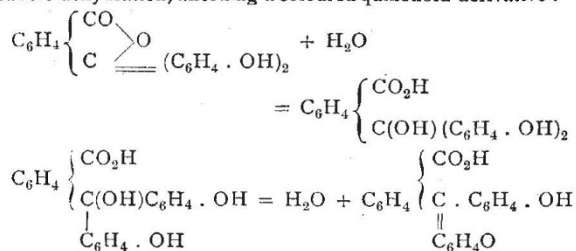


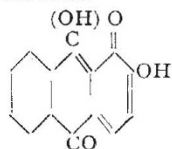
SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, March 2.—Dr. J. H. Gladstone, vice-president, in the chair. The following papers were read:—The magnetic rotation and refractive power of ethylene oxide, by W. H. Perkin. The magnetic rotation of ethylene oxide is remarkably low, and the refractive power is also below the calculated value.—The origin of colour (including fluorescence), vii. The phthaleins and fluoresceins, by H. E. Armstrong. The author has previously taken exception to the formulæ usually assigned to phenolphthalein and its congeners; the exhibition of colour by these substances could not be accounted for by the formulæ generally ascribed to them. The correctness of the author's views has now been demonstrated by Bernthsen and Friedländer independently. The former chemist has shown that the rhodamines afford true ethereal salts, proving that they form carboxy-compounds and not lactone derivatives. Bernthsen also points out that the characteristic development of colour observed on adding alkali to phenolphthalein is probably due to the hydrolysis and subsequent conversion of the colourless lactone derivative into a quinoid compound; the latter then suffers dehydration, affording a coloured quinoid derivative:—

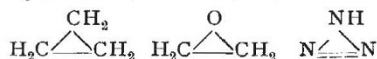


Friedländer also has lately shown that phenolphthalein and hydroxylamine interact in alkaline solution with formation of a hydroxime; this and other evidence has led him to the opinion that in their coloured state phenolphthalein and the allied phthaleins which behave similarly towards alkalis, are all quinoid compounds. The fact that the rhodamines yield ethereal salts is also remarked in a patent specification by a German colour firm. The author considers the recognition of the quinoid nature of the rhodamines and fluoresceins to be an important argument in favour of the views that fluorescence is a form of colour, and that all quinoid derivatives would be visibly fluorescent were it not that the rays which cause the fluorescence sometimes become absorbed in the solution.—The origin of colour, viii. The limitation of colour to truly quinoid compounds. Change of colour as indicative of change of structure, as in the case of alizarin, by H. E. Armstrong. A quinoid compound may be defined as a *hexaphene*, i.e. an unsaturated cycloid composed of six "elements," of which two are $C \curvearrowright R$ groups in either para- or ortho- positions. Coloured substances generally appear to fall within this definition; the few exceptions to the rule may be explained either by the author's view of isodynamic change or as resulting from the presence of traces of impurity. Some of the keto-chlorides prepared by Zincke possess an intense yellow colour, although containing the group $-CCl_2-CO-$; it is, however, not improbable that in such substances the group CCl_2 is the true equivalent of the $C \curvearrowright R$ group. The usual constitution assigned to alizarin does not explain its red colour, red being the characteristic colour of the orthoquinones; the colour may be accounted for by regarding alizarin as an isodynamic form of dihydroxyanthraquinone thus:—



The red colour of the chloranilates may be explained in a somewhat similar manner.—Notes on optical properties as indicative of structure, by H. E. Armstrong. From a consideration of the refractive and dispersive powers of the metallic carbonyls, the author anticipates that quinoid compounds generally will be found to possess specially high refractive powers. There are indeed experimental data supporting this view—anthracene, a hydrocarbon which is probably quinoid in structure, having a

high refractive power; further evidence is afforded by the specific refractions of the ortho- and para-nitranilines. The author then proceeds to discuss the orthodox formulæ for trimethylene, ethylene oxide, and diazoimide—



contrasting these substances with nitrous oxide; he contends that the above structural formulæ have no real justification, and that latent affinities may exist in these compounds just as in carbonic oxide. Thus nitrous oxide may be regarded as $< N - O - N >$, and diazoimide as $< N - NH - N >$. The influence exerted by the ethenoid and benzenoid groups in organic substances upon their refractive and dispersive powers, is also considered.—The origin of colour, ix. Note on the appearance of colour in quinoline derivatives and of fluorescence in quinine, by H. E. Armstrong. From considerations based upon the previous notes, the author shows that any amido-derivative of quinoline might become quinoid in structure, owing to a change from the centric to an ethenoid form, and would hence be coloured. Similarly, an ethenoid form of naphthalene would be quinoid; it is therefore possible that the fluorescence exhibited by many derivatives of this hydrocarbon is characteristic of the pure substances, and does not always originate in impurities.—The ethereal salts of glyceric acid, active and inactive, by P. Frankland and J. MacGregor. The authors have prepared and characterised a number of ethereal salts of inactive and lævo-glyceric acid; they point out regularities between the rotatory powers of the active salts of a somewhat similar nature to those observed amongst the ethereal salts of tartaric acid.—Formation of the ketone 2:6-dimethyl-1-ketohexaphane, by F. S. Kipping. On distilling the calcium salt of dimethylpimelic acid with soda lime, an oil is obtained which contains a ketone of the composition $C_8H_{14}O$. This ketone is apparently a dimethylketohexamethylenic; it is doubtless a homologue of the ketone recently prepared by von Baeyer by distilling calcium pimelate with soda lime.—Note on the interactions of alkali-metal haloids and lead haloids, and of alkali-metal haloids and bismuth haloids, by Eleanor Field. By boiling potassium or ammonium iodide with lead haloids in aqueous solutions, double compounds are obtained, whose composition depends upon the proportions in which the constituents are used. Salts of the compositions, $3PbI_4KI$, $3PbI_4NH_4I$, PbI_3PbCl_2 , PbI_3PbCl_3 , and PbI_22PbBr_2 , are described. The interactions of haloid salts of the alkali metals with bismuth haloids lead to the formation of compounds having the following compositions— $BiBrCl_4K_2$, $BiClBr_4K_2$, and $BiCl_3Br_3(NH_4)_3$. The composition of the products obtained depends, not only on the proportions in which the reacting salts are employed, but also on the nature of the halogens and the metals.—An isomeric form of benzylphenylbenzylthiourea by A. E. Dixon. Phenylthiocarbimide and dibenzylamine interact to form the compound $PhN : C(SH) \cdot N(C_7H_7)_2$, isomeric with the thiourea $C_7H_7N : C(SH) \cdot NPh \cdot C_7H_7$, melting at 103° , previously obtained by the author from benzylthiocarbimide and benzylaniline; the new substance melts at $145-146^\circ$.—A new atomic diagram and periodic table of the elements, by R. M. Deeley. The author constructs a new atomic diagram of the elements by plotting "volume heats" against "volume atoms." The volume heats are the products of the specific heats and densities, whilst the volume atoms are obtained by dividing relative density by atomic weight.

PARIS.

Academy of Sciences, March 27.—M. Lœwy in the chair. —The two candidates selected as competitors for the place of *Astronome Titulaire* at the Paris Observatory were: In the first place, M. Prosper Henry; in the second, M. Paul Henry. —On the construction of the chart of the heavens, and the determination of the co-ordinates of the centres of the negatives, by M. Lœwy.—On the organic substances constituting vegetable soil, by MM. Berthélot and André. "Humus" may be defined as that portion of the remains of vegetation which resists the action of the air and lower organisms, and remains as an insoluble residue in the soil, supplying the roots of the higher plants with nitrogen, sulphur, phosphorus, alkalies, &c. One specimen of earth freed from all visible plant remains, cellulose, and carbohydrates, taken from the experimental soil of the Vegetable Chemistry station at Meudon, contained 19.1 parts of organic carbon, 1.5 of hydrogen, 1.7 of nitrogen, 11.9 of organic oxygen, total 34.2 parts of organic matter. Some of

the principles could be isolated by dissolving them in alkalis, and reprecipitating by acids. These were found to contain 55.2 per cent. of carbon, 6.8 of hydrogen, 3.0 of nitrogen, 35.0 of oxygen, 3.5 of ashes. A repeated treatment with hydrofluoric and hydrochloric acids left in one instance 1.4 per cent. of insoluble matter of a constitution similar to the preceding. This insoluble matter acted upon solutions of potassium salts in much the same manner as artificial humic acid obtained from sugar. It forms potassium compounds which are capable of resisting even prolonged washing by rainwater. This explains the "absorbing" action of the soil upon the alkalis, and especially upon potash.—On the interference fringes of grating spectra on gelatine, by M. A. Crova.—Researches on samarium, by M. Lecoq de Boisbaudran.—Remarks on the native iron of Ovifak and the bitumen of the crystallised rocks of Sweden, by M. Nordenskiöld. Among the blocks of native iron brought from Ovifak in 1870 there was one of about 40 kgr. which it was impossible to saw or to cut. It is now supposed that this is due to black diamonds disseminated through the iron. Considerable masses of bitumen are found in the crystalline rocks of Sweden, notably near Norberg and Dannemora. One of the two kinds found gives a large number of grating products and leaves hardly any ashes. The other resembles anthracite. It yields little on distillation, and leaves much residue on combustion. This residue contains, besides silica, iron, lime, magnesia, &c., some oxide of nickel, uranium (3 per cent.), cerium, and yttrium, the three last in the form of carbon compounds resembling nickel carbonyl. These also occur in carbon forming large nodules in the oldest sedimentary strata of Sweden, the alum schists.—Observations of small planets made at the Toulouse Observatory, by M. B. Baillaud.—The Bielids, by P. François Denza.—On orthogonal correspondance of elements, by M. Alphonse Demoulin.—On the possibility of defining a function by an entire divergent series, by M. H. Padé.—A new sclerometer, by M. Paul Jannettaz.—On the indications of water-level in boilers by a glass tube, and their influence upon explosions, by M. Hervier.—On initial capacities of polarisation, by M. E. Bouty. The electricity absorbed in virtue of capacity of initial polarisation is entirely recoverable, on the condition of employing for the discharge an external circuit of negligible resistance.—On the distillation of mixtures of water and alcohol, by M. E. Sorel.—A general method for the calculation of atomic weights according to the data of chemical analysis, by M. G. Hinrichs.—On the formation of gallanilide, and on its triacetyl and tribenzoyl derivatives, by M. P. Cazeneuve.—On the lakes of Sept-Laux (Isère) and La Girotte (Savoie), by M. A. Delebecque.—On a means of preserving beetroot plants and economic or ornamental young vegetables against the attacks of greyworms (*Chenilles d'Agrotis*) and other insect larvæ, by M. A. Laboulbène; with remarks by M. Chambrelent.

BERLIN.

Physiological Society, March 3.—Prof. du Bois Reymond, President, in the chair.—Dr. J. Munk gave an account of one part of the experiments on the nutrition of fasting-men, which he had carried out in conjunction with Messrs. Lehmann, Müller, Senator, and Zuntz. The same observers having some years ago made experiments on the fasting-man, Cetti, whose outcome was not in accord with the results of experiments made on dogs, they had more recently experimented again over a period of six days on another fasting-man, Breithaupt. This man's nutrition was followed for several days, on an ordinary diet, before the period of fasting, and again after the latter had ended. During the fast the patient was at liberty to consume as much water as he pleased, the amount taken being carefully noted. The following were the results of the experiments. The output of nitrogen sank slowly and continuously during the whole period of fasting. The urinary phenol increased in amount up to the fourth day (the sixth day in Cetti's case) and then sank to a minimum. Indol was only found in traces, and acetone was absent altogether. The amount of chlorine, as of alkali, diminished progressively, and continued below the normal even after food was once more taken. The urine contained a large quantity of phosphoric acid, as also of lime and magnesia. Prof. Zuntz reported on the respiratory interchange of the above man. When at rest the intake of oxygen was the same as that of a normally fed person twelve hours after a meal. The respiratory quotient varied from 0.66 to 0.69, and was thus less than that due to the oxidation of fats alone (0.7), or of proteids alone (0.8). During the fast the patient's power in

turning a wheel against friction was the same as that observed when feeding, but fatigue set in much sooner, and was most marked in the cardiac muscles. During the earlier days of the fast, the consumption of oxygen when working was the same as for a normal person, but later on it became greater. The after-effects of work lasted longer than when food was taken. The speaker regarded the above extremely low respiratory quotient during the fast, as due to the possibility that the proteids split up into glycogen and some other substance, which was then oxidised and gave rise to the small quotient observed. In support of this view experiments were made by Dr. Vogelius on the construction of carbohydrates in the fasting body. In the fasting animals on which the experiments were carried out, all glycogen was removed by moderately strong doses of strychnine. After this they were sent to sleep for eighteen hours by means of chloralhydrate, and at the end of this period glycogen was found in considerable quantity both in their liver and muscles—glycogen which must presumably have been formed from the metabolism of their own proteids.

Meteorological Society, February 7.—Prof. von Bezold, President, in the chair.—The President gave a short account of a paper he had recently published in the *Sitzungsberichte* of the Berlin Academy on the thermal exchanges of the atmosphere, and entered into details as to the general propositions therein put forward. The latter are as follows:—1. The total radiant heat received by the whole earth in a year is equal to the total amount given off by radiation in the same period. 2. The total heat received by any portion of the earth or the atmosphere is on the average equal to that given off by the same portion. 3. The total heat received and given off in the course of a year is not the same for different portions of the earth or atmosphere: in some parts the amount received is greater than that given off, and *vice versa*. 4. The heat received by given portions of the earth or atmosphere during any given period of the year is in general not equal to that passed off during the same period. 5. The total amount of heat taken in at the surface of the whole atmosphere during a given portion of the year is not necessarily equal to that given out at the same surface during the same period.

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