schools, and of which the object is to give the more common properties of determinants, illustrate the said properties copiously with examples of the second, third, and fourth orders, and give additional examples of the same kind for practice. The object is here on the whole well attained, there being more examples for the pupil than is usual. For a "beginner's text-book," however, it is unquestionably long-drawn-out and expensive. A book (e.g. Dölp's, Bartl's, &c.) with very much more matter and, to say the least, as good in quality, would be got in Germany for two shillings, and this costs five. The object of the author "to render an interesting and beautiful branch of mathematical analysis more accessible to junior students" is thus somewhat frustrated at the outset.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

A Glimpse through the Corridors of Time

THE eloquent and exceedingly interesting lecture by Prof. Ball, F.R.S., under the above title, reported in your journal, has brought to my mind a short, far too much forgotten paper by Immanuel Kant. With your permission I will give a few extracts from this paper, which cannot but be interesting to many of your readers. Kant became subsequently very celebrated in a sphere of human knowledge usually considered far removed from natural science, in consequence of which his papers relating to this science are now almost universally overlooked. Nevertheless some of them contain extraordinary glimpses of truth a century or more in advance of this time, glimpses possible only to genius.

The paper to which I wish more particularly to draw attention was published in 1754, when Kant was thirty years of age. It will be found in the collected works edited by F. U. Schubert and K. Rosenkranz (Leipzig, Leopold Voss, 1839, vol. vi. p. 4). The paper relates to the question whether the length of day has altered, and through what cause. In this paper Kant states: "If the earth were a perfectly solid mass, without any liquid, the attractions of the sun and moon would not alter the rate of rotation round the axis. . . . If, however, the mass of a planet includes a considerable amount of liquid, the united attractions of the sun and moon, by moving this liquid, impress upon the earth a part of the vibrations thus produced. The earth is in this condition." He then goes on to state that the moon produces the greatest effect, and, the tide running round the earth in a direction opposed to that of rotation, "we have here a cause, on which we can count with certainty, incessantly reducing this rotation by as much as it may be capable of." A little further on he says: "When the earth steadily draws nearer and nearer to the end of its rotation, this period of change will be completed when its surface is, relatively to the moon, at rest; i.e. when it rotates round its axis in the same time in which the moon revolves round it, and will, consequently, always show the same face to the moon. . . . If the earth were entirely fluid the attraction of the moon would very soon reduce its rotation to this minimum. Herein we at once see a cause why the moon always shows the same face to the earth. . . . From this we may conclude with certainty that when the moon was originally formed, and still fluid, the attraction of the earth must, in the manner above described have reduced the speed of rotation, which then in all probability was greater, to the present measured limit." I have given only a few short abstracts, and I have no doubt that mathematicians may find many faults in the paper, but it is nevertheless clear that Kant had recognised the influence of tidal action, both on the earth and on the moon, and has given a glimpse through the corridors of time a century earlier than any of the authorities mentioned by Prof. Ball.

After Kant it was, I believe, R. T. Mayer, of Heilbron, who, long before Prof. Helmholtz drew attention to the influence exerted by the tidal wave on the rotation of the earth.

Westminster Hospital, December 5, 1881

A. DUPRÉ

Dante and the Southern Cross

I HAD supposed the query—in reply to which I ventured to offer the very brief note which was printed in NATURE (vol. xxv. p. 173)—to have proceeded from some English reader, unacquainted with the various solutions of the difficulty involved in the question, which have been suggested, and who might have been satisfied with a reference to such a discussion of the matter as that in the "Cosmos," by a critic in whom were united all the needful qualifications to a degree which can hardly be looked for elsewhere.

Dr. Wilks appears to have written with a similar impression in referring the querist to the commentary of the late distinguished Dantophilist, Dr. H. C. Barlow, whose fervid belief in the extent of Dante's knowledge ("ottimo Astronomo, summo Teologo") could not be exceeded by the most ardent patriotism, and was never qualified by the judicious reservation which Signor N. Perini admits. What I venture to add, refers to the notes which have appeared, rather than the original query as I understood it.

For a solution of the apparent paradox in Humboldt's retaining the old view of the sense of "prima gente" while accepting—not Galle's "opinion," but—the result of his computations as to the visibility of the stars of the Southern Cross to the earlier inhabitants of Europe, I would refer Signor N. Perini to the earlier and much fuller development of Humboldt's views, contained in the last twenty pages or so of vol. iv. of the *Examen Critique de l'Histoire de la Géographie Moderne*, where, at the same time, will be found a great deal of valuable and suggestive information relative to the Arabian celestial globe theory, and also to the probability (the words "non viste mai . . ." notwithstanding) of Dante having derived some knowledge of the constellations of the southern hemisphere from the description of "Les voyageurs pisans ou vénitiens qui visitaient l'Égypte, l'Arabie et la Perse." But I would at the same time urge that the whole of what is said in the "Kosmos" on the subject of the Southern Cross is not intended to be applied to the Dante question, but to the larger one of the progress of oceanic discovery, and that it was in connection with this larger topic that Humboldt availed himself of Dr. Galle's computations. Dr. Barlow appears to have been misled by failing to notice this distinction in his enthusiastic letter to the *Athenæum* (September 1860) of which the article quoted by Dr. Wilks from the volume of "Contributions to the Study of the Divina Commedia" is a condensation.

Count St. Roberts's essay, to which Signor N. Perini refers, is probably little known, and not easily obtained, in England; but we may conjecture that its object was to argue against the supposition of the element of ecclesiastical mysticism—hateful to modern Italian liberalism—as entering into the Divina Commedia and affecting its imagery and modelling. If the essay had thrown any new light on the subject of the query, we may conclude Signor N. Perini would have imparted it to us. However, I believe that everything that can be found to throw light on this interesting question has been adduced and weighed with the dispassionate calmness of a master mind, as it is set forth with candour and perspicuity in the exhaustive discussions to which I have referred. In conclusion may I remark on the importance, in such correspondence as we have been engaged in, of quoting the original words of an author—with or without translation, as may be thought proper. In the quotation, as from "Cosmos," by Dr. Barlow, given by Dr. Wilks and the passage is re-quoted by Signor Perini—nonsense is made of a sentence by "da" being rendered "since," instead of "whereas." In the same translation "mit vieler Orientalischen Reisenden aus Pisa" is improved into "with many learned Oriental travellers of Pisa." Such changes might sensibly affect any argument founded on the passages. For the same reason I would have preferred heading this correspondence "Dante and the quattro stelle."

J. J. WALKER

University Hall, December 31

A Pet Baboon

I KNOW not if the inclosed account, written by a friend of mine now resident at Zanzibar, for whose accuracy and truthfulness I can answer, is worthy of a place in your columns.

JULIA WEDGWOOD

"You ask after my quaint little pet baboon, and I really must give you the history of her end. She grew and she grew till

she got to be half as tall as I am, and then, sad to relate, with advancing age her temper did not improve; I am afraid if I spoke the truth I should have to describe it as savage. She became a perfect terror to many people, and she even attacked me once or twice. She was playful to the last when I had her alone, and often resumed many of her old quaint caressing ways that were indescribably fascinating from their childlikeness. But the funny thing was, that if the Bishop was near she would immediately turn upon me and scratch and bite me, and he had only to go out of sight for her good temper to return. At last, however, I felt she was becoming a nuisance to other people, by her habit of grabbing at everybody that passed, and her savage gesticulations; so, seeing also how she longed to exercise those active wiry little limbs of hers—inventing all sorts of ludicrous games and gymnastics—I made up my mind to let her loose. There is a charming little island not far from the shore, which we thought would be just the place Judy would revel in. Mr. — and Miss —, and a number of our little boys, escorted her there. She came down to the shore to watch them off, and gave one cry of dismay at being deserted; but we hope that the sweets of liberty have more than consoled her for the loss of society. I missed the creature dreadfully at first. She was a constant amusement and interest with her quaint ways, and even her naughty tempers were ludicrous. Really if Mr. Buckland had been alive I think I should have sent her to him. I think he would have appreciated her intelligence and love of a romp, and she would never have been savage with him. She never once attempted to bite our Bishop; she always preferred him to any one else, and was always affectionate with him. I want very much to know whether other people have noticed that these baboons really laugh; I have heard somewhere, I am sure, that the power of laughter is the distinction between man and animals. But Judy certainly used to laugh—not at a joke I confess; and nothing made her so savage as being laughed at. But when she romped with me she used to open her mouth and show all her white teeth, and regularly laugh like a child, especially when she was tickled. I shouldn't have parted with her if I had been living alone, but living with others, as one does here, it did not seem fair to keep a creature that really did frighten some of the household."

"Tanganyika Shells"

UNDER the above heading a paragraph appeared in NATURE, vol. xxv. p. 101, in which Mr. C. A. White, of Washington, states that certain species described by me in the *Proceedings of the Zoological Society*, 1881, pp. 558-560, from the great African Lake Tanganyika, "are without doubt, generically identical with the *Pyrgulifera humerosa* of Meek," a fossil form from the Bear River Tertiary of North America. Mr. W. H. Dall, of the Smithsonian Institution, had previously, in a letter to me, dated October 24, expressed a similar opinion. I have been unable to procure for examination and comparison a specimen of the North American shell, and am consequently compelled to arrive at a conclusion from a study of Mr. Meek's figure and description in the report upon the "United States Geological Exploration of the Fortieth Parallel," vol. iv., pp. 176-178, woodcut 6, and plate 17, figs. 19-19a. As a result I find it decidedly inadvisable at present to locate the two forms in question in the same genus. I admit that in regard to general outline and character of "sculpture" there is no distinction of any importance. However, when the aperture (which in univalve shells most frequently exhibits the main generic characters) is closely scrutinised, features present themselves which incline me, until actual comparison is possible, to hold these two types generically distinct. The outer lip of *Pyrgulifera* is said to be "subsinoous at the termination of the shoulder of the body volution above," and the basal margin of the aperture is described as "faintly sinuous." On the contrary, in *Paramelania* no trace of the latter character is present, and the upper extremity of the labrum where it joins the volution, instead of being "subsinoous," is actually prominent. But another equally important distinction is the prolongation of the body-whorl below the aperture, together forming a more or less basal effusion. Independent of these actual differences, we must take into consideration certain probabilities and improbabilities. In the first place the difference in geographical position militates to some extent against the identity of these two forms. Then the vast lapse of ages surely must have evolved some differences in the animals as indicated by the dissimilar apertures, and again the operculum of *Paramelania* is very peculiar, and who shall say that this appendage was

of a like nature in the Bear River shell. In conclusion, I should observe that the African form was considered of sub-generic rank by me, and not as a distinct genus, as stated by Mr. White.

EDGAR A. SMITH

The Growth of Trees

JUST fifty years ago I was at school in Salisbury. I have only visited it once since until last week, when I had the unique pleasure of rambling over the old but familiar haunts, of course including Old Sarum. On mounting the outer ring of the well-known mound from the Stratford side, a beech tree in the bottom of the ditch reminded me that it was just there our usher carved with his knife on such a tree "Tempus Fugit." On going down to look for the motto, I only found unreadable abrasions on the bark, but on the north side of the same tree "1817" was distinctly engraved. On examining a tree near, I found on the bark "Carpe Diem, 1831." This recalled to my memory the fact that our usher's "Tempus Fugit" was suggested by some such motto carved by the usher of another school. Is it worth recording that this carving on the bark of a beech tree is quite legible after an interval of fifty years, while the date "1817" on another is also, probably genuine? If so, perhaps it is worth noticing that both legible carvings are on a north aspect not reached by the sun, while the lost motto "Tempus Fugit" would be exposed to the sun with an easterly aspect.

Barnstable, January 2

W. SYMONS

INDIAN FOSSILS.—Mr. Richard Lydekker, of the Geological Survey of India, asks if any of our readers can give him information as to the whereabouts in England of collections of fossil bones from the Siwaliks of India. He is aware (beside the British Museum collection) of collections at Ludlow, Cambridge, and Edinburgh, but he believes there are others in the country. A large collection was sent home some years ago by a Major Hay, the destination of which is unknown to him. Mr. Lydekker is now engaged in working at Siwalik fossils, and as he intends spending some months in England next summer, he wishes to look up all the collections then.

OUR ASTRONOMICAL COLUMN

COMET 1881 *b*.—Notwithstanding some statements to the contrary, the orbit of this comet when the later observations are brought to bear upon it, is sensibly different from a parabola, and from two independent investigations, the first by MM. Dunér and Engström, the second by M. Bossert (from eight normal places, based upon 423 observations), the period results about 2955 years. An observation at Marseilles on October 24 gave at 9h. 39m. 4s. mean time, R.A. 18h. 44m. 58.12s., N.P.D. 20° 24' 23".2, corrected for parallax.

The following positions are given by Dr. Dunér:—

At 12h. Berlin M.T.										
R.A.					Decl. N.		Distance from Earth.			
h. m. s.					°					
January	10	...	22	58	11	...	57	28.3	...	3.118
	12	...	23	3	4	...	57	15.5		
	14	...	—	7	53	...	57	3.3	...	3.195
	16	...	—	12	39	...	56	51.5		
	18	...	—	17	22	...	56	40.3	...	3.274
	20	...	—	22	1	...	56	29.5		
	22	...	23	26	38	...	56	19.2	...	3.354

The student of this branch of astronomy will be aware that comets have been followed to greater distances; the extraordinary comet of 1729, which never approached the earth, indeed could not approach her, within three times the earth's mean distance from the sun, and yet was visible with small telescopes, still affords a unique case, it must have been a body of an altogether exceptional character.

THE MINOR PLANETS IN 1882.—The supplement to the *Berliner Astronomisches Jahrbuch* for 1883, containing ephemerides of the small planets for 1882 has been circulated in advance of the publication of the volume as usual for some years past. Of the two hundred and twenty members of the group detected up to the present time, we find approximate places for every twentieth day of 217, and accurate opposition ephemerides of 41. The approximate ephemerides include No. 220. Three only of the planets approach the earth at opposition, within the earth's mean distance from the sun, viz. No. 12, *Victoria*, in