has nothing—as Mitchell asserted—to do with its solubility or compressibility. *Just as little practicable is the chemical hypothesis upon what takes place in caoutchouc, and the absorption of gases such as nitrous oxide, carbonic acid, and hydrogen by caoutchouc must be considered as a purely physical phenomenon.* A layer of caoutchouc is, then, to be conceived as a *porous* substance, endowed with powers of condensing as well as of rarefying gases whose porosity is of the same order as the porosity of graphite. The motion of the gas takes place through the pores of the caoutchouc.

It is much to be regretted that Graham's experiments upon the passage of gases through metals were so conducted, that they cannot now be calculated with the help of the laws of the diffusion of gases in absorbent substances. I have been able to calculate only those numbers which, as they are not without interest, I will here communicate. They are the constant D for hydrogen in platinum at bright red heat, and D for carbonic oxide and hydrogen in iron at full red heat.

A platinum wire absorbed at red heat 0·17 volumes of hydrogen (taking the average of four experiments). A tube drawn out of the same mass of fused platinum, 0·11 centimetres in diameter, let 489·2 cubic centimetres of gas in the minute pass through a surface of 1 square metre; therefore

$$D = 0{\cdot}00053 \frac{cm^2}{sec}.$$

A tube of malleable iron, 0·17 centimetres in diameter, let 0·284 cubic centimetres of carbonic oxide and 76·5 cubic centimetres of hydrogen through the square metre in the minute. Since one volume of this metal can contain four volumes of carbonic oxide, so is for this gas

$$D = 0{\cdot}00000002 \frac{cm^2}{sec}.$$

Since the coefficient of absorption of this metal for hydrogen was less than four, so is the constant D for this gas greater than $0{\cdot}00000054 \frac{cm^2}{sec}$, whence it follows, if there can be any comparison between these two numbers, that in metals greater constants D belong to specifically lighter gases.

It has lately been asserted by Stefan that the constant D, in both water and alcohol, is greater for oxygen and nitrogen than for carbonic acid, and that the greatest constant pertains to hydrogen. It would be, however, premature to wish to draw from his experiments any conclusions with regard to the nature of absorption of gases in fluids.

Franz Exner has already shown, several years ago, that, on the passage of gases through a lamina consisting of a solution of soap in water, the interchanged volumes of two gases are directly proportional to their coefficients of absorption and in inverse ratio to the square root of their specific gravities. Hence Stefan has concluded that the constant D in fluids is in inverse ratio to the square root of the specific gravity of the gas, and that the gas molecules move by themselves and not in connection with the molecules of the fluid, which would correspond with Dalton's views on the nature of absorption in fluids. Meanwhile, these conclusions are contradicted by the experiments of Pranghe, who has shown that the above-mentioned relation in the case of the lamina is not at all borne out when pure unboiled linseed oil is used. We see from this, then, that what takes place in the case of fluids must be much more complicated, and that we must subject the matter to a much more searching and extended inquiry before we shall be in a position to say anything definite upon the nature of the absorption of gases in liquids.

S. Wroblewski

NOTE ON PREHISTORIC STATIONS IN CARNIOLA [1]

THE most important of these prehistoric stations is the burial-field of Klenik, near Waatsch. During the year 1878 about 250 graves, covered with stone slabs, were opened at a depth of from ½ metre to 2½ metres. They contained skeletons, some remains of burnt corpses, and a great number of various objects. The bronze and other articles are very similar to those found in the well-known cemetery near Hallstadt, in Upper Austria. No Roman remains were met with. Thus there is no doubt of the pre-Roman age of these stations and cemeteries near Waatsch. They may be ascribed with great probability to the Taurisci, a Celtic tribe, known to have worked the salt at Hallstadt, and to have extended from Upper Austria, through Styria and Carinthia, as far as the Julian Alps. Strabo asserts explicitly that the very ancient landing-place Nauportus (now Ober-Laibach) was a settlement of this people, and, according to him, Italian merchandise was brought by carriage from Aquileja over Mount Okra (now Birnbaumer Wald), then by the River Savus to Siscia (now Sissek) and the Danubian districts. Thus it must be admitted that before the reign of Augustus a much-used water-communication existed on the Save and the Laibach between Siscia and Nauportus. The tradition ascribing the foundation of Emona to the Argonauts is an indication of the very remote beginning of this intercourse. Prof. Müllner, of Marburg, has lately offered some forcible arguments to the effect that Emona did not occupy the present position of Laibach, but was at the south end of the Laibach Moor, where Brundorf and Sonnegg now stand.

The graves, with skeletons, at Rojé, near Morants, contain objects referable to the Merovingian Period (fourth to seventh centuries); and a skull from one of them is of the type of those found in the successional sepultures.

[1] From the First Report of the Prehistorical Committee of the Vienna Academy, with 22 plates. By F. von Hochstetter and Ch. Deschmann. (*Proceedings*, Imper. Acad., July 3, 1879.)

GEOLOGY OF GREECE

1. *The Thessalian Olympus.*—In treating of the geology of Greece, as determined by a recent survey, Herr M. Neumayr, in the *Proceed.* Imper. Acad. Sciences, Vienna, July 17, 1879, describes this mountain-group as having a north and south direction, and consisting of a somewhat flattened dome of strata, with a subordinate syncline on the west. The limits on both sides are defined by lines of fracture. The constituent rocks are schists, of many kinds, with enormous intercalated limestones, at some places 3,000 metres thick. These latter are partly saccharoidal, partly semicrystalline, and sometimes nearly compact. In the last variety there are, in some localities numerous indeterminable organic remains.

2. M. Neumayr and L. Burgerstein state that the broad peninsular mass in South Roumelia, below Salonica, known as Chalkidiké (Chalcidica), is for the most part composed of micaceous and other schists, excepting its south-west portion and the Athos promontory. At some places considerable beds of marble are intercalated. The middle promontory of the three terminating the great peninsula is called Longos, and consists of gneiss, the oldest rock of the region.

3. The Island of Cos, according to Neumayr, consists for the most part of schists, marble, and Hippurite-limestone (with Rudistæ). The remainder is occupied by upper tertiary and diluvial deposits. Of the tertiaries the lower pliocene paludina beds strikingly resemble, in their fauna, the analogous Sclavonian deposits, and over them lie marine pliocene beds and rhyolitic tuffs; and eruptive rocks, trachytic in character, are also present. Being the extreme eastern member of the Cyclado-Sporadic series, traversing the Egean, and being connected with the neighbouring volcanic islands, Cos is well adapted to afford an insight into the nature of this submarine mountain-chain, and it yields an indication of the South-Egean basin being a depressed area of diluvial origin. The freshwater pliocene fauna offers interesting materials for the discussion of the upper tertiary freshwater deposits of the Egean region at present known, and of the evolution of the Eastern Mediterranean area. A number of passages have been collected by Prof. Hörnes from the Greek Classics, mentioning "giants' bones," which may point to places where remains of fossil mammals have been found.

NOTES FROM NEW ZEALAND

Wild Pigs and Wekas (*Ocydromus*).—Early in the spring of 1876 I spent several days in fern-collecting and botanising in the Malvern Hills district of Canterbury. Whilst so engaged, in many places I came across fresh pig-tracks and rootings, now and then sighting a boar. On one open hillside, bordered with fagus woods, I found three nests of that curious rail, the weka (*Ocydromus*); each of the nests contained eggs. It seemed remarkable that the nests should have remained unravaged by the wild pigs that were constantly roaming about the neighbourhood. It is highly improbable that the keen-scented swine were not aware of the weka's haunts. The trail of this bird is strong, readily followed by dogs; indeed, dogs take to this pursuit with so much of pleasure and relish that many good sheep-dogs

become unreliable and almost worthless when they enter upon weka-hunting. It is a well-known fact that wekas usually abound in districts infested with wild pigs; they probably find their advantage in feeding on the varied forms of insect life disclosed in the soil upturned by the swine in rooting up ferns, spear-grass, &c.

The Kea (*Nestor notabilis*).—In NATURE, vol. iv. p. 489, I called attention to certain destructive habits developed in the Kea. Since the date when that notice was written the bird has become very much better known to sheep-farmers in the alpine districts. During the past winter sheep were attacked by the kea as far north as the Rangitata River; it is probable these birds came from the district known as the Mackenzie country, as they have been troublesome about Lake Ohou.

A New Zealand Gamekeeper's Return.—Naturalists may read with some interest perhaps the following return of animals killed by gun or trap, on a large estate in the Middle Island; the numbers given do not include animals that have been destroyed by means of poison, or "the bill of mortality" would have been very much heavier.

From January 12, 1879, *to August* 24, 1879

Wild pigs	108
,, cats	18
Rats	1,054
Falcons	10
Harriers (*Circus assimilis*)	790
Wekas (*Ocydromus*)	893
Pukekos (*Porphyrio melanotus*)	5,074
Paradise ducks (*Casarca variegata*)	175
Shags	9
	8,131

Ohinitahi, October 7 T. H. POTTS

SCIENTIFIC SERIALS

Journal of the Asiatic Society of Bengal, vol. 48, Part 2, No. 11, 1879, contains:—S. E. Peal, note on the old Burmese route over Patkai *via* Nongyang (viewed as the most feasible and direct route from India to China), with two maps and two plates.—Louis Schwendler, on a new standard of light, with a plate.—W. T. Blanford, a second note on mammalia collected by Major Biddulph in Gilgit.—Dr. J. Armstrong, Marine Survey Department, on some new species of hydroid zoophytes from the seas and coasts of India, with four plates.—Lieut. R. C. Temple, note on the formation of the country passed through by the 2nd column Tal Chotiali field force during its march from Kala Abdullah Khán, in the Khójak Pass to Lugárí Bárkhan, in the spring of 1879, with a map.—W. T. Blanford, notes on a collection of frogs and reptiles from the neighbourhood of Ellore and Dumagudem.—J. Wood-Mason, preliminary notice of a new genus (Parectatosoma) of Phasmidæ, from Madagascar, with descriptions of two species.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, December 11.—"On the Reversal of the Lines of Metallic Vapours," No. VII. By G. D. Liveing, M.A., F.R.S., Professor of Chemistry, and J. Dewar, M.A., F.R.S., Jacksonian Professor, University of Cambridge.

The experiments of which the results are here given were all made with the powerful electric current from the Siemens dynamo-electric machine in limestone crucibles.

With sodium carbonate the green pair wave-lengths 4983, 4982 were reversed, showing dark lines in the middle of the bright ones, the less refrangible of the two giving the stronger dark line. The sodium line given by Lecoq de Boisbaudran at wave-length 4670 showed as a diffuse blue band with a *pair* of fine dark lines in it, of which the stronger and more lasting was the less refrangible. The diffuse blue band resolved itself into *two* diffuse lines as the sodium carbonate evaporated, and the measurement of their positions in comparison with a conspicuous titanium line, which lies between them, and was made to show at the same time by introducing a fragment of titanic oxide into the crucible, gave for this sodium pair the wave-lengths 4667, 4664. The red pair, wave-lengths 6160, 6154, were also seen reversed in like manner, but the authors failed to detect any difference in the strength or continuance of the dark lines in this case. The reversals of the red pair first ceased to be visible, next those of the diffuse blue pair, then the dark lines in the green pair, and then those in the yellowish green (5687, 5681). In some cases when a large quantity of sodium carbonate was put into the crucible a curious double reversal occurred. In the middle of an enormous dark expansion of D a bright yellow band appeared, which in turn had a narrower dark band, or a pair of dark lines, in its middle. A similar double reversal of the lithium blue line occurred so far as to show a bright line in the middle of the dark one. Of the two violet lines of potassium the authors observed that the more refrangible remained reversed longer than the other.

In addition to the reversals of calcium lines before observed by them, the authors have noticed the reversal of all the more conspicuous calcium lines of the G group and some others. The finer lines, wave-lengths 4434·3, 4454·5, slightly less refrangible than the strong lines 4434, 4454, were reversed, but only when one of the poles was a bar of iron, instead of carbon. The strong lines just mentioned were expanded so as to cover their neighbours, and all four lines were seen black against the bright background in the positions and of the same relative strengths as when bright.

When strontium chloride was put into the crucible twelve lines besides those before noted were observed reversed. Besides these, many dark bands were observed in the less refrangible part of the spectrum, of which three appear to be identical with bright bands ascribed to strontia, and one with a bright line given by strontium chloride.

Manganese, introduced as sulphate, gave with facility the violet triplet, as dark lines on the continuous background. The bright blue lines of manganese were not, however, reversed until some metallic magnesium was introduced. This brought out the reversal of the lines, wave-lengths 4753, 4783, and 4823, the last being the most easily reversed of the three.

Lead introduced in the metallic state gave a reversal of the violet line, wave-length 4058, which Cornu had previously seen reversed, but this reversal was far better seen, becoming a wide black band when the lead was introduced as an alloy with zinc. Probably the lead vapour was not so rapidly oxidised when mixed with zinc, and a thicker, if less dense, stratum interposed between the arc and the spectroscope. When lead ferrocyanide was used, not only the line above mentioned was reversed, but also, much less strongly, a line near it, wave-length 4062.

With zinc, only the less refrangible two of the three bright blue lines were seen reversed. The very bright lines, wave-lengths 4924, 4911, seen in the spark between zinc poles, were not seen at all in the arc, resembling in this respect the magnesium line, wave-length 4481, and the cadmium lines, wave-lengths 5377, 5336.

When cadmium was put into the crucible the lines, wave-length 5085, 4799, and 4677 were reversed, not the line, wave-length 4415. With a large dose of cadmium the red line, wave-length 6438, was once seen reversed for an instant only.

With silver, besides the reversals before observed by the authors, the line, wave-length 4053, showed a dark line in the middle of its expansion as noticed by Mr. Lockyer, but they could see no reversal of the line, wave-length 4208. Instead of the reversal of this line they observed that a second bright line came out close to it, rather diffuse, and about midway between the line 4208 and the calcium line 4215. This second line coming out near the other silver line gave the appearance of a reversal in the middle of a diffuse line, but besides the measurements made with a micrometer the authors assured themselves of the fact by watching the fading of the second line as the silver evaporated. The use of an alloy of zinc with silver did not alter the appearance of these two lines, or bring out a reversal of either of them. The authors failed to see any line of silver either bright or reversed with wave-length about 4240, as noticed by Cornu. With the carbons arranged vertically and the light viewed through the upper, perforated carbon, silver gave a channelled spectrum as described by Lockyer and Roberts. As this channelled spectrum was not seen with silver in any other arrangement of the crucibles, the authors are led to attribute it to a comparatively cool condition of the silver vapour ascending the carbon tube, a condition of near approach to a state of liquefaction.

Having observed that lines frequently came out with mixtures which were not visible when the separate ingredients were used, they tried a few amalagms. None of these showed any reversals