

			s	t	u	v	w	x
100PbSO <sub>4</sub>	yield	109.2444 PbN <sub>3</sub> O <sub>6</sub> = b						
		109.307 ,, Turner						
100Pb	,,	159.98 ,, Stas						
		159.9743 ,, Stas						
100PbN <sub>3</sub> O <sub>6</sub> = b	,,	67.3799 PbO = i						
		67.4016 ,, Svanberg						
100AgCl	correspond to	29.5607 LiCl = $\frac{1}{b}$						
		29.584 ,, Mallet, Troost						
100Ag	correspond to	39.2692 ,, = $\frac{1}{b}$						
		*39.358 ,, Stas						
100LiCl = $\frac{1}{b}$	yield	162.6508 LiN <sub>3</sub> O <sub>6</sub> = c						
		162.5953 ,, Stas						
100Tl	yield	130.38969 TlN <sub>3</sub> O <sub>6</sub> = b						
	Experiment 8	130.3897 ,, Crookes						
	Mean of 10 experiments	130.391 ,, ,,						
100C <sub>8</sub> O <sub>8</sub> (SO <sub>3</sub> ) <sub>3</sub> .12H <sub>2</sub> O = c	contain—	14.1694 GO						
		14.169 ,, Nilson and Pettersson						
100MgC <sub>2</sub> O <sub>4</sub> H <sub>2</sub> O <sub>2</sub> = c	contain—	27.338 MgO = i						
		27.3665 ,, Svanberg & Nordenfeldt						
100MgCO <sub>3</sub> = c	contain	47.6 ,,						
	Mean of 19 experiments	47.627 ,, Marchand and Scheere						
100H <sub>4</sub> N <sub>3</sub> .SO <sub>4</sub> .3AlOSO <sub>3</sub> .24HO = c b	contain—	11.2814 AlO						
	Mean of 10 experiments	11.2793 ,, Mallet						
100H <sub>4</sub> N <sub>3</sub> .SO <sub>4</sub> .3GaOSO <sub>3</sub> .24HO = c b	contain—	18.9325 GaO						
		18.9596 ,, Lecoq de Boisbaudran						

  

Li	...	22	2'36559	7'412	7'0235	7'333	3
Ca	...	58	6'23656	39'0824	40'082	38'666	6
Na	...	70	7'52688	23'5842	23'051	23'333	3
K	...	118	12'68817	39'7564	39'109	39'333	3
Rb	...	256	27'5269	86'2424	85'529	85'333	3
Mg	...	36	3'8537	24'15	24'014	24	6
Sr	...	132	14'1303	88'5498	87'575	88	6
Ba	...	206	20'05183	138'1915	137'007	137'333	6
Pb	...	306	32'7566	205'2748	206'946	204	6
Ag	...	324	34'683467	108'6748	107'923	108	3
Cs	...	398	42'605	133'496	132'918	132'666	3
H	...	3	0'31915	1	1'0023	1	3
N	...	14	1'48936	14	14'029	14	9
O	...	24	2'55319	16	16	16	6
F	...	58	6'04166	18'93	19'027	19'333	3
Cl	...	107	11'14583	34'9236	35'451	35'666	3
Br	...	243	25'3125	79'3125	79'951	81	3
I	...	387	40'3125	126'313	126'848	129	3
B	...	11	1'14583	10'771	10'966	11	9
G	...	14	1'45833	9'072	9'106	9'333	6
C	...	18	1'875	11'75	12'001	12	6
Si	...	22	2'29166	28'722	28'26	29'333	12
Al	...	28	2'9166	27'416	27'075	28	9
P	...	32	3'3333	31'33	31'029	32	9
Ti	...	42	4'375	54'833	49'961	56	12
La	...	44	4'5833	143'61	138'844	146'666	30
S	...	48	5	31'33	32'058	32	6
Di	...	50	5'20833	146'875	144'906	150	27
Yt	...	60	6'25	88'125	90'023	90	13.5
Yb	...	62	6'45833	182'125	173'158	186	27
Ce	...	64	6'6666	139'26	140'747	142'222	20
Sc	...	66	6'875	43'0833	44'081	44	6
Zr	...	68	7'0833	88'7777	89'573	90'666	12
Ga	...	72	7.5	70.5	68'963	72	9
As	...	76	7'9166	74'417	75'09	76	9
V	...	78	8'125	50'9166	51'373	52	6
Cr	...	80	8'3333	52'222	52'129	53'333	6
Mn	...	84	8.75	54'833	54'029	56	6
Fe	...	86	8'9583	56'139	56'042	57'333	6
Ni	...	90	9'375	58.75	58'062	60	6
Co	...	91	9'4792	59'403	59'023	60'666	6
Sn	...	92	9'5833	120'11	117'968	122'666	12
Cu	...	96	10	62'666	63'318	64	6
Nb	...	98	10'20833	95'95833	94'027	98	9
Zn	...	100	10'4166	65'278	65'054	66'666	6
Ta	...	106	11'04166	184'5186	182'562	188'444	16
Se	...	120	12.5	78'333	78'978	80	6
Sb	...	126	13'125	123'375	120'231	126	9
W	...	142	14'79166	185'3888	184'032	189'333	12
Mo	...	150	15'625	97'9166	97'747	100	6
Cd	...	170	17'7083	110'972	112'092	113'333	6
In	...	176	18'3333	114'888	113'659	117'333	6
Th	...	178	18'54166	232'389	233'951	237'333	12
U	...	184	19'1666	240'222	239'03	245'333	12
Te	...	196	20'4166	127'945	128'254	130'666	6
Au	...	204	21'25	199'75	196'606	204	9
Bi	...	216	22.5	211.5	208'001	216	9
Ir	...	300	31'25	195'833	193'994	200	6
Pt	...	304	31'6666	198'444	194'867	202'666	6
Hg	...	306	31'875	199.75	200'171	204	6
Os	...	308	32'0833	201'056	198'951	205'333	6
Ru	...	318	33'125	103'7916	104'457	106	3
Rh	...	320	33'3333	104'444	104'285	106'666	3
Pd	...	326	33'95833	105'981	105'981	108'666	3
Tl	...	618	64'375	201'708	204'183	206	3

San Francisco, California, July 24

E. VOGEL

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The following gentlemen were on Monday, November 3, elected to Fellowships at St. John's College:—C. M. Stewart, M.A., First Class in Natural Sciences Tripos of 1879, author of several papers on chemical subjects, and Master

at the Newcastle School, Staffordshire; J. Brill, B.A., Fourth Wrangler in 1882, Assistant Professor of Mathematics in University College, Aberystwith; W. F. R. Weldon, B.A., First Class in the Natural Sciences Tripos of 1881, author of a number of papers in Zoology and Comparative Anatomy, formerly Demonstrator to the Professor of Zoology and in the Morphological Laboratory; A. R. Johnson, B.A., Sixth Wrangler and First Division in the Mathematical Tripos of 1882-83 (new regulations), author of papers in the *Messenger of Mathematics*, &c.; G. F. Stout, B.A., First Class in the Chemical Tripos of 1881-82 (new regulations), and First Class (with distinction in Metaphysics) in the Moral Sciences Tripos of 1883; G. B. Mathews, B.A., Senior Wrangler in 1884, Professor of Mathematics in the University College of North Wales, Bangor. It is worth noting that Pure and Applied Mathematics, Chemistry, and Biology have been markedly recognised by this election.

Dr. Donald MacAlister has been appointed University Lecturer in Medicine, and Dr. Bushell Annington University Lecturer in Medical Jurisprudence.

Mr. Walter Heape has been approved by the Board for Biology and Geology as Demonstrator in Animal Morphology, on the nomination of the Lecturer in that subject, Mr. Sedgwick.

Prof. Sidgwick, Prof. Adamson (Owens College), and Messrs. James Ward and J. S. Nicholson are appointed Examiners for the Moral Sciences Tripos.

Mr. A. R. Forsyth of Trinity College is appointed Examiner in the Mathematical Tripos (Third Part) in January next, in the place of the late Mr. R. C. Rowe.

In reference to our note a fortnight ago (vol. xxx. p. 649), we should state that, at Trinity College, Major Scholarships of the value of 80*l.* a year, which may be raised to 100*l.* subsequently, are open for competition in Natural Sciences as well as in Classics and Mathematics to persons not yet in residence, with the usual restriction as to age.

SHEFFIELD.—Another step has been taken in the formation of the new Engineering School at Firth College, Sheffield, in the appointment of Mr. W. H. Greenwood to be Professor of Metallurgy and Mechanical Engineering, and Mr. Ripper to be Assistant Professor of Engineering. It may be in the memory of our readers that the City and Guilds of London Institute made a grant about eighteen months ago of 300*l.* a year to the Firth College in aid of the establishment of a Chair of Engineering. Since then additional subscriptions have been promised for five years to the amount of 550*l.*, together with a capital sum of over 10,000*l.* A site for laboratories and shops has been obtained, and these will be proceeded with as soon as possible. It is hoped that the special advantages of Sheffield will make it the central school of metallurgy, especially for iron and steel, in the kingdom, and the Committee intend to spare no efforts in rendering it a complete and effective one.

#### SCIENTIFIC SERIALS

*The American Journal of Science*, September.—On the amount of the atmospheric absorption, by S. P. Langley. From numerous observations taken at sea-level or at an altitude of nearly 15,000 feet, the author is led to infer that the mean absorption of light as well as of heat by our atmosphere is probably at least double the usual estimate of about 20 per cent. He also believes that fine dust particles, both near the surface and at a great altitude, play a more important part in this absorption, both general and selective, than has been hitherto supposed.—A study of tornadoes, by Henry A. Hazen. In this paper the author examines some of the ordinary theories that are advanced for explaining the origin and development of these destructive phenomena. After showing some of the seeming difficulties involved in these theories, he proceeds to point out a few of the characteristics of the outbursts, with a view to opening up fresh lines of investigation, upon which a further advance may be made towards a true knowledge of the forces underlying them. He is inclined to think that J. Allan Broun's theory, attributing tornadoes to the direct influence of the sun's electricity upon the moisture of the air, or possibly to the indirect effect from the sun's heat, is more satisfactory than the numerous theories of friction, evaporation, condensation, sudden changes of temperature, and the like.—On the absorption of radiant heat by carbon dioxide, by J. E. Keeler. The author considers it probable that to the action of CO<sub>2</sub> in the atmosphere is due one or more of the

great gaps in the invisible part of the solar spectrum which the discoveries of Prof. Langley show to be much more extensive than had hitherto been supposed. He further regards it as certain that some other agent than this gas contributes essentially to the total absorptive power of the atmosphere, so that a method of analysis based on this power, in which the effect of the second agent is neglected, cannot lead to correct results.—Note on the Triassic insects from Fairplay, Colorado, by Samuel N. Scudder. These fossil remains present an assemblage of forms altogether different from anything hitherto found in the Palæozoic series on the one hand, or in the Jurassic beds on the other. They seem to show a commingling of strict Jurassic forms with a larger proportion of types which may be called Upper Carboniferous or Permian, with a distinct Jurassic leaning. Hence the probability that the beds in which they occur belong to the Triassic or intermediate formation.—On the flexibility of Itacolomite, by Orville A. Derby. From observations made on this extensive series of quartzose rocks occurring in the gold and diamond regions of Minas Gerais, Brazil, the author infers that the peculiar property of flexibility attributed to them is not an original characteristic, but only a surface character, a phase of weathering or decay brought about by percolating waters.—On the age of the glazed and contorted slaty rocks in the vicinity of Schodack Landing, Rensselaer County, New York, by S. W. Ford.—On the relations of the mineral belts of the Pacific slope to the great upheavals, by Geo. F. Becker. The views of H. P. Blake and Clarence King regarding the parallelism of the series of mineral belts on the Pacific slope to the great mountain ranges, and attributing the deposits themselves to the solfateric action accompanying the ejection of igneous rocks, have since been mainly confirmed. But, independently of any theory, a conclusion of economical importance evidently follows from the fresh facts recently brought to light. A great majority of all the rich ores west of the Wahsatch Range occur in belts following the western edges of distinct geological areas—the Cretaceous in Utah, the Palæozoic and Carboniferous in Nevada and Arizona, the Jura-Trias in East California, &c. Hence analogy points to the neighbourhood of the still unexplored portions of these contacts as the most promising for future discoveries of the precious metals.—Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England, No. 9, by A. E. Verrill.—Brief contributions to zoology from the Museum of Yale College, No. iv.—Work of the steamer *Albatross* in 1883.—Geology of the Blue Ridge, near Balcony Falls, Virginia, by John L. Campbell.

October.—On the duration of colour-impressions upon the retina, by Edward L. Nichols. Taking up the subject where it was left fifty years ago by Plateau's researches, the author concludes, from a protracted series of experiments: (1) that the study of the duration of colour-impressions produced by different portions of the spectrum tends to confirm Plateau's results; (2) that the persistence of the image is a function of the wave-length producing it, being greatest at the ends of the spectrum, and least in the yellow; (3) that it decreases with the intensity of the ray producing it; (4) that it is not the same for all eyes; (5) that the duration is in inverse order to the luminosity of the colours producing it; (6) that each wave-length of the visible spectrum produces three primary impressions, red, green, and violet, of which the green is the most evanescent, violet the most persistent; (7) that the duration of the retinal image depends upon the length of time during which the eye has been exposed, decreasing as the exposure increases.—Description of a fulgurite from Mount Thielsen, Oregon (one illustration), by J. S. Diller.—On the paramorphosis of pyroxene to hornblende in rocks (two illustrations), by Geo. H. Williams.—On the southward ending of a great synclinal in the Taconic Range (with a map and several illustrations), by James D. Dana. The section of the Taconic Range here dealt with extends about 150 miles along the western border of New England, mainly between Middlebury, in Central Vermont, and Salisbury, in North-Western Connecticut. The conclusions arrived at regarding the synclinal character of the system and the Lower Silurian age of the rocks agree with those of Sir William Logan, except that he made the limestone to precede instead of to include the Trenton group.—On supposed glaciation in Pennsylvania, south of the terminal moraine (with a map), by Prof. H. Carville Lewis. The author considers that all the existing surface phenomena may be explained by the action of running waters and other causes independent of glaciation.—History and chemical analysis of a mass of meteoric iron