

The Tailed Amphibians, Including the Cacilians. 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

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[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 "bioxamed," 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 1842'7, 1855'0, 1865'5, 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.

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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. 13½°, 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. xviii. 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