

sanitary science. By placing in our hands a description of the Public Health systems in vogue amongst continental nations, it allows us the opportunity of comparing them with our own, and correcting our shortcomings by their experiences. Notably should this be the case in our methods of food inspection. H. BROCK.

OUR BOOK SHELF.

The English Flower Garden: Style, Position, and Arrangement; followed by a Description of all the best Plants for it, their Culture and Arrangement. By W. Robinson. Third Edition. (London: John Murray, 1893.)

THIS quite recently published new edition of this most charming and useful book has been so completely altered as to be at first sight scarcely recognisable, and we are glad to record that all these alterations have been improvements, the result of a determination on the author's part never to give up the effort of making it better. In the present edition the old plates, many of which contained but feeble portraits of plant life, have been broken up, and in their places we find delightful pictures of some of our best loved flowering shrubs and plants, at one time represented as growing over walls or cottage porch, or again by the lake or riverside. All of these are perhaps not equal in execution, but it has seldom happened to us to see so large a number of illustrations with so few that are below a high standard. Such delightful woodcuts as those of the double flowering hollyhock, the Alpine pink, or of *Rodgersia podophylla* brighten up the pages and add much of interest to this book. So familiar is this volume to most lovers of plants, of which the fact of three editions within ten years is a satisfactory proof, that it seems almost needless to explain that the first portion of it is devoted to a series of chapters on such subjects as design and position of a garden, on the wild garden, the Alpine garden, on spring, summer, and autumn flowers, and we note even on "Pergolas," the illustration of this latter being from Venice. Alas! in these northern countries our sunshine scarcely ever needs a shade. The whole of the first portion of the book is rewritten, and many new illustrations are given, such as the "primrose garden in a small clearing of a birch wood" in Surrey, the group of "Solomon's seal at the foot of a wall," and others too numerous to mention.

The second and much larger portion is devoted to a list, arranged in alphabetical order, of all those plants that have been grown successfully in the gardens of Great Britain and Ireland, and of some few that may be expected to grow there. Like the rest of the volume, this part too has been very thoroughly revised and brought up to date. To every one in the possession of a garden, or having the care of one, we would say study this "English Flower Garden," for you cannot do so without profit.

Logarithmic Tables. By Prof. George William Jones. (London: Macmillan and Co., 1893.)

THIS book of tables, which we notice has reached its fourth edition, will be found to serve the purpose for many computations which require an accuracy extending only to four or five places of decimals. The tables throughout seem to be well arranged, and the figures neatly printed, thus fulfilling two important requirements from the computer's standpoint. In addition to five-place logarithms there is a table to four-places, together with four-place trigonometric functions, a table of useful constants, and an addition-subtraction table. Among others we may mention a five place table of natural sines, &c., with a six-place table of their logarithms, prime

and composite numbers, squares, cubes, square roots, &c., Bessel's coefficients for interpolation to the fifth differences, binomial coefficients for interpolation, also for fifth differences, and lastly a useful table of the errors of observations, from which we can at a glance determine the ordinates of the probability curve, values of probability integrals, &c. An explanation, preceding the tables themselves, shows how they may be advantageously used, and the author offers the reward of "a dollar" for the first notice of a mistake "to promote the detection of errors."

Catalogue of the British Echinoderms in the British Museum (Natural History). By F. Jeffrey Bell, M.A. (London: Printed by Order of the Trustees.)

DURING recent years many additions have been made to the collection of echinoderms in the British Museum; and, as Dr. Günther explains in his preface to the present volume, much time and labour have been given to the study and arrangement of these additions. It seemed expedient, he says, to prepare, together with the nominal list of the specimens, a complete account of the species hitherto found in British seas. All students of the subject will congratulate themselves on the fact that this decision was arrived at, for the result is that they are now provided with a handbook which will enable them to identify, without much difficulty, any specimens that may come in their way. Mr. Bell, in beginning the preparation of so full a catalogue, had before him a task of no small difficulty, and in the manner in which he has discharged it he has displayed great patience, insight, and knowledge. A number of well-printed plates add largely to the value of the work.

LETTERS TO THE EDITOR.

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The Hatching of a *Peripatus* Egg.

IN NATURE, vol. xlv. p. 468, I briefly described some eggs of the larger Victorian *Peripatus*, which were laid by specimens kept alive by me in the winter (Australian) of 1891. At that time, following previous authority, I identified the species which laid the eggs as *P. leuckartii*. It appears now, however, that the real *P. leuckartii*—at any rate, in New South Wales—is undoubtedly viviparous, and our oviparous Victorian species is, therefore, probably distinct. (It may be remembered that in NATURE, vol. xxxix. p. 366, I suggested this probable distinction on account of the remarkable pattern of the skin usually exhibited by the fifteen-legged Victorian form.) Further particulars on this subject are given in my "Further Notes on the oviparity of the larger Victorian *Peripatus*, generally known as *P. leuckartii*,"¹ and in the literature cited therein. In that paper I described two embryos, removed from eggs which had been laid for about three and eight months respectively. In the latter case I showed that the embryo was possessed of the full number of appendages, and was in all respects a perfect young *Peripatus*, differing externally from the adult only in the smaller size and less deeply pigmented skin. On the strength of these observations I claimed to have definitely proved that the larger Victorian *Peripatus* at any rate sometimes lays eggs, and that these eggs are capable of undergoing development outside the body until perfect young animals are produced. I am now able to add some further information.

For some time only one egg (belonging to the original lot, for none have since been obtained) remained in the hatching box. The shell of this egg had changed to a dark brownish colour, and latterly an embryo had been visible through the shell, coiled up inside. The egg was lying on a small piece of rotten wood, which rested on the glass floor of the hatching box. On

¹ "Proceedings of the Royal Society of Victoria," vol. v. p. 27; also *Annals and Magazine of Natural History*, 1892.

January 3, 1893, not having opened the box for some days, I made an examination. The egg was in its former position, so far as I could tell, but the shell was split on one side and the young *Peripatus* had escaped. This young *Peripatus* was found lying dead on the glass floor of the hatching box, 25 mm. distant from the shell. It must have crawled off the rotten wood and along the glass to the position in which it was found. It was only about 5 mm. in length, so that, even assuming that it moved in a perfectly straight line, it must have crawled for a distance five times its own length. To the naked eye the young animal appeared of a pale greenish colour. It could not have been dead for very many days, but decomposition had already set in, and the animal was stuck to the glass on which it lay. It was impossible to remove it without considerable injury, but I ultimately succeeded in mounting it in Canada balsam, and it is impossible, even in its present condition, to doubt that it really is a young *Peripatus*, for the characteristic jaws and claws are well shown. I also mounted the ruptured egg-shell, and found that the characteristic sculpturing on the outside was still clearly visible.

This egg, then, hatched out after being laid for about seven-months (from about July 1891 to about the end of December 1892). I cannot believe that under natural conditions the embryos take so long to develop. At any rate it now appears certain that the larger Victorian *Peripatus* lays eggs which may hatch after a lapse of a year and five months.

ARTHUR DENDY.

The University of Melbourne, February.

A Simple Rule for finding the Day of the Week corresponding to any given Day of the Month and Year.

A RULE was lately mentioned to me by a friend for finding, almost by inspection, the day of the week for any given year and day of any month in that year, during the present century. The basis of the rule is so obvious, when once the rule is stated, as to require no demonstration, but it struck me as so ingenious as to be worth while communicating it to you in case you deemed it worthy of insertion. I also append a very easy method of extending the rule to any date subsequent to the introduction of the Julian intercalation either in the past or future, except indeed for the eighteenth century, in which the introduction of the new style requires a special treatment.

The nineteenth century rule above alluded to is this. Each of the 12 months has its special numerical constant, thus:—

Jan.	Feb.	Mar.	Ap.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
3	6	6	2	5	0	2	3	1	3	6	1

Write down four columns thus

A | B | C | D

Under A enter day of month, under B constant for that month, under C year of century, under D greatest multiple of 4 in the year of century.

Add together the numbers under these heads, divide by 7, and the remainder is day of week; except that in Leap Year I must be subtracted for any day before February 29.

Example.—June 18, 1815 (Battle of Waterloo):—

A	B	C	D	Sum.	Remr.
18	0	15	3	36	36
					7
					1
					Sunday.

February 1, 1892:—

A	B	C	D	Sum.	Remr.
1	6	92	23	122	122
					7
					3
					Sunday

Subtract 1 for Leap Year before February 29. *Ans.*—3—1=2 or Monday.

December 25, 1892:—

A	B	C	D	Sum.	Remr.
25	1	92	23	141	141
					7
					1
					Sunday.

To extend the rule to any future century, we have only to alter the monthly constants, adding 5 to each for each added century after the present, and 1 for each century, an exact multiple of 4, in the interval.

Thus for the thirty-first century. Number of added centuries is 12, and there are 3 centuries, succeeding multiples of 4 (twenty-first, twenty-fifth, and twenty-ninth). Therefore add $5 \times 12 + 3 = 63$, or omitting multiples of 7, add 0.

NO. 1222, VOL. 47]

Hence, constants for thirty-first century are the same for the present century.

New Year's Day, 3001,

A	B	C	D	Sum.	Remr.
1	3	1	0	5	5
					Thursday.

For centuries anterior to the eighteenth we must first of all find by special method what the monthly constants would have been throughout the eighteenth century without the change of style, and then subtract 6 for each century short of the eighteenth.

It may easily be seen that the constants throughout the eighteenth century would have been without change of style.

Jan.	Feb.	Mar.	Ap.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	5	5	1	3	6	1	4	0	2	5	0

For the eleventh century subtract 7×6 or 42, *i.e.* since this is multiple of 7 subtract 0, and we get the same repeated.

For the seventeenth subtract 6, and remember that when the result is negative we must replace it by the defect of the corresponding positive number from 7, and we get

3	6	6	2	4	0	2	5	1	2	5	1
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Example.—Battle of Hastings, Oct. 14, 1066.

A	B	C	D	Sum.	Remr.
14	2	66	16	98	0
					Saturday.

Execution of Charles I., Jan. 30, 1649,

A	B	C	D	Sum.	Remr.
30	3	49	12	94	94
					7
					3
					Tuesday.

H. W. W.

"Roche's Limit."

WITH reference to Prof. G. H. Darwin's notes (NATURE, March 16, p. 460) on the investigations of M. Roche as to the smallest distance from its primary at which a satellite can exist, does not the distance given—viz. 2.44 times the radius of the primary—refer to the case of the satellite having the same density as its primary? In Note 3 Prof. Darwin warns the reader that Roche's limit depends, to some extent, on the density of the planet. Suppose the density of the planet to remain the same while that of the satellite is taken at double. In this case the tidal or differential influence of the planet on the two halves of the satellite will have doubled, while the gravitational attraction of the two halves of the satellite on each other will have become fourfold; and generally, the power of the planet to pull the satellite asunder will be inversely as the density of the satellite, and directly as the density of the planet.

An alteration of the size of the satellite does not much affect the question, because both forces are thereby equally altered, so long as the satellite is very small in comparison with its distance from the planet.

Seeing that the tidal or differential influence of a planet on its satellite is inversely as the cube of their distance apart, perhaps it would be correct—as far as gravitational influence alone is concerned—to state the limit at which a satellite can exist as being equal to $2.44 R \times \left(\frac{D}{d}\right)^{\frac{1}{3}}$

where

R = the radius of the planet,

D = the density of the planet,

d = the density of the satellite.

As an interesting case of the same problem from a different point of view, suppose two very small equal spheres in contact, and a third much larger sphere placed in line with their centres, all three having the same density; then, when the distance of the point of contact of the small spheres from the centre of the large one is 2.52 times the radius of the large one, the attraction of the two small spheres for each other just balances the differential influence of the large one tending to draw them asunder. The effects of variation in density and size being the same in this case as in the former.

It would probably be interesting to many of your readers to have Prof. Darwin's views as to whether it is a reasonable supposition that a small satellite, such as Jupiter's fifth, is likely to have the same density as Jupiter; and whether the meteorites forming Saturn's ring are likely to be of so small density as