

SCIENTIFIC SERIALS.

American Journal of Science, November.—On the wave-length of the D_3 helium line, by A. De Forest Palmer, jun. The definition and intensity of this line varied greatly from day to day. The best combination of intensity and definition was obtained by avoiding prominences and working only on very clear days. The average for seventeen series of measurements was $5875.939 \pm .006$.—Some additional notes on argon and helium, by Edwin A. Hill. The conclusion that argon is monatomic depends upon the correctness of three assumptions, viz., that a gas, with little or no rotational energy, must be monatomic; that the ratio of the two specific heats of 1.67 proves the gas to have no rotational energy; and that the ratio of the two specific heats is correctly determined. In choosing between the two alternatives of a diatomic gas without rotational energy or a free atom devoid of chemical affinity, the presumption is strongly raised that it is not a monatomic gas, but diatomic and chemically inert because the two atoms of the molecule are very strongly bound together. There is not much doubt that helium is a mixture, and if anything can be argued from the analogies between argon and helium, argon is a mixture likewise.—Recent progress in optics, by W. Leconte Stevens. Part II. This concluding portion of the presidential address deals with colour photography, with recent researches on the spectrum and on polarised light, and with colour sensation.—Effect of the mutual replacement of manganese and iron on the optical properties of lithophilite and triphylite, by S. L. Penfield and J. H. Pratt. The transition from LiMnPO_4 to LiFePO_4 is marked by a considerable change in the optical characters of these isomorphous minerals. With an increase in iron there is an increase in the indices of refraction, and also the divergence of the optical axes changes rapidly.—The reduction of selenic acid by hydrochloric acid, by F. A. Gooch and P. S. Evans, jun. A solution of selenic acid is boiled in hydrochloric acid, and if the solution is not too dilute the reduction is obtained in a few moments. The hydrochloric acid must form at least 30 per cent. of the entire solution. The solution should be boiled until all the chlorine is expelled, but must not be allowed to fall below two-thirds of its original volume.—Reduction of selenic acid by potassium bromide in acid solution, by F. A. Gooch and W. S. Scoville. When intermixed with sulphuric acid and potassium bromide, selenic acid liberates bromine in proportion to the excess of acid, the bromide, and the elevation of the temperature. On boiling, the bromine is evolved and may be collected in potassium iodide, and the iodine thus set free may be determined by standard sodium thiosulphate and taken as the measure of the bromine distilled.—Restoration of some European Dinosaurs, with suggestions as to their place among the Reptilia, by O. C. Marsh. The geological positions of *Compsognathus* and *Scelidosaurus* are fully determined, but that of *Hypsilophodon* and *Iguanodon* is not so clear. The latter are found in the Wealden, which is usually considered to be Cretaceous, but might as well be classified as Upper Jurassic.

THE numbers of the *Journal of Botany* for November and December are chiefly occupied with papers on descriptive botany. Mr. D. Prain completes his account of the genus *Argemone*, and Herr R. Schlechter his *Asclepiadaceae Elliotianae*, and describes also two new genera of the order, from Madagascar and from Angola.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 21.—“On the Gases obtained from the Mineral Eliasite.” By J. Norman Lockyer, C.B., F.R.S. (Received August 6, 1895.)

Observations have been made of the gases obtained from the mineral eliasite heated *in vacuo*, in the manner which I have described in a former paper,¹ and, in addition to lines of known gases, others have been noted, for which no origins can be traced, at the following wave-lengths:—

Ångström.	Rowland.
6121.4	6122.4
6064.6	6065.7
5990.2	5991.2
5874.9	5875.9 (D_3)
5845.7	5846.7
5428.8	5429.8
5403.1	5404.1

¹ *Roy. Soc. Proc.*, vol. lviii. p. 68.

The wave-lengths of these lines have been determined by means of a Steinheil spectroscopie having four prisms, comparisons being made with adjacent metallic lines, and the positions interpolated by micrometric measurements; the accuracy may perhaps be taken to be within 0.1 tenth metres. Other lines have been noted, but they are not included in the list, for the reason that their wave-lengths have not yet been determined with the dispersion stated above.

Of the lines in the foregoing list, six are in all probability coincident with chromospheric lines, as shown in the following table, which also indicates the frequencies and brightnesses of the lines according to Young:—

Wave-length of Chromospheric Lines.

(Ångström's scale).	(Rowland's scale).	Frequency.	Brightness.
6121.2	6122.4	5	3
6064.5	6065.7	5	2
5990.0	5991.6	10	4
5874.9 (D_3)	5875.9	100	90
5428.8	5429.9	8	3
5403.1	5404.1	5	3

It is important to point out that all these lines do not appear in the spectrum at the same time. For instance, in the first two specimens of the mineral no trace of D_3 was noted, but in the third portion examined, all coming from the same specimen, D_3 appeared as a pretty bright line. Again, as in the case of a previous operation on bröggerite,¹ in one experiment with eliasite the products of distillation, collected in four stages, gave different spectra.

These facts seem to indicate that the gas obtained from eliasite is either a compound or a mixture of gases, just as it is that obtained from bröggerite according to former experiments.

It is also to be remarked that among the lines in the eliasite spectrum, those at 6122.4 and 6065.7 have been recorded in the gases obtained from cleveite, and 6122.4 has also been noted in the gas obtained from gummite.

It seems to be more than probable, therefore, that the lines observed in eliasite indicate a new gas, in some way associated with those given off by cleveite and bröggerite, and the fact that D_3 is not necessarily present in the spectrum, furnishes an additional argument in favour of the view that the gas obtained from cleveite or bröggerite is complex.

Addendum. Received November 18.

The results in the foregoing paper depend upon eye observations on the red end of the spectrum. Since it was communicated to the Society the blue end has been investigated photographically. Many specimens of eliasite have been distilled, and numerous photographs of the spectra of the gases given off have been taken.

The work has been rendered difficult by the very small quantity of what I believe to be a new gas, and the large quantity of carbonic acid, nitrogen, and hydrogen given off from the mineral. Attempts have been made to get rid of the known gases, in order to make the lines in the new gas better visible, and then the amount of gas was in most cases very small and at times admixed with argon produced by the sparking.

The photographs have been measured and reduced, and it is probable that the lines, or some of them, which cannot be ascribed to any known gases, may belong to the same gas as that giving the lines observed in the red. I append a table of some of these lines, which suggest possible coincidences in stellar and solar spectra; the numbers in brackets indicate the intensities of the lines, 6 being the maximum in the case of α Cygni, and 10 the maximum in the case of the eclipse spectrum.

Wave-lengths (Rowland).	Coincidences.
3961.4	α Cygni (6)
4035.2	Eclipse (2)
4058.6	„ (1)
4128.3 }	α Cygni (3)
4131.4 }	„ (3)
4224.0	Eclipse (1)
4255.7	„ (1)
4442.5	„ (3)

¹ *Roy. Soc. Proc.* vol. lviii. p. 194.

In addition to the above lines there are others with which no celestial coincidences have been traced.

Some of the unknown lines at first noted in the red have been observed again in the gases obtained from other specimens; it is important to note that remarkable variations in the spectra have been observed in passing from one specimen to another.

Although the evidence in favour of a new gas is already very strong, no final verdict can be given until the spectra of all the known gases, including argon, have been photographed at atmospheric pressure and the lines tabulated. This part of the inquiry is well in hand.

November 28.—“Examination of Gases from certain Mineral Waters.” By Alexander Kellas and Prof. William Ramsay, F.R.S.

A sample of gas of an inflammable nature from “Allhusen’s Well,” Middlesbrough, was tested for argon. The usual constituents, nitrogen, hydrocarbons, &c., were removed by the usual absorbents, magnesium, copper oxide, &c., and finally by sparking with oxygen over caustic soda. The spectrum of the residue was carefully compared with that of argon, and the lines were all found to be coincident. No new lines appeared, nor was any helium yellow visible. An incombustible gas from another well at the same place was also tested, and was found to contain 0.5 per cent of argon.

Some gas from a boiling spring near Reykjavik, Iceland, was found to contain a greater proportion of argon than is present in air, viz. 1.14 per cent. No helium could be detected in the gas, nor were there any lines which could not be recognised as belonging to argon.

“On the Percentage of Argon in atmospheric and in respired Air.” By Alexander Kellas.

Experiments were made on the comparative amount of argon in ordinary air, and in air which had been frequently breathed, with the view of ascertaining whether, if the proportion of oxygen and carbon dioxide in air be very much altered, argon would either enter into, or be expelled from, the respiratory system. The experiments show that the proportion of argon to nitrogen remains nearly normal, even when the air has been greatly altered in composition by respiration.

From the experimental results it appears that 100 c.c. of nitrogen and argon of breathed air contains 1.210 c.c. of argon. This percentage is larger than that in normal air. One of two suppositions may be made: either the increased amount is due to the air having been confined over water during breathing, or argon is given off from blood in greater amount than it is absorbed, when the composition of the air in the lungs is so much altered; the former appears the more probable supposition. In any case the difference is not great; and it would appear that argon, like free nitrogen, plays no important part in the animal economy, save as a diluent.

Linnean Society, November 21.—Mr. J. G. Baker, F.R.S., Vice-President, in the chair.—His Grace the Duke of Bedford, Messrs. Bernard Arnold and E. B. Fernan were elected Fellows of the Society. Mr. B. B. Woodward was admitted.—The Rev. G. Henslow exhibited a MS. common-place book of the latter end of the fourteenth century. The entries in Latin and English were found to consist chiefly of medical recipes in which about 200 plants are named for their user, and some methods of distilling *Aque vite* described. In addition were some notes on geometry and astronomy, and calculations of altitudes and superficies. Mr. Baker thought the number of plants named at the date referred to was a matter of some interest to botanists, and suggested publication of the list of names with their identification where possible.—Mr. Henslow also exhibited a series of shells of *Buccinum undatum* and *Fusus antiquus*, showing the variation in form which occurs in the reparation of injury sustained at an early stage of life, the subsequently renewed whorls assuming shapes resembling those of other species in the same genus, and even in other and very different genera. Usually the uninjured whorls could be detected by the apex being of the normal character; but in some cases the abnormality appeared to be congenital, being carried completely into the apex. This raised the question whether these were acquired characters and hereditary, having been impressed upon the offspring born after the parent shell had been injured, and renewed by growth. Mr. E. R. Sykes and Mr. B. B. Woodward offered some criticism in the discussion which followed, and deprecated the suggestion of anything like “mimicry,” the resemblances in question being regarded as purely accidental.—Mr. T. H. Buffham exhibited lantern slides of a red marine alga,

Bonnemaïsonia hamifera, Hariot, found floating in the sea at Falmouth. This species, recorded previously only from Japan, bears thickened branches terminating in a hook (hence the specific name), in this respect resembling *B. californica*, Buffham, which was also shown. Various microscopic characters of each were described and compared with those of *B. asparagoides*, Ag. It was suggested that if *B. hamifera* had been introduced from Japan, it could only have been from spores, or possibly the hamose branches might develop into plants, since the Falmouth specimens were quite fresh, and must have been living near the place of discovery.—Remarks on the mode of distribution of algae were made by Mr. George Murray and Mr. E. A. Butters.—Dr. D. Morris, C.M.G., read a paper on the development of a single seed in the fruit of the cocoanut palm (*Cocos nucifera*). Alluding to the occurrence of palms with twin and trifid stems arising from one base, it was shown that these were due (1) to several seeds in one fruit; (2) to more than one embryo in a seed; or (3) to a branching of the primary shoot. In cases cited by Rumphius, Forbes and others, several seeds were found in one fruit. The course of the development of the single cell was illustrated by means of lantern slides. The obliteration of the two cells began about the second or third week after the spathe was open. By the end of the seventh week they were reduced to narrow slits, which were still traceable in the mature fruit.—On behalf of Mr. A. J. Ewart, Prof. Harvey Gibson gave an abstract of a paper on assimilatory inhibition, the causes by which it may be induced, and their influence on vitality. It was shown that most inhibitory agencies operate by inhibiting the initial stages in assimilation, but any cause affecting the rapidity of removal of carbohydrates from assimilatory cells will also affect their power of assimilation, the commencement of which is determined mainly by the development of the chlorophyll pigment, but is also influenced by other indeterminate factors probably plasmatic in origin. The paper dealt mainly with the discussion of experiments with a large number of plants, and criticism of the results arrived at by other investigators. An interesting discussion followed, in which Dr. Scott, Prof. Reynolds Green, and Prof. Weiss took part.—Mr. A. C. Seward gave the substance of a paper on a new species of *Pinites* from the Wealden (England).

The Institution of Civil Engineers, December 17.—Sir Benjamin Baker, K.C.M.G., President, in the chair.—The design and testing of centrifugal fans, by Mr. H. Heenan and Mr. W. Gilbert. The object of the experiments recorded in this paper was to determine the best form of fan-blade and fan-case, and the most economical diameter and speed of a fan, to produce any required volume of air at a given pressure. The comparative output of fans of the same type, but differing in size, showed that, if they were run at the same tip-speed and produced the same water-gauge, the air-discharge would be proportional to the centre section of the fan, that was, to the diameter multiplied by the width. A series of tests made to determine the efficiency of an expanding chimney was also described. Air was passed from a fan through a delivery tube into an expanding chimney, the sides of which could be set at any desired angle to the centre line of the tube. The efficiency for any angle was obtained by dividing the vacuum observed at the throat of the chimney, by the calculated vacuum due to the reduction of velocity of the air as it passed from the inlet to the outlet of the chimney. The results of the tests showed that the angle on each side might be as much as 15° without loss of efficiency. The air speed recommended at the chimney outlet was 20 feet per second, and the efficiency with this speed varied between 0.43 for 6° opening, and 0.42 for 15° opening on each side.

Mineralogical Society, November 19.—Anniversary meeting.—Prof. N. S. Maskelyne, F.R.S., in the chair.—The following officers and members of Council were elected: President, Prof. N. S. Maskelyne, F.R.S.; Vice-Presidents, Rev. S. Haughton, F.R.S., Dr. Hugo Müller, F.R.S.; Treasurer, Mr. F. W. Rudler; Foreign Secretary, Prof. J. W. Judd, F.R.S.; General Secretary, Mr. L. Fletcher, F.R.S.; ordinary members of Council, Prof. Green, F.R.S., Mr. Harker, Prof. Lewis, Mr. Pringle, Mr. Prior, Mr. Thomson, Mr. Tutton, Mr. Watts, Prof. J. Geikie, F.R.S., Mr. Hutchinson, Mr. Kitto, Lieut.-General C. A. McMahon. Mr. J. H. Collins was elected an auditor in place of Mr. F. Rutley, resigned. The Rev. Mark Fletcher and Mr. R. C. Webb were elected members of the Society.—Mr. Wm. Barlow read a paper on homogeneous structures and the symmetrical partitioning of them, and

exhibited models, manufactured by himself, to illustrate the manner in which various types of cubic symmetry can be constructed from units composed of any material distributed in the least symmetrical manner compatible with the requirements of that system. The models were hollow cubes, each containing three small hands affixed to one diagonal, right hands in some cubes and left hands in others. The author insisted upon the desirability of regarding the problem as one of the homogeneous distribution of matter without any limitation as to the form of the units, herein placing himself in opposition to the recently expressed views of Fedorow, who regards parallelohedra as the basis of all crystalline structures.—Prof. A. S. Herschel exhibited a number of intricate coloured models, made by himself, to illustrate the symmetrical partitioning of space, and indicated the various ways in which they may be viewed as interpenetrating or juxtaposed compartments. In the discussion which followed, Mr. Tutton agreed with Mr. Barlow's conclusion that the space-units should not necessarily be endowed with the same symmetry as the whole solid, and suggested an analogy between the author's conception of a growth of the hands whereby they might meet and fill the space with close-packed units, and the growth in volume which may occur when one metal in a salt is replaced by a heavier one of the same series. The President observed that such space-partitioning surfaces are purely imaginary; their form and dimensions must vary with temperature-changes, &c. The morphology of crystals has had nothing to learn from the geometry of crystal tactics; on the other hand, it has corrected and guided the course of those geometrical inquiries. The future working-out of the relations of stereo-chemistry to morphology and to actives will give significance to the stereohedra and parallelohedra of Fedorow, and will perhaps explain the existence of planes of symmetry, a principle which underlies any true theory of crystal-structure.

PARIS.

Academy of Sciences, December 16.—M. Marey in the chair.—On a theorem in geometry, by M. J. Bertrand.—The composition of flour and other products of roller milling. This is an attempt to place the operation of milling upon a scientific basis. The products of the fining were separately weighed and analysed, and samples of bread made from each.—Observations on Brooks' comet (1895, November 21) made at the Paris Observatory, by M. G. Bigourdan.—Observation of a meteor, by M. G. Bigourdan. A very brilliant meteor seen 7h. 4m. 50s. p.m., December 15. It appeared to be moving very nearly horizontally at a height of 45° in the direction from east to west.—A new explanation of the phenomenon of the solar prominences, by M. J. Fényi.—The equation to derived partials with constant coefficients, and on non-analytical functions, by M. E. Borel.—On the rolling of two surfaces on each other, by M. E. Cosserat.—Measurement of the force acting on a non-electrified dielectric, placed in an electric field, by M. H. Pellat. An experimental proof of a theorem established in a previous note.—The direct combination of nitrogen with metals, by M. A. Rossel. It has been found that if an intimate mixture of finely-powdered calcium carbide with magnesium powder is heated with free access of air, the metal is almost completely transformed into the nitride. Finely divided aluminium, zinc, iron, and copper act similarly.—On the preparation and properties of crystallised chromous sulphide, by M. A. Mourlot. Metallic chromium was heated to a high temperature in a stream of sulphuretted hydrogen. The product proved to be the protosulphide, which on strongly heating was obtained in the crystalline state. A study of its behaviour towards a number of reagents showed that it is a compound of considerable stability.—On lithium subchloride, by M. Guntz. This is prepared by heating lithium and the ordinary chloride together to a red heat. The product decomposes water with the liberation of hydrogen.—On some new safranines, by M. G. F. Jaubert.—Study on *Aspergillus oryzae*, by M. E. Sorel. It is shown that if cultures of the conidia in malt-wort are subjected to certain temperatures, and in presence of hydrofluoric acid, the mycelium first produced breaks down into a yeast-like form capable of isolation by repeated cultivation in malt-wort. This yeast is active, and whilst fermenting an ordinary malt solution produces no mycelium. The latter, however, can be reproduced again under special conditions, thus completing the life cycle.—Functional assimilation, by M. F. Le Dantec.—On the process of development in the Filigranes and Salmacyns, by M. A. Malaquin.—On the influence of electricity on the development of the embryo of the chicken,

by M. C. Dareste.—Study of the effect of the colour of light upon vegetation, by M. C. Flammarion.—On some vegetable impressions in the coal-measures of Southern Brazil, by M. R. Zeiller.—A new disease in the leaves of the larch, by M. E. Mer.

NEW SOUTH WALES.

Linnean Society, October 30.—Mr. Henry Deane, President, in the chair.—On the occurrence of diatomaceous earth at the Warrumbungle Mountains, N.S.W., by Prof. T. W. Edgeworth David.—Jottings from the Biological Laboratory, Sydney University, No. 18.—On certain points in the structure of the pearly nautilus, by Prof. W. A. Haswell.—The grey gum of the North Coast districts (*Eucalyptus propinqua*, sp. nov.), by Henry Deane and J. H. Maiden. This grey gum has for many years held an uncertain botanical position, having been ranked, at different times, by botanists under *E. punctata*, *E. saligna*, and even *E. viminalis*. The authors believed that it but perpetuates the confusion to place it under any existing species. Its bark and timber considerably resemble those of *E. punctata*. From this species *E. propinqua* differs in the smaller size of the flower-buds and fruits; and in the narrow lanceolate leaves which also have more parallel and less prominent lateral veins than *E. punctata*. The calyx-tube and also the operculum of *E. propinqua* are more distinctly hemispherical, and its flowers more pedicellate. The fruit of *E. punctata*, though variable in size, is always larger and more cylindrical than that of *E. propinqua*. *E. propinqua* was fully described, and its affinities and differences from other species were further given in some detail. The species is found from the Hawkesbury River to the Tweed River, and probably will be found to extend to South Queensland.—On new localities for *Peripatus*, by Edgar R. Waite.

CONTENTS.

	PAGE
The Evolution of Art. By E. Sidney Hartland . . .	169
The Flora of Bourbon. By W. Botting Hemsley, F.R.S. . . .	170
Technical Education. By N. J. L.	171
Our Book Shelf:—	
Loudon and McLennan: "A Laboratory Course in Experimental Physics."—W. G. Rhodes	172
Buckton: "The Natural History of <i>Eristalis tenax</i> , or the Drone-fly."—L. C. M.	172
T. and T. G. Jones: "Working Models for Engineering Students. Engine Slide-Valves"	172
"Macmillan's Geography Readers"	172
Letters to the Editor:—	
The Bury St. Edmunds Human Skull Fragment. (Illustrated.)—Worthington G. Smith	173
The Coronal Rays of Passion-flowers.—John H. Wilson	173
Colours of Mother-o'-Pearl.—Ernest H. L. Schwarz; F. A. Bather	174
Northerly Wind in Winter Seasons. (With Diagram.)—A. B. M.	174
"Perlites."—Prof. Grenville A. J. Cole	175
The Discovery of the Anti-Toxin of Snake-Poison.—Prof. E. Ray Lankester, F.R.S.	175
Male of Apus.—Dr. W. B. Benham	175
The Merjelen Lake.—Percy F. Kendall	175
The Paris Academy of Sciences and the Royal Society	175
The Habits of the Cuckoo	176
The Yorkshire Gypsy-Springs. By Harwood Brierley	177
Notes	177
Our Astronomical Column:—	
Orbits and Origin of Comets	180
Comet Brooks, 1895	180
The Movements of Horizontal Pendulums. By John Milne, F.R.S.	180
The Antwerp Meteorological Congress	182
The Huxley Memorial	183
Relations of the Weather Bureau to the Science and Industry of the United States. By Prof. W. S. Moore	187
University and Educational Intelligence	189
Scientific Serials	190
Societies and Academies	190