difference, the law of proportionality being thus still observed. Now taking the simple arithmetical progression having for difference $\pi = 3, 1416$, it furnished a series of terms which markedly concord with the series of the atomic weights or equivalents as presented by Mendeleeff's Tables, and the successive blanks occurring in the series established by him in his Tables are very approximately filled up by the succession of the terms of this progression both as regards numerical values and order of succession.

To demonstrate this Mendeleeff's Tables have been drawn out, with the addition opposite each equivalent of the corresponding approximate value in terms of the progression π.

In Table I., containing his grouping into *Typical* and *Great Periods*, there is shown the succession of the elementary bodies and their equivalents, as also the comparative concordant succession of the terms of the progression π with approximate values mostly in terms of $\frac{1}{3}\pi$.

In the Table II., or of *Periodic Series*, the blanks existing in these series as indicated by Mendeleeff are shown to be very approximately filled up by corresponding terms, in value and order of succession, of the progression π. This is markedly the case as regards the gap existing between the series 8 and 10, where are wanting *twelve terms*, which, being filled up by successive terms of the progression π, the thirteenth term, corresponding to the equivalent of Lanthanum = 180 (?) is represented in the progression π by the value $57\frac{1}{3}\pi = 180, 1164$, or approximatively by the value $57\pi = 179, 0712$.

Considering this progression of terms of π it will be found that of the sixty-five elementary bodies given in Mendeleeff's Tables the following corresponding equivalents are represented, with an approximation of less than a unit, by terms of the progression :—

H	=	1	...	$\frac{1}{3}\pi$ = 1, 0472
Be	=	9, 4	...	3π = 9, 4248
C	=	12	...	4π = 12, 5664
O	=	16	...	5π = 15, 7080
Fl	=	19	...	6π = 18, 8496
Si	=	28	...	9π = 28, 2744
Ph	=	31	...	10π = 31, 4159
Ca	=	40	...	13π = 40, 8404
Ta	=	48 ?	...	15π = 47, 1240
Va	=	51	...	16π = 50, 2656
Fe	=	56	...	18π = 56, 5488
Ni	=	59	...	19π = 59, 6904
Co	=	59	...	,, ,,
Cu	=	63	...	20π = 62, 8313
Zn	=	65	...	21π = 65, 9736
(Gallium ?	=	69·1	...	22π = 69, 1150)
(Norwegium ?	=	72	...	23π = 72, 2566)
As	=	75	...	24π = 75, 3984
Se	=	78	...	25π = 78, 5400
Rb	=	85	...	27π = 84, 8232
Yt	=	88	...	28π = 87, 9648
Zr	=	90	...	29π = 91, 1064
Nb	=	94	...	30π = 94, 2477
(Terbium ?	=	99	...	32π = 100, 5312)
Ru	=	104	...	33π = 103, 6725
Rh	=	104	...	,, ,,
Pd	=	106	...	34π = 106, 8144
In	=	113	...	36π = 113, 0976
Sb	=	122	...	39π = 122, 5224
Te	=	125	...	40π = 125, 6636
Cs	=	133	...	42π = 131, 9472
Di	=	138 ?	...	44π = 138, 2300
Ce	=	140–141	...	45π = 141, 3720
(Davyum ?	=	153	...	49π = 153, 9384)
(Decipium ?	=	157	...	50π = 157, 0795)
Er	=	178 ?	...	57π = 179, 0712
La	=	180 ?		
Ta	=	182	...	58π = 182, 2128
Os	=	195	...	62π = 194, 7786
Ir	=	197	...	63π = 197, 9208
Pt	=	198		
Hg	=	200	...	64π = 201, 0624
Tl	=	204	...	65π = 204, 2040
Pb	=	207	...	66π = 207, 3450

Such a concordance must be taken as some proof of the reality of a certain correspondence between the values of the equivalents and those of the terms of the progression π.

It is fully admitted that the equivalents are but relative, both as regards their number and their numerical values, to the forces which the present state of chemical analysis can bring to bear on matter, and admitting the existence of a law of progression by which the equivalents may be connected, such a progression should as a matter of necessity differ both as regards the number of representative terms and their values from the present received succession and numerical values of the equivalents, and consequently show discordances in certain places and approximate concordances in others; such is shown by the terms of the progression π.

J. P. O'REILLY

May, 1880

BIRDS OF THE SOLOMON ISLANDS

IN a paper "On the Birds of the Solomon Islands," by E. P. Ramsay, F.L.S., &c., Curator of the Australian Museum, Sydney, read before the Linnean Society of New South Wales, February 23, 1881, the following new birds were described :—

1. *Graucalus elegans*, sp. nov.—A species allied to *G. hypoleucus* of Gould, but differing in its smaller size, whiter under-surface, broad jet black band on lorcal region, extending below the eye, and in having ashy grey shoulders.

2. *Piczorhynchus Richardsii*, sp. nov.—A remarkably distinct species, with the body and the wings and tail above black, ossified nape, and hind neck white, head and throat black, chest and remainder of the under surface chestnut; this species comes from the Island of Nyi, and has been named in compliment to Lieut. Richards, R.N.

3. *Myzomela Tristrami*, sp. nov.—A jet black myzomela of large size, the bill strong and yellow, with end black, bases of the inner webs of the quills below ashy. This species is allied to, but distinct from, *M. nigra, M. Forbesii, and M. pammelana.*

4. *Mygomela pulcherrima*, sp. nov.—This fine species has the whole of the head, neck, chest, breast, and sides of the body and flanks, the interscapular region, rump, and upper tail coverts of a rich deep crimson, the remainder of the plumage black. The extent of the scarlet on the flanks and breast is greater than in either of the allied species *M. cardinalis* and *M. nigriventris.*

5. *Zosterops* (*Tephras?*) *olivacens*, sp. nov.—In this genus there is no trace of white round the eye, and the bill has quite a different contour than that of any species of the genus *Zosterops.* The first and sixth primary quills in this species are equal, and the third is equal in length to the fourth. The general colour above is a uniform dull brown washed with olive, inclining to smokey brown on the head, inner webs of the quills below margined with white, under surface light ashy brown, almost white on the abdomen, length about five inches.

6. *Nasiterna fiuschii*, sp. nov.—A very distinct species of a uniform grass-green tint, paler on the abdomen, under tail coverts yellow, length 3·8 inches.

The paper contains notes on six or eight other species of interest and a fine collection of Solomon Island birds were exhibited—about fifty species.

OUR ASTRONOMICAL COLUMN

THE VARIABLE STAR χ CYGNI.—A maximum of this variable should now be close at hand. Prof. Winnecke assigns it to July 31, rather later than the average period of the last few years would give it. Its brightness at maximum has varied during the present century from 4m. to a very little above 7m. In vol. vi. of the Bonn Observations, Argelander has given nine observations of the position of this star, about which there has been so much and unnecessary confusion. Its place for 1880·0 is in right ascension 19h. 45m. 57·33s., declination 32° 36′ 42″·1. A comparison of Lalande's observation in 1793 with Argelander's shows that there is no appreciable proper motion. The variability of χ Cygni was discovered in 1686 by Kirch, whose first observed maximum is dated November 28, 1687.

COMET 1881 *b*.—It appears this comet was detected at Sydney as early as May 22, so that we may yet receive observations from the Australian observatories made nearly a week before the first of those made at Rio Janeiro. The orbit, founded upon post-perihelion places, which we published last week, gives the comet's place on May 22 at 10 p.m. at Sydney in right ascension 4h. 58·5m., declination 35° 33′ S., and at this time the comet was distant from the earth 0·772 of the earth's mean distance from the sun. M. Cruls' first position, deduced from the observations at Rio is as follows :—

M.T. at Rio.	R.A. h. m. s.	Decl. ° ′ ″
May 29·27980 ...	5 2 3·8 ...	−31 15 24·9

The comet was nearest to the earth about midnight on June 19, when its distance was 0·283.

The ephemeris subjoined is for Greenwich midnight :—

	R.A. h. m.	N.P.D. °	Log. distance from the Earth.	Sun.
July 22 ...	11 44·2 ...	8 5·0 ...	9·9290 ...	0·0065
23 ...	11 55·5 ...	8 13·5		
24 ...	12 5·9 ...	8 22·7 ...	9·9479 ...	0·0173
25 ...	12 15·5 ...	8 32·4		
26 ...	12 24·5 ...	8 42·5 ...	9·9657 ...	0·0281
27 ...	12 32·9 ...	8 52·9		
28 ...	12 40·7 ...	9 3·4 ...	9·9825 ...	0·0388
29 ...	12 48·0 ...	9 13·9		
30 ...	12 54·9 ...	9 24·5 ...	9·9982 ...	0·0493
31 ...	13 1·3 ...	9 35·2		
August 1 ...	13 7·4 ...	9 45·9 ...	0·0131 ...	0·0597
2 ...	13 13·2 ...	9 56·4		
3 ...	13 18·7 ...	10 7·8 ...	0·0271 ...	0·0700
4 ...	13 24·0 ...	10 17·2		
5 ...	13 29·2 ...	10 27·4 ...	0·0404 ...	0·0800
6 ...	13 34·3 ...	10 37·4		

COMET 1881 *c*.—Telegrams from the Smithsonian Institution at Washington notify the discovery of a comet at the Observatory of Ann Arbor, by Mr. Schäberle, apparently on July 16; it was situate, according to the telegrams, nearly in the right ascension of Capella in 48° declination (or ? 38°).

NEAR APPROACH OF VENUS TO 107 TAURI.—Prof. Winnecke has circulated a note in which he suggests a method of determining the solar parallax from observations of this planet, when it approaches or occults a fixed star. We refer to the note at this time, only to draw attention to a close approach of the planet to 107 Tauri, a star of 6·5m. on the morning of July 24. According to a calculation by one of Prof. Winnecke's pupils the star will be occulted, but there appears to be some mistake here. Taking the star's place from the Greenwich Catalogue of 1864 and the Radcliffe Observations 1870-75, its apparent position will be R.A. 5h. 1m. 51·33s., Decl. +19° 42′ 15″·1, and at conjunction in R.A. July 23 at 20h. 26m.·2 G.M.T., the geocentric difference of declination (Venus-star) is 28″·7; this difference is reduced by the effect of parallax at Greenwich to 22″·9, and Wichmann's value of the semi-diameter of the planet being 10″·8, it appears neglecting tabular error of place, that at conjunction in right ascension, the south limb of Venus will be 12″ north of the star.

[Since the above was in type Dr. Gould's observations of the great comet at Cordoba have been received; they show that at the end of May the elements upon which our ephemeris is founded may give the comet's position with errors of + 1′·0 in R.A., and + 3′·8 in declination.]

SCIENTIFIC SERIALS

Bulletin de l'Académie Royale des Sciences de Belgique, No. 3.—On the intensity of scintillation during auroræ boreales, by M. Montigny.—Observations on the anatomy of the adult African elephant, by MM. Plateau and Liénard.—On a general property of liquid sheets in motion, by M. Vander Mensburghe.—On the triangulation of the kingdom, by M. Adan.—On the magnetism of bodies in relation to their atomic weight, by M. Enera.—On the broadening of the lines of hydrogen (third communication), by M. Fiévez.

No. 4.—Liberty, and its mechanical effects, by M. Delbœuf.—Note on *Pretswichia rotundata*, J. Prestwich, discovered in the coal schist of Hornu, near Mons, by M. de Koninck.—On the transformation of methylchloracetol into acetone and thiacetone, by M. Spring.—On the blood of insects, by M. Fredericq.—Note on certain co-variants, by M. le Paige.—Researches on the reproductive apparatus of osseous fishes, by Mr. MacLeod.—On the stratigraphic position of remains of terrestrial mammalia discovered in Eocene strata of Belgium, by M. Rutot.

Archives des Sciences Physiques et Naturelles, June 15.—International Geological Congress at Bologna (1881); report of Swiss Committee on unification of nomenclature, by Renevier.—On an artificial reproduction of Gaylussite, by MM. Favre and Soret.—Study on palæontological and embryological development, by M. Agassiz.—Researches on alternating generations of Cynipides of oak, by M. Adler.—Observations on luminous plates, by M. Dufour.—Apparatus for Lissajous' curves, by the same.—The telephone and return currents of telegraph lines, by M. Cauderay.

Atti della R. Accademia dei Lincei, vol. v. fasc. 13.—Astronomical and physical observations on the axis of rotation and the topography of Mars, at the Royal Observatory of Brera, in Milan, with the Merz equatorial, by S. Schiaparelli.—Preliminary note on the volcanic ejection of tufa of Nocera and Samo, by S. Scacchi.—Researches on the variations of tone in the human blood-vessels, by Signori Rajardi and Mosso.—On observations of solar spots, faculæ and protuberances, at the Royal Observatory of the Roman College, during the first quarter of 1881, by V. Tacchini.—On the mean monthly and annual temperatures and the daily thermometric excursions deduced from observations at the observatory of the Roman College, by the same.—A supposed new red star, by the same.—Observations on small planets, by the same.—On the depolarising property of saline solutions, by S. Macaluso.—On the constitution of derivatives of santonine, by S. Cannizano.—On the action of bromine on naphthaline, by S. Magatti.—Attempt at synthesis of pyragallic acid, by the same.—On a new (3rd) homologue of pyrol contained in oil of Dippel, by Signori Ciamician and Dennstedt.—On cadaveric poisons, by S. Moriggia.—On the saccharifying ferment of wine, by S. Selmi.—Some theorems on geometry of *n* dimensions, by S. Veronese.—On the skeleton of Scelidoterian exhibited in the geological museum at Bologna, by S. Capellini.—Primordial fauna in Sardinia, by S. Meneghini.—On botanical taximony, by S. Carnel.—Ephemerides and statistics of the Tiber in 1880, by S. Betocchi.—Determination of the difference of longitude between Rome and Milan, by Signori Respighi and Celoria.—Absolute value of gravity at Rome, by S. Respighi.—On corrections in elliptical co-ordinates in the calculation of planetary perturbations, by S. de Gasparis.—Some artistic, literary, and geographical fragments of Leonardo da Vinci, by S. Govi.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, June 22.—R. Etheridge, F.R.S., president, in the chair.—Thomas Hart and David William Jones, Coronel, Chili, South America, were elected Fellows of the Society.—The following communications were read:—Description of a new species of coral from the Middle Lias of Oxfordshire, by R. F. Tomes, F.G.S. The species of coral described in this paper was referred by the author to the genus *Thamnastræa* and the sub-genus *Synastræa*, under the name of *Thamnastræa Walfordi*, in honour of its discoverer, Mr. E. A. Walford. The specimen was from the *Spinatus*-beds of the Marlstone, at Aston-le-Walls, Oxfordshire. Like *Thamnastræa Etheridgei*, previously described by the author (*Q. J. G. S.* xxxiv. p. 190) from the Middle Lias of Oxfordshire, this species presents the same sub-generic characters as *T. arachnoides* of the coral rag of Steeple Ashton; and the author remarks upon the fact that the only species known from the English Lias resemble corallian rather than Inferior-Oolite forms.—Note on the occurrence of the remains of a Cetacean in the Lower Oligocene strata of the Hampshire basin, by Prof. J. W. Judd, F.R.S., Sec.G.S. With a note by Prof. H. G. Seeley, F.R.S., F.G.S. The author referred to the rarity of remains of marine mammalia in the Lower Tertiaries of Britain, the only recorded species being *Zeuglodon Wanklyni*, Seeley, from the Barton clay. The single specimen in his possession was obtained at Roydon, about a mile and a half north of Brockenhurst, where the beds exposed in the brickyard consist of sandy clays crowded with marine fossils, and resting upon green freshwater clays, with abundance of *Unio Solandri* belonging to the Headon series. The author briefly referred to the question of the horizon of these deposits, which he regards as belonging to the same great marine series as the beds of Brockenhurst and Lyndhurst, which he holds to be Tongrian or Lower Oligocene. The Cetacean vertebra obtained by Prof. Judd was stated by Prof. Seeley to be a caudal vertebra, probably the eighth, but not later than the twelfth, of a species belonging, or closely related to the genus *Balænoptera*, and especially approaching *Balænoptera laticeps*, a species of the North Sea which appears to range to Japan. Prof. Seeley regarded it as representing a new species, which he named *Balænoptera Juddii*.—Descrip-