

been previously computed. Expressed in the form usual in our catalogues the elements are:—Perihelion passage, September 15^h 11^m G.M.T.; longitude of perihelion, 250° 4'; longitude of ascending node, 260° 43'; inclination, 72° 33'; log. perihelion distance, 9.70535; motion, retrograde. The intensity of light is diminishing.

MINIMA OF AIGOL.—The under-mentioned Greenwich times of minima of this variable are from Prof. Winnecke's ephemeris, in the computation of which correction depending upon recent observations has been applied:—

Oct. 9	h. m.	Nov. 1	h. m.	Dec. 11	h. m.
12	15 52	4	14 23	14	17 48
15	12 41	7	11 12	17	14 37
18	9 30	21	8 1	20	11 26
	6 19	21	16 5	23	8 14
		24	12 54	23	5 3
		27	9 43		
		30	6 32		

There would appear to have been perturbations in the period during the last few years which are not reached even by Prof. Schönfeld's formula involving two inequalities, which would make the above times about thirty-five minutes later.

A PROBABLY VARIABLE STAR.—Prof. Pickering notifies his observation of a red star, with banded spectrum, the place of which on September 14 was in R.A. 16h. 31m. 32s.; Decl. + 72° 32'. On September 17 its magnitude was 8.6. It is not found in the "Durchmusterung," nor in Federenko, Schwed, or other circumpolar catalogue. Its variability is therefore suggested.

CERASKI'S VARIABLE, U CEPHEI.—Mr. Knott informs us that he obtained a good observation of the minimum of Ceraski's variable of short period on the night of October 2; time of min. 11h. 47m. G.M.T., mag. 9.2. Prof. Schmidt's ephemeris in *Astron. Nach.*, No. 2382, has 11h. 37.5m. The star did not fall quite so low, as in the minima which Mr. Knott observed in March, April, and May last.

[ERRATUM.—In last week's "Astronomical Column" (p. 520), for "add ρ " read "add P."]

CHEMICAL NOTES

MM. SCHUTZENBERGER AND COLSON describe (*Compt. rend.*) several new compounds of silicon. When crystalline silicon is strongly heated in a current of carbon dioxide the compound $(\text{SiCO})_x$ is produced. When nitrogen is passed over a hot mixture of silicon and carbon $(\text{Si}_2\text{C}_2\text{N})_x$ is formed. The authors regard these compounds as the oxide and nitride respectively of the radicle *carbo-silicon* $(\text{Si}_2\text{C}_2)_x$. The nitride of silicon $(\text{Si}_2\text{N}_2)_x$ is also described: it is obtained by the direct union of nitrogen and silicon.

It is well known that certain metallic chlorides, e.g. sodium chloride, are precipitated from aqueous solution by hydrochloric acid; attention has been drawn in these Notes to recent work of Ditté and others on this subject. M. Sabatier describes several hydrates of ferrous and ferric chloride (*Compt. rend.*) produced by this general reaction.

MANY years ago Graham drew attention to the change in properties produced in certain oxides by the action of heat, e.g. ferric oxide is soluble in hydrochloric acid, but when strongly heated it becomes almost insoluble. This "department of corpuscular philosophy"—to use Graham's phrase—has not been much studied. The experiments detailed in *Archiv Néerland* by M. van Bemmelen form an interesting contribution bearing on this subject. It is shown that the amount of water of hydration taken up by the oxides of tin, silicon, and manganese at the moment of the formation and precipitation of the hydrates of these oxides from aqueous solutions, is dependent on the molecular state, i.e. on the as yet unknown conditions of molecular equilibrium, of the solid hydrates. The molecular state being the same, the amount of water of hydration rises with temperature and humidity of the surrounding air; to each temperature and degree of humidity corresponds a certain equilibrium of oxide and water; the relations between the weights of the oxide and water are generally too complex for expression by a simple formula. From an examination of the phenomena attending the action of the amorphous hydrated di-oxides of the above-named elements on acids, alkalis, and salts, M. van Bemmelen concludes that weak double compounds are produced, but that these are very easily dissociated; the amount of dissociation varying with the chemi-

cal nature and the mass of the reacting substances, and with the temperature. In most cases stable compounds are produced simultaneously with these series of unstable and largely-dissociated compounds. The formation and dissociation of such unstable compounds depend also on the conditions of molecular stability of the hydrated oxides themselves. By arranging these conditions so as to insure considerable molecular stability—e.g. by heating the hydrates—the power of forming the unstable compounds is much diminished. That a force of the same nature as chemical affinity is concerned in the formation of some of these weak compounds is shown by the decomposing action exerted by hydrated MnO_2 on the stable compounds K_2SO_4 , KCl , and KNO_3 , compounds which do not show signs of dissociation in aqueous solution. M. van Bemmelen would thus extend the sphere of chemical phenomena, and would see no sharp division line between the actions of the so-called physical forces—adhesion, absorption, &c.—and the force of chemical affinity.

AN ingenious method for determining the total solid matter in solution in different waters is described in *Chem. Soc. Journal* by Dr. Mills. The method is based on the fact that if a small glass bead with an attached weight is allowed to ascend in a saline solution of known strength, it will rise more slowly, the greater the amount of solvent present. Experiments are given showing that the rate of ascent is also dependent on the nature of the soluble matter, i.e. on the viscosity of the solution. For detecting variations in the solids in the same water, for preparing standard solutions, &c., the bulb method is likely to be useful. Experiments detailed in the same paper lead Mills to regard the specific gravity of a potable water as a direct indication of the quantity of total solids in solution.

ANALYSES of the mud deposited round the Buxton thermal spring, by T. C. Thresh (*Chem. Soc. Journ.*), show that when dried at 120° this mud contains about 71 per cent. Mn_2O_3 , with oxides of Pb, Cu, Fe, Al, Zn, Ba, Sr, Mg, and Mo, and closely agrees in composition with many specimens of "wad" or "bog manganese." Analyses of the gas evolved at the spring and of the gases dissolved in the water closely confirm those made by Playfair in 1852: the gas evolved at the spring consists of about 99 per cent. nitrogen and 1 per cent. CO_2 , that dissolved in the water of about 60 per cent. N and 40 per cent. CO_2 . The water in the baths contains as much gas as could be forced into water at a pressure of 1.64 atmospheres.

A LONG and important paper by W. H. Perkin, on "Isomeric Acids obtained from Coumarin and the Ethers of Hydride of Silyl," appears in the same number (August) of the *Chem. Soc. Journ.* Perkin has obtained two series of compounds, differing in properties, but generally convertible, one into the other, by the action of heat. He thinks that the ordinary theory of isomerism, according to which this phenomenon is traceable to the occupation of different relative positions by the atoms in two molecules, fails to explain the cases of isomerism now described by him. He favours the view that the atoms in the molecules of any pair or the newly-described compounds occupy the same relative positions, but are at different absolute distances from each other. It is, however, to be remembered that the present theory of isomerism is applicable only to gaseous molecules; the molecular phenomena of liquid and solid bodies are too complex to find, as yet, any general explanation. Perkin's new compounds seem to belong to this rapidly-increasing group of "physical isomerides," i.e. to liquid or solid bodies whose chemical properties are to be traced to the binding together of molecular groups, the individual members of which occupy relatively different positions, and which groups react as chemical units. The facts concerning molecular volumes of metameric compounds are also, on the whole, opposed to that theory of isomerism favoured by Perkin in his important paper.

A SERIES of papers on the photo-chemistry of silver bromide by Herr Eder has appeared in *Chemisches Centralblatt*. It is shown that silver bromide prepared with an excess of silver nitrate is much more sensitive towards light than when prepared with excess of potassium bromide, provided the silver bromide is disseminated through an indifferent substance, e.g. collodion pyroxylyene. When disseminated through an easily oxidisable substance, e.g. gelatin or gum, silver bromide prepared with a slight excess of soluble bromide is from four to six times more sensitive than when disseminated through indifferent collodion with excess of silver nitrate. An emulsion of silver bromide in gelatin with a slight excess of the soluble bromide after several days digestion at 30°-50° becomes much more sensitive than any