

It is stated that Calandrelli published an account of his observations in the Roman journals in December, which was transferred to the official journal of Palermo on the 11th of the same month. Perhaps a reference to the Italian journals might bring to light a further observation or observations; the comet is said to have been bright, but the weather about the date of discovery was unsettled, and for several days previously had prevented observations of any kind.

COLOURED BELTS ON JUPITER.—In connection with the supposed periodicity in the appearance of marked colour on the belts of this planet, the observations of Gruithuisen, of Munich, in the years 1836-40 possess interest. They are found in his *Astronomische Jahrbuch*, 1839, p. 76, 1840, p. 99, and 1841, p. 101. He first noticed the colour on April 23, 1836, at 9½h., when, observing with a 30-inch refractor of 2½ inches aperture, and power 150, the single central belt then visible had a brown tint throughout, and he states that, hardly believing his own vision, he called a person who was at hand, and on asking him what colour the belts presented, he replied "the colour of rust." With a 5-foot telescope, power 120, the brown tint was not distinguished. On subsequent occasions he found that with the highest powers of the telescope the belt appeared of a bright reddish brown, while with the lower powers it was merely of a dark shade, and hence concluded that the intensity of light was disadvantageous to discerning the colour. In addition to the brown tint of the central belt, it was remarked that the planet near its north pole had a bluish-grey tint in May, 1836; a few months later Dr. Albert, a pupil of Bessel, observing with a 30-inch telescope, found the polar region "quite blue." The length of Gruithuisen's descriptive remarks prevents their being transferred to this column, but we refer to the observations, as his annual volumes are not often met with here, and the fact of such observations having been made forty years since may not be generally known. That these tints should have been conspicuous with such small optical aid is worthy of note.

THE INTRA-MERCURIAL PLANET.—In M. Leverrier's last communication to the Paris Academy on the planet assumed to exist within the orbit of Mercury, it was mentioned that, with the elements adopted, or very similar ones, a solar conjunction would occur on March 22, and a transit over the sun's disc was possible, though uncertain. A close examination of the disc is therefore to be recommended on March 22 and 23, and there is reason to believe that observers in widely-differing longitudes are prepared to undertake it. If no transit should then occur, eight or nine years may elapse before one is possible at the spring node.

CHEMICAL NOTES

ATOMIC WEIGHTS OF CAESIUM AND RUBIDIUM.—M. Godeffroy gives an account in Liebig's *Annalen* of some determinations he has made on the above subject. To obtain pure material he employs Redtenbacher's method for the separation of the caesium, rubidium, and potassium, by preparing their respective alums, separating these by fractional crystallisation, and finally converting them into pure chlorides of the metals. The determination of chlorine in the non-dilutescent caesium chloride, gave, as the mean of four closely-agreeing experiments, the atomic weight of caesium as equal to 132.557, the atomic weights of chlorine and silver being taken as 35.46 and 107.94 respectively; from analogous experiments the author finds the atomic weight of rubidium to be equal to 85.476.

ON THE SPECIFIC HEAT OF GASES.—In Poggendorff's *Annalen*, clvii., E. Wiedemann gives a most interesting communication on this matter, in which he criticises the experiments of Regnault on the same subject, and describes a new method of

determining the specific heats of gases introduced by himself. On comparing the author's results with those of Regnault it is found that the method employed by the former is not inferior in accuracy to that of Regnault, and also that a great economy of material may be effected by using Wiedemann's process; this economy giving the experiments greater range in a comparatively shorter time. The following tables give a synopsis of the numbers and numerous tables given in Wiedemann's paper:—

Specific Heats of Equal Weights.

	I.	II.	III.	IV.
	0°	100°	200°	
Air	0.2389	—	—	0
Hydrogen	3.410	—	—	0
Carbon monoxide ...	0.2426	—	—	0
Carbon dioxide ...	0.1952	0.2169	0.2387	22.28
Ethylene	0.3364	0.4189	0.5015	49.08
Nitrous oxide	0.1983	0.2212	0.2442	23.15
Ammonia	0.5009	0.5317	0.5629	12.38

Specific Heats of Equal Volumes.

	V.	VI.	VII.	VIII.	IX.
	0°	100°	200°	Specific weight.	$\frac{P}{P'} \frac{V}{V'}$
Air	0.2389	—	—	I	1.00215
Hydrogen	0.2359	—	—	0.0692	—
Carbon monoxide...	0.2346	—	—	0.907	1.00293
Carbon dioxide ...	0.2985	0.3316	0.3650	1.529	1.00722
Ethylene	0.3254	0.4052	0.4851	0.9677	—
Nitrous oxide	0.3014	0.3362	0.3712	1.5241	1.00651
Ammonia	0.2952	0.3134	0.3318	0.5894	1.01881

Columns I., II., III., contain the true specific heats at the temperatures indicated; column IV. the difference of specific heat at 0° and 200° expressed in percentage of the specific heat at 0°. Columns V., VI., VII., represent the true specific heats in reference to the unit of volume, the specific heat of the unit volume of air being taken as 0.2389; column IX. gives Regnault's proportions of the products of the volumes V and V', and the pressures P and P', when P is at the pressure of one, and P' at the pressure of two atmospheres. Herr Wiedemann thinks that the specific heat determined in these experiments seems to be composed of two parts, the heat caused by work expended on the expansion of the gases in overcoming outside pressure, and secondly, the heat employed in the internal work of the gas itself. He also thinks that attempts to determine the separate parts of the heat of molecular motion, of which the specific heat is composed in constant volumes—of the heat of atoms according to Naumann—and also the attempt to establish simple relations between the two to be still premature, as the alteration of the specific heat with the temperature would cause these effects to have different relations between different temperatures. The author thinks that the alteration of specific heat of the gases with the temperature cannot be explained by the deviation of such gases from the perfect gaseous condition. As an illustration of this he cites the case of ammonia gas, which, although more remote from the state of a perfect gas than nitrous oxide or carbon dioxide, still possesses smaller variations of its specific heat with change of temperature than either of these latter gases.

ACTION OF ANTIMONY PENTACHLORIDE ON CERTAIN ORGANIC SUBSTANCES.—The action of this re-agent on some organic substances has lately been investigated by C. W. Lossner, who gives an account in the *Journ. pour Chimie* of the results he obtained. When chloroform and antimony pentachloride are gently heated together, preferably in sealed tubes to 100° C., the chloroform becomes converted into carbon tetrachloride. Ethyle

bromide is attacked by antimony pentachloride, the whole of the bromine being liberated and ethyle chloride formed. The action of antimony pentachloride on ethene bromide differs according to the quantities employed. With the same number of molecules of the two substances the chief product is ethylene chlorobromide, whilst with two molecules of pentachloride to one of ethene bromide the product is ethene chloride. Ethene bromide is not acted on when similarly heated with phosphorous pentachloride. The product of the reaction of acetic acid with antimony pentachloride is monochloroacetic acid, accompanied by another substance with a higher boiling point. When salicylic acid is gradually added to antimony pentachloride, monochloro- and dichloro-salicylic acids are produced along with other products; monochloro-salicylic acid is found in small quantities only. Dichloro-salicylic acid on being boiled with potash for a considerable length of time exchanges its chlorine for hydroxyl, yielding gallic acid accompanied with pyro-gallic and oxy-salicylic acids. When paroxybenzoic acid is acted on by two or four molecules of antimony pentachloride the mono- and dichlorinated acids are found respectively. From these reactions it is evident that the action of antimony pentachloride differs from that of its analogue, phosphorous pentachloride, since it simply parts with its chlorine, which replaces hydrogen in the acid radical, instead of replacing the hydroxyl group by chlorine, as is generally the case when phosphorous pentachloride acts upon organic substances.

ACTION OF CHLORINE ON PEROXYDES.—MM. Spring and Arisqueta continue (*Bull. Acad. de Belg.*, xlii. p. 565) their researches into the action of chlorine on peroxydes of metals, for the purpose of elucidating the very important question whether the atomicity of certain bodies is variable (as supposed by Kolbe and Blomstrand), *i.e.*, whether whilst one atom of a body in a molecule is, say, tri-atomic and possesses basic properties, another atom of the same body may be pent-atomic and partake of the properties of an acid, or whether the atomicity remains invariable, as supposed by Kékulé and the authors of the paper. Former researches induced M. Spring to conclude that the atoms of chlorine possess constantly the same properties in all their compounds with oxygen, which would be contrary to the alleged varying atomicity. Now, studying the action of chlorine upon the peroxyde of silver, the authors prove, by a very delicate experiment, that its result is the formation of a peroxyde of chlorine, a body prevised by the theory, but unknown until now, and they conclude, therefore, that the structure of peroxydes of silver and of chlorine is identical, which identity gives a new argument in support of the invariability of the atomicity of chlorine and silver.

BORON AND ITS SPECIFIC HEAT.—Boron occurs, it is known, in two different forms, in the amorphous state, and in crystals. M. Hampe has recently found (*Liebig's Annalen der Chemie*) that both the black and the honey-yellow crystals are not pure boron, but compounds of the element; the black crystals consisting of albuminum and bromine in the proportions $AlB_{1.2}$, and the yellow crystals of aluminium, carbon, and boron, $C_2Al_3B_{1.8}$. Boron has hitherto been numbered among the few elements which show a departure from Dulong and Petit's general law of the constancy of specific heat into atomic weight, and M. Weber sought the reason for this departure in the case of boron, as in those of carbon and silicon, in the fact that the specific heat varies with the temperatures, but at high temperatures reaches a value which establishes an agreement with Dulong and Petit's law. The determination of the specific heat of boron, however, as also M. Weber's experiments, were made with crystals of boron. Now, since, according to M. Hampe, these crystals are not pure boron, but compounds of it, the whole question as to the validity of Dulong and Petit's law for the pure element boron remains an open one. All the attempts made by M. Hampe to produce pure crystallised boron had been with-

out success. He is engaged in further investigating whether the amorphous boron can be produced in absolute purity.

HEATED AIR.—Dr. Kayser, of Nuremberg, has lately conducted a number of experiments upon the effects of heating ordinary air, with especial reference to the warming of dwellings. The results appear in the last report of the Munich Industrial Museum, and may briefly be summed up as follows:—Air previously free from carbon monoxide was invariably found to contain this gas after heating. The tests were performed with chromic acid, and also with cuprous chloride. In order to test the products of the decomposition of the dust present in the air, about sixty litres of air, which had been heated, were drawn through an ordinary apparatus for determining carbonic acid, which contained absolute alcohol. The liquid assumed a yellowish brown colour, and flake masses were suspended in it. The flakes were found to consist chiefly of carbon. After filtration and evaporation of the solution, a brown residue was obtained. This was insoluble in water, intensely acrid, and possessed a resinous, empyreumatic odour. The estimations of carbonic acid and water before and after heating showed no difference worthy of mention.

NOTES

CONTRIBUTIONS are being collected in Stockholm for the establishment of a scientific college. The *Dagblatt* states that steps will be taken at once to fill the chairs in philology, the natural sciences, history, &c.

BARON VON RICHTHOFEN, for a long series of years president of the Berlin Geographical Society, has accepted a call to the Chair of Geography in the University of Bonn.

THE large collections brought back by the German exploring expedition in the *Gazelle* under the command of Baron v. Schleichnitz have been formed into a separate museum in Berlin. The ethnographical section is especially rich and valuable, embracing many objects brought from islands where the natives are rapidly disappearing.

THE Society for African Exploration at Berlin has been amalgamated with the newly-formed German branch of the international societies, under the leadership of the King of Belgium. During the three years of its existence it has been exceedingly active, and has expended the following sums:—Dr. Güssfeldt's Loango expedition, 9,200*l.*; expedition of Homeyer, Lux, and Pogge to the Cassandje, 1,000*l.*; Dr. Lenz's journey to the Ogowe, 1,000*l.*; various stations and shorter excursions, 2,500*l.* It has at present over 5,000*l.* in its treasury. The first session of the newly-formed *Deutsche afrikanische Gesellschaft*, was held in Berlin on January 16. The society confines its field of operations to Central Africa, proposing to open up this region "to civilisation, travel, and commerce, by the establishment of permanent stations and the maintenance of exploring parties." The energies of the society will also be directed to the repression of slavery. A letter was read from the Crown Prince of Germany, expressing his desire to take an active part in furthering the objects of the Society. A request for pecuniary assistance from the Government has already been presented to the Chancellor of the Empire.

THE Berlin *Afrikanische Gesellschaft* has received telegraphic news from Dr. v. Pogge, the African explorer, who landed last week in Lisbon, stating that he had succeeded in penetrating to the long-sought-for country of King Muata Yambo in Central Africa. A detailed report is awaited with interest in geographical circles.

DR. O. LENZ, the African traveller, has been forced to return to Europe with a shattered constitution. For a number of years