

The Tailed Amphibians, Including the Cæcilians. A Thesis presented to the Faculty of Michigan University by W. H. Smith. (Detroit, Michigan, 1877.)

THE title of this little volume tells its own story. It is a detailed catalogue of all the species of tailed amphibia known. In addition to using the works of all the best writers on this group, Mr. Smith has availed himself of the specimens in his University Museum, and from these has drawn up many of the descriptions and characters. A number of artificial keys are given to the genera and species; the synonymic lists appear to have been worked out with care, and to have been brought down to date. A list of authors on the subject of the work is appended, and here and there, after the diagnoses of the species, will be found details of their habits, geographical distribution, and development.

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.]

Indian Rainfall

AGREEING in the main with the views put forward by Mr. Archibald in his letter in NATURE (vol. xvii. p. 505), I beg leave to refer briefly to one or two points in which I differ from him, and I hope that you will be able to find space for this note, because Mr. Archibald has done me the honour of mentioning my name so frequently in his letter, that I might reasonably be supposed to entertain opinions identical with his own on all points regarding the question under discussion.

In the first place I would point out that the atmospheric current which brings the winter rains of Northern India, whilst it has nothing to do with the summer monsoon, does not descend in the Punjab, as Mr. Archibald says, and then proceed eastwards to the North-West Provinces and Behar, and sometimes even as far as Calcutta, but blows in just the opposite direction, appearing as a south-east wind over the Gangetic plain and the Eastern Punjab. The place of its descent in the winter months is farther south, in latitude 22° or 23° N., and thence it flows northwards in almost the same manner as the summer monsoon.

In the next place, I think the hypothesis of the approximately inverse variation of the winter rain, as compared with sun-spots, does not necessarily postulate a corresponding inverse variation of solar radiation. Such a relation I consider to be highly probable, but the somewhat meagre data I was able in a former communication (vol. xvi. p. 505-6) to adduce in favour of it were only intended to prove that the question of "solar activity" was yet an open one, and that it did not follow that solar radiation was most intense at times of maximum sun-spots, because many meteorologists, reasoning from magnetic and other analogies, assumed it to be so. The direct solution of the question must be accomplished by actinometric observations, as Mr. Blanford proposes, and, while it remains unsettled, it will probably be best to try and correlate the variations of rainfall with those of some other meteorological element upon which rainfall depends. I have recently been occupied with an analysis of the rainfall observations of twenty stations in Northern India, embracing between them 11° of latitude and 24° of longitude, and extending over periods of from fifteen to forty-nine years, and I find a remarkable coincidence between the variations of the winter rainfall and those of the temperature of the tropics as given by Köppen in his exhaustive paper in the *Zeitschrift der oesterreichischen Gesellschaft für Meteorologie*, vol. viii., Nos. 16 and 17. When the rainfall deviations of the different stations are thrown into the form of percentage variations from the local mean and are then combined and the results "bloxamed," we get a series of numbers which gives a curve from 1834 to 1877 resembling Köppen's curve very closely, when the latter is extended up to 1877. The two curves not only resemble each other in all their more important fluctuations, but their epochs

of maximum and minimum approximately coincide. These are:—

Max.	{	Tropical Temperature	1842'7,	1854'7,	1865'1,	1876'3(?)
		Winter Rain	1876'9(?)
Min.	{	Tropical Temperature	1836'9,	1847'7,	1858'4,	1874'8
		Winter Rain	1837'8, 1848'1, 1860'6, 1874'7

It would therefore appear to be highly probable that the periodic variation of the winter rainfall of Northern India is caused by a corresponding variation in the temperature of the tropics, which determines, within certain limits, the quantity of vapour added to the air and the direction and velocity of the atmospheric currents. It appears, also, from the table, that the maximum of winter rainfall is attained nearly a year before the minimum epoch of sun-spots, as given by Wolf. I have found that this is also the case with the winter rainfall of London, and Mr. Draper has shown (NATURE, vol. xvii. p. 16) that the same relation holds good at New York.

The co-existence of severe droughts in Hindustan with devastating floods in Burmah and Assam, is a very strong argument against the theory of Dr. Meldrum that the rainfall of the whole globe varies directly with the sun-spots; but it would naturally follow from the view advocated by Mr. Archibald, because, in very hot years, which are approximately those of minimum sun-spot, the general tendency to a cyclonic circulation of the atmosphere round the Asiatic continent in the summer months would be so intensified as partially to obliterate the smaller cyclonic indraught towards Central India, which brings up a moist current from the Bay of Bengal to the Himalaya and the plains of Northern India.

S. A. HILL

Allahabad, May 18

A Twenty Years' Error in the Geography of Australia

IN almost every detailed map of Australia, including some of the latest, we find, at the head of the Alligator River, in about S. lat. $13\frac{1}{2}^{\circ}$, and E. long. 133° , some such note as this:—"Steep walls, 3,800 ft." This is copied from the map illustrating "Leichardt's Journal," published in London in 1847. This map was (as stated in the preface) drawn by S. A. Perry, Esq., Deputy Surveyor-General of New South Wales, from materials furnished by Leichardt, and was engraved in London by Arrowsmith. As Leichardt only returned from his first expedition at the end of 1845 or beginning of 1846 he could have had no opportunity of correcting or revising this map. Mr. James Wilson, the geologist to the North Australian Expedition under Mr. A. C. Gregory, having passed over much of the same country, and finding the plateau nowhere more than 1,600 feet above the sea, came to the conclusion that Leichardt's supposed statement was an engraver's or printer's error which had escaped correction, and gave his reasons for this view in the *Proceedings* of the Royal Geographical Society, vol. i. p. 230, and subsequently in the same society's *Journal*, vol. xxviii. p. 137 (1858). Notwithstanding the extreme improbability—almost amounting to absurdity—of there being precipices of the enormous height of 3,800 feet, in a country where there were no important mountains, and where Gregory, who had passed within eighty miles, and M'Douall Stuart, who had passed within forty miles of the place, found nothing but a moderately-elevated plateau, with ravines never exceeding 600 feet deep, no notice appears to have been taken of Mr. Wilson's correction, but the "3,800 ft." has been copied again and again in works of reputation and authority. We find it even in the new edition of the "Encyclopædia Britannica," art. "Australia," given as an established fact in the following words:—"On the north side of the continent, except around the Gulf of Carpentaria, the edge of the sandstone table-land has a great elevation; it is cut by the Alligator River into gorges 3,800 ft. deep."

The curious thing is, however, that this marvellous phenomenon, which, if it existed, would be unapproached in Australia and equalled nowhere but among the mountains of the great continents, is not even alluded to in the published journal of the traveller who is supposed to have discovered it! On Leichardt's map the "steep walls" are noted between the stations of November 10 and 11, but in his "Journal" we find no reference to anything remarkable till November 17, when he comes to the head of a magnificent valley, into which he was obliged to descend, and which caused him much delay and circuitous explorations on account of its steep rocky walls estimated by him to be "1,800 feet high." It is pretty clear, then, that the

"3,800 feet" is a map error, and that even the 1,800 feet is merely an estimate, and probably an over estimate; for we must take into consideration the evidence of other explorers in the same region, and the appalling effects of coming, in a nearly level plateau, to the brink of such a precipitous rocky barrier.

I am making a similar correction to the above by means of a note in a work I am now engaged upon (on Australian Geography), but as the error has obtained such wide circulation and seems so hard to kill, it becomes advisable to call attention to it as soon as possible, and in a way that will be likely to attract attention.

ALFRED R. WALLACE

Opening of Museums on Sundays

YOUR last number contains a letter from my friend Prof. Corfield, which I confess to having read with some little astonishment. He expatiates, and with justice, on the merits of the town of Maidstone, whose citizens do not scorn the grace which "paleontological, conchological, and other collections" must add to life spent in a country "well worth visiting," and who appropriately find their last resting-place in a cemetery "which is one of the most beautiful in the country." I would not demur a moment to such a fascinating picture, were it not that Prof. Corfield, led away by a pardonable enthusiasm, expresses his belief "that this is the first and only scientific museum that has yet been opened on Sunday in the United Kingdom." Surely the Chairman of the Committee of the Sunday Society need not go to Maidstone for the first victory in the very just cause which he upholds, seeing that for the last quarter of a century the three buildings which contain the Botanical Museum of the Royal Gardens, Kew, have been open to the public from two till dusk every Sunday throughout the year.

Royal Gardens, Kew

W. T. THISELTON DYER

Socialism in South Africa

I NOTICED this morning that along the bottom of the front wall of my house, on the verandah, there lay a quantity of reddish-brown powder; there was enough to fill a coffee-cup. On looking closer I saw that it was made up of small and larger fragments which glistened, and on inspecting some in my hand they turned out to be the heads, legs, trunks, &c., of countless ants. A number of these animals were still on the wall above, and my attention being now arrested, I watched them, and saw that they were contributing to the carnage beneath. This species of ant is a small, comparatively harmless one, the chief sin of which is that it makes its way to every species of food and swarms on it. As is usual with ants, the general body of insects is accompanied by larger individuals, which are provided with heads and jaws quite disproportionate to their bodies, and with these jaws they do all the cutting up. Among the ants on the wall there was a large sprinkling of these "soldier ants," and the whole community seemed to be bent on destroying them. The proportion of heavy-jawed to ordinary ants was about one to ten. I saw a group of little ones fastening on to a big one, which made desperate efforts to release itself. At first the big one bit several little ones in two, and the parts dropped down from the wall; but after a while the little ones severed all the legs of the big one, and finally got on his back and cut him in two. The group then dropped down to swell the mass below. Similar scenes were enacted elsewhere on the wall. The commencement of one combat was as follows:—A big ant walked along till it met another big one, and the two shook antennae. Just then a little one seized hold of a hind leg of one of these big ones. Neither took any notice, but continued a rapid conversation. Suddenly other small ones came up, when the big one whose leg was grabbed turned furiously on the little one and seized him by the middle. This could not be done until the big one had doubled himself up; as soon as he had hold of his small antagonist he lifted him in the air and snipped him in two. Meanwhile all the big one's legs had been seized by little ones, and the party seemed to turn over and over, little bits tumbling down, now a leg, now half an ant, till the big one was vanquished.

The ant is most assuredly subject to passions. The way in which the big ant turned on the little one was singularly indicative of rage. The determined manner in which he laid hold of the little one was quite human. If I had had a magnifying glass, the scene would have been really exciting.

Maritzburg, Natal, May 12

F. E. COLENSO

The Telephone Relay or Repeater

THE writers have been at work since the announcement of the invention of the Bell articulating telephone in endeavouring to devise means by which the telephone might be relayed. Quite a number of devices have been tried, but, from the exceedingly feeble amount of the movements of the diaphragm of the receiving telephone, they have heretofore been unsuccessful in obtaining any practical results.

The discovery by Prof. Hughes of the inexpressibly delicate microphone has given us the means by which we have finally at last solved this very important problem. We apply the microphone as a telephone relay or repeater by attaching it directly to the diaphragm of the receiving telephone. The microphone so attached is a miniature one consisting essentially of three pieces of carbon, arranged as described by Prof. Hughes. The two parallel pieces are cemented directly to the telephone diaphragm, and the third piece placed in cavities near their ends. The microphone forms, of course, part of the new circuit in which it is desired to repeat the telephonic message. By the movements of the telephone diaphragm the microphone produces such variations in the electrical current traversing its circuit as to cause the original message to be repeated to any instruments placed therein.

We have tried our telephone relay or repeater on several telephone lines, and find it to work satisfactorily. By attaching a number of miniature microphones to the receiving diaphragm and suitably connecting the battery, increased delicacy will undoubtedly be obtained.

EDWIN J. HOUSTON

Central High School, Philadelphia, ELIHU THOMSON

U.S., June 7

New Form of Microphone Receiving-Instrument

HAVING been experimenting with the microphone, and studying the effect of the passage of the current on a galvanometer, it occurred to me that if the needles were fixed, strains would be produced in it by the action of the current. To test this, I passed a few yards of copper wire (about No. 30) on a small bar magnet lengthwise, and found, on placing it to the ear, that sounds were heard on interrupting the current; these sounds were much intensified by placing the magnet inside the lid of a pasteboard box.

Having a six-inch horse-shoe magnet beside me, I passed along one of its limbs from two to three yards of the same wire, and on placing the lid of a tin box on the flat sides of the ends of the magnet, an excellent receiving-instrument was obtained. With this tuning-fork, sounds, singing, whistling, speaking, and violin music were heard distinctly. A single Leclanché coil was used, the transmitter consisting of two small pieces of carbon pencil touching slightly, and connected with an open pasteboard box.

W. J. MILLAR

Glasgow, June 17

A Waterspout

AMONG the meteoric phenomena of which we have heard recently, not the least interesting occurred on Thursday the 14th near the Kelston Round Hill, about three miles to the west of Bath. Shortly after five o'clock in the evening the inhabitants of the village of Weston, which lies between Kelston Hill and Bath, were startled by a volume of water advancing like a tidal-wave along the Kelston Road; in a minute the water was upon them, flooding the houses and laying the main street four feet deep under water; with such force did it come that a stone weighing five hundred-weight was carried several yards, while smaller ones were taken a much greater distance.

It was not known in the village from where the water had come, but it so happened that about five o'clock I was proceeding to Weston Station by the Midland Railway from Bristol to Bath, and when in sight of the Round Hill I was struck by the blackness and lowness of the clouds in its vicinity. Suddenly there was a flash of lightning, and immediately after the Hill was enveloped in what appeared to be a storm of rain of unusual density.

On arriving home I was not altogether surprised to find the commotion in the village, and I at once attributed the source of the water to the cloud which I had seen; I therefore made my way in the direction of Kelston Hill.

On arriving under the brow of the Hill it was very clear that something more than an ordinary storm had occurred. Near the