The second article is an able advocacy of the advantages of a uniform decimal system of weights and measures, compared with our present multifarious scales.—Mr. R. A. Proctor on "The Construction of the Heavens" gives an outline of the different theories which have been started as to the constitution of the sidereal system, especially those of the two Herschels and the elder Struve, and argues in support of his view that all the nebulae hitherto discovered, whether gaseous or stellar, exist within the limits of the sidereal system.—The last article is by Captain Oliver on "Mediæval and Modern Ordnance and Projectiles compared."—The remainder of the number is taken up with notices of scientific works and reports of progress in physical and mechanical science.

*Revue Scientifique*, Nos. 51-53, and 2nd series, 2nd year, Nos. 1-4.—The report of M. Claude Bernard's course of lectures at the Collège de France on experimental medicine is brought to a conclusion with the close of the volume. Further reports are given of papers read at the Rostock meeting of the Association of German naturalists and physicians. M. L. Dumont has an article on civilisation considered as accumulated force. Report of M. Milne-Edwards' lecture on the Classification of Mammalia, being the introduction to his course at the Museum of Natural History on Zoology (Mammalia and Aves).—The new volume commences with a translation of Sir John Lubbock on the Origin of the Family. Sir W. Stokes's lecture before the University of Dublin on Public Medicine in Germany is translated. Of courses of lectures in France, we have M. de Quatrefage on the origin of the Prussian race at the Museum of Natural History; M. A. Chauveau, before the Society of Medical Sciences at Lyons, on the general physiology of virus; and M. Georges Ville, at Vincennes, on Chemical Manures. No. 4 contains an interesting sketch of the history of the Observatory at Greenwich, a sequel to the history of the Paris Observatory in an earlier number. We have also the usual amount of reports of the proceedings of foreign scientific societies.

## SOCIETIES AND ACADEMIES

LONDON

Entomological Society, July 1.—Prof. Westwood, president, in the chair.—Mr. Jenner Weir exhibited two examples of a rare British lepidopterous insect, *Agrotera nemoralis*, captured by him in Abbot's Wood, Sussex.—Mr. Meldola exhibited varieties of several species of British Lepidoptera, and an example of *Leucania vitellina*, taken at Brighton in 1869.—Prof. Westwood exhibited several remarkable coleopterous insects sent from Ceylon by Mr. Thwaites; also, from the same locality, banded cocoons of a species of *Ichneumonidae* attached to threads nearly three inches long; and an illustration of the habits of some species of moth which cuts out large oval pieces from the leaves of *Citrus* and forms therewith a moveable flattened tent, beneath which it lives and undergoes its transformations.—Mr. Müller exhibited portions of the leaves of *Pteris aquilina* from Weybridge, attacked by three species of dipterous larvæ.—Mr. Dunning called attention to a letter in NATURE from Dr. Leconte concerning the parasite of the beaver on which Prof. Westwood had founded the order *Achreioptera*. Dr. Leconte considered the insect pertained to the *Coleoptera*. Prof. Westwood dissented therefrom.—Mr. Dunning also read extracts from an article in the same journal by Mr. Moseley, concerning the sound produced by the Death-head Moth, in which the writer maintained that the noise proceeded from the proboscis, and was caused by the expiration of air.—Mr. Lewis brought to the notice of the meeting a circular addressed to entomologists (with a list of signatures appended

thereto), urging them to ignore the re-instatement of forgotten names until such time as the method of dealing with them shall be settled by common agreement.

Meteorological Society, June 19.—Mr. John Tripe, president, in the chair. At the ordinary meeting, which preceded the Anniversary Meeting, Captain Toynbee exhibited charts showing the results already obtained in the meteorological office by the discussion of the observations for a portion of the North Atlantic, comprising ten degrees square, for the first four months of the year. The district extends from the Equator to 10° N., and is bounded by the meridians of 20° and 30° W. He explained the variations in the several elements from month to month which had been rendered visible by the minute discussion to which the materials had been subjected, and pointed out the importance to navigators of the precise information as to winds, &c., now presented to them. He stated that the meteorological committee intended to distribute copies of the chart for January, in order to elicit opinions as to the proposed method of publication. At the Anniversary Meeting which followed, the Report of the Council was read. In the Report the Council stated that as the number of Fellows showed a diminution from 340 to 314, it had been deemed advisable to introduce a change into the management of the society. Accordingly a room had been taken at No. 30, Great George Street, Westminster, and an assistant secretary appointed to attend there daily. The gentleman selected is Mr. W. Marriott, formerly engaged at Greenwich Observatory, and he entered upon his duties on May 1st. It is hoped that by these means the business of the Society will be conducted in a more satisfactory manner.—The fifth volume of the Proceedings being now complete, the Council have increased the size of the publication to royal 8vo, so as to allow of the binding up of the Registrar-General's Quarterly Returns with the Proceedings of the Society. The new series will be entitled the "Quarterly Journal of the Meteorological Society," and will be edited by a committee of the council, Mr. Glaisher having resigned the editorship. The Report concluded with the usual obituary notices of deceased Fellows.—The president then delivered an address, in which he said that he would allude briefly to some facts connected with meteorology and its correlations with sickness and death. The careful daily record of meteorological observations made with standard instruments was commenced at many stations some time before the compilation of mortality returns, in the office of the Registrar-General of Births and Deaths, so that the mortality tables of the metropolis can safely be compared with the Greenwich returns, and for extra-metropolitan localities with those supplied by any of our observers. He had carefully compared the Greenwich observations for some years with those made by himself at Hackney, by Mr. Burge at Fulham, Mr. Symons at Camden Town, and Mr. Heywood in the City, and ascertained that the mean daily temperature did not vary on an average more than half a degree, although the maximum and minimum observations differed very considerably. He had therefore used the Greenwich tables in all his comparisons between the rate of death from different diseases and varying states of the weather. A number of valuable results have already been obtained as regards the course of epidemics, the influence of high and low temperatures on the public health, and, to a less extent, of different hygrometric conditions of the air. Dr. Hoskins long since (about 1855) wrote a valuable paper on the "Correlation between Meteorological, Medical, and Agricultural Science;" and he (the president) commenced a series of essays in 1848 on the influence of variations in the temperature, moisture, weight, and electricity of the atmosphere on the death-rates of scarlet fever and other epidemic diseases. The Manchester Medical Association, Dr. Ballard, and others, have written on the effects of variations of temperature on the health of the people. The whole of the writers have arrived at tolerably uniform conclusions, viz., that very cold and very hot weather induce an increase in the number of cases of disease and of deaths, and that a temperature between 55° and 65° is most beneficial to health in this country. He stated many years since, in one of his reports, that a cold wet summer always coincides with a less amount of sickness and fewer deaths than a hot dry summer. It is somewhat singular that, whilst very cold weather causes a great increase in the sickness and mortality of any given population, and especially amongst the very young and very old, the increase should extend to almost all diseases. It is true that the chief sickness and mortality are caused by affections of the lungs; but there is also a greater number of cases, although not of deaths, even from diarrhoea. Thus the rate of death, in weeks

having a mean temperature of less than 35°, was nearly 45 per cent. greater than in weeks having a temperature of 60° to 65°; and in weeks having a mean temperature above 65° the average rate of death was about 30 per cent. more than in weeks having a mean ranging between 60° and 65°. The range of temperature in this country which is the best for health is so small that every one should use reasonable care when the mean is above or below the standard; at the same time we must not forget that extremes are always injurious, whatever the average may be. This is especially the case as regards diarrhoea, for the mortality from this cause, with a continuance of the mean above 65°, is at least twenty times as great as at 40° to 45°. The comparison between temperature and epidemic diseases has led to the important facts that, as regards small-pox, it produces the smallest number of deaths as soon as the daily mean reaches 62°, and has continued a short time at that degree of heat, which is usually about the end of July or early in August, and does not become so fatal again until the mean temperature has sunk for a short time below 54°, which is generally about the end of September. This is not quite invariable, as it varies somewhat in epidemic and non-epidemic years. The fatality from small-pox increases as the temperature sinks below 54°, until the middle of January, when the lowest average temperature is ordinarily reached, viz., about 35.5°. Scarlet fever, on the other hand, is at its lowest point from the middle of March to the end of the third week in April, when the daily mean varies between 41.5° and 47.5°, from which it gradually increases in fatality as the weather gets warmer, but not quite at an equal ratio, until the end of October or early in November, when the impetus apparently given to it by the warm weather has ceased, and the mortality declines. He had very carefully examined the influence of other meteorological elements on the disease, and find all of them to be almost inert as compared with that of temperature. How far the temperature, moisture, and electricity of the atmosphere are concerned in exciting diseases to become epidemic, we are unable at present to state; but the periodicity which epidemics exhibit is opposed to these being the chief causes. Thus small-pox, scarlet fever, and measles, have a very decided tendency to become epidemic in the metropolis every fourth year, whilst there is no single meteorological element or combination of elements which has so decided a periodical excess or minus of its average amount. A record of correct observations extending over many more years than we now possess, and a close comparison of these with correct returns of sickness and death in any sufficiently large area will, he does not doubt, enable statisticians to determine the precise relations which exist between the state of the public health and meteorology. There is at present, however, so little known of the varying electrical conditions of the air (at least so as to measure the changes) that it is perhaps somewhat premature to express this opinion.

## BOSTON

Lyceum of Natural History, November 13, 1871.—Dr. H. Endemann read a paper "On Meat and the Methods of Preserving it," in which he described the extract of meat made according to Liebig's process, and stated that its value is overestimated, as experiments have shown that the ashes of the extract are as nutritious as the extract itself. No organic substance has been found that will produce the effects of extract. He then described the process of salting meat, and showed that the salts used, as well as any water employed subsequently to freshen the meat, remove a large part of the extractive salts, leaving it difficult of digestion. Smoking depends on the carbolic or cresylic acid contained in the smoke, by which the albumen and fibrin are coagulated, hence the meat is not readily digested. One of the best processes for preserving meat is enclosing it in air-tight cans, but this often fails on account of mechanical difficulties. He proposed to preserve meat by cutting it into slices and drying it in a hot-air chamber, at a temperature below 140° F., which may be done within two hours. This dried meat is then ground in a mill. The fibrin and albumen are not coagulated, and will take up water. The apparatus used in the preparation of the dried meat, and its applications for soup, solid dishes, and for invalids, was also described.

November 20.—Prof. B. N. Martin, vice-president, in the chair. Prof. T. Egleston exhibited five crystals of Diamond and one of red spinel, from South Africa. Two of the diamond crystals showed the cleavage parallel to the octahedron, two were curved hexoctahedra. The fifth was a cube one quarter of an inch square, weighing 0.006 gms. The cube is a twin by interpenetration, and shows the faces of the rhombic dodecahedron

on both crystals. The cube faces are all striated in the direction of the diagonals of the faces of the cube, and show, consequently, the tendency toward the octahedral form. The spinel was perfectly transparent, of a beautiful ruby colour. Its form was that of a hemitrope octahedron.—Prof. D. S. Martin exhibited specimens of a clay containing recent shells, from a deposit which had been the bed of a lagoon within quite a modern period, near the town of Lewes, Delaware. The shells are in very perfect preservation, though the epidermis is nearly gone, and the texture is becoming fragile and chalky. The principal species are *Sanguinolaria fusca*, *Nassa obsoleta*, and *Modiola plicatula*, of which the first two are now living on the beaches outside, and probably the last also. These specimens give an excellent illustration of the mode of formation of many of our fossiliferous clays and marls. The deposit may, perhaps, have value as a fertiliser. He also gave some description of the very remarkable sand-dunes or moving hills at Cape Henlopen, a mile or two east of Lewes. The sand brought down by the Delaware River accumulates at this point, and when thrown up on the beach, is taken in charge by the heavy east winds, and carried inland in a great line of drifting hills, which rises in a very long and gentle slope on the windward side, and falls off abruptly from the crest on the leeward, as is usual in wind drifts. The whole surface of the windward side is studded with the tops of dead tree trunks, the remnants of a pine forest, overwhelmed by the advance of the hill. The crest seems steadily approaching the lighthouse keeper's dwelling, and will, probably, necessitate its removal in the course of some few years. Prof. A. M. Edwards said the specimens just exhibited are of considerable interest, as they show very nicely the mode in which certain stratified rocks containing fossils are evidently formed. Under certain circumstances, say when formed in a locality like the tropics, where animal life abounded, and the mollusca especially occurred in large quantities, so that calcareous matter would accumulate, such a deposit might become, in time, converted into a limestone in which the forms of the enclosed shells and other organic remains would be preserved in a more or less perfect manner. If, on the other hand, calcium compounds were not present in abundance, but the particles of the deposit thrown down should consist of coarse and for the most part siliceous sand, sandstone, also enclosing fossils, would eventuate. But to me, the material of which the deposit exhibited consists, and which encloses the well-preserved remains of mollusca, is of more special interest, as this is the third time that such a formation has come under my observation, and I have studied one of these deposits with some care, as it proved to be, for the most part, made up of the siliceous skeletons of Diatomaceae, to the consideration of which, both recent and fossil, I have devoted many years. All cases of marsh inversion are of interest to geologists, and the opportunities they present the microscopists of obtaining specimens for study makes them doubly attractive. The Hoboken and the Cape Henlopen specimens will be examined and reported upon hereafter.—Mr. Jas. Hyatt made some remarks on the occurrence of some plants in the vicinity of New York city. The cotton thistle, *Onopordion*, may be found at Fish-kill Landing, on the Hudson River, a short distance from the railroad station, at the office of the iron works. He was able to secure flowers there for Dr. Torrey's collection. The plant has maintained itself there for several years. *Gentiana quinqueflora* abounds in South-Eastern Dutchess County, and from thence he was able to furnish for Dr. Torrey's collection the only specimens from this State. *Viola rotundifolia* abounds at Weehawken, N. J., at the foot of the Palisades, west of the Ferry dock.

## PARIS

Academy of Sciences, July 15.—M. de Pambour presented a further note on the reaction water wheel.—An important memoir by MM. Jamin and Richard on the cooling of gases was read.—M. A. Thenard described an apparatus for subjecting gases and vapours to the action of electricity.—M. Gaiffe described a new and cheap form of battery, consisting of a vessel in which are immersed a rod of lead and a rod of zinc, the former reaching the bottom, which is covered with a layer of aluminium; the exciting fluid in water containing 10 per cent of hydrochlorate of ammonia.—M. H. Sainte-Claire Deville communicated a note by M. J. M. Gaugain on the induction currents developed in M. Gramme's machine.—M. Faye presented a note by M. Respighi in reply to some criticisms of Father Secchi, upon his observations on the constitution of the sun.—M. J. A. Broun read a second note on the simultaneity of barometric variations between the tropics.—M. H. Tarry presented a note on the magnetic currents and solar explosions, which accompanied an

aurora borealis observed on July 7. Upon this paper MM. C. Sainte-Claire Deville and Tissot made some remarks.—M. C. Sainte-Claire Deville also presented a note by M. J. Gay, describing cloud-shadows observed by him at the Grande Chartreuse, with reference to a recent balloon observation by M. Tissandier.—M. H. Sainte-Claire Deville communicated a note by M. A. Houzeau on the instantaneous oxidation of alcohol, in which the author described the conversion of alcohol into acetic acid and aldehyde by the direct action of ozonized oxygen.—M. C. Bernard presented a note by M. N. Gréhaut on the quantitative determination of urea by means of Millon's test and the mercurial pump.—M. C. Dareste communicated his discovery of the presence of starch in the young of the European freshwater tortoise (*T. europæa*).—M. Des Cloizeaux read a further note upon ambygonite and montebrasite.—M. Daurée reported upon a collection of minerals from Chili, offered by M. Domeyko to the School of Mines at Paris.—M. Sainte-Claire Deville read a paper on the absence of Combustible Gases in the emanations from the Caldeira of Furnas in St. Michael's. The same gentleman communicated an extract from a letter by M. H. de Saussure, giving an account of his observations upon the late eruption of Vesuvius in April of the present year, and made some remarks upon its contents. He also presented a note by M. Gorceix on the state of Vesuvius, and of the gaseous emanations of the Phlegrean fields in the month of June, 1869.—M. Milne Edwards presented a note by M. Wetelet upon the genus *Ovulites*, which the author regards as belonging to the Polyzoa. He describes a new form under the name of *Ovutaba margaritula*. M. Milne Edwards also communicated a note by MM. A. Grandidier and L. Vaillant on the fossil crocodile of Amboulint-satre in Madagascar, which they regard as a new species, and name *Crocodylus robustus*.

## BOOKS RECEIVED

- ENGLISH.—The Thanatophidia of India: J. Fayrer (J. and A. Churchill).—Qualitative Analysis by Dr. C. R. Fresenius, translated by A. Vacher, 8th edition (Churchill).—The Battle of the Gauges renewed, 1872: R. T. Fairlie (E. Wilson).—Perspective, or the Art of Drawing what one sees: Lieut. W. H. Collins (Longmans).
- AMERICAN.—Description of the *Balanoptera musculus* in the possession of the Boston Soc. Nat. Hist.: T. Dwight (Boston Soc. Nat. Hist.).—Embryological Studies on Hexapodous Insects: A. S. Packard, jun. (Peabody Academy of Science).
- FOREIGN.—Die Pflanzen Galiziens u. der Bukowina: J. A. Knapp.—(Through Williams and Norgate).—Révue d'Anthropologie, 1872, No. 1.—Zeitschrift der Biologie, 8 Band 2 Heft.—Ueber algenartige Einschüsse in Diamanten u. über Bildung derselben: Dr. Göppert.

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## NOTICE

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