XIV.—*Great Snow-fall in Kashmir.*—*By* R. Lydekker, B. A.

Among the inhabitants of the Kashmir Himalaya, the winter and spring of 1877-78 will long be memorable on account of the enormous quantity of snow which then fell on their mountains and valleys, and still more on account of the grievous famine which followed this excessive snow-fall. So excessive indeed was this snow-fall, that no tradition or record exists even among the oldest inhabitants of anything approaching to such a fall. I have therefore thought that a short account of this abnormal snow-fall, and of the destruction inflicted by it on the indigenous animal life, might be thought not unworthy of a place in the records of the Asiatic Society, and have accordingly put together the following notes :

Early in the month of October 1877, snow commenced to fall in the valley and mountains of Kashmir, and from that time up to May 1878, there seems to have been an almost incessant snow-fall on the higher mountains and valleys ; the inhabitants have indeed informed me that in places it frequently snowed without intermission for upwards of ten days at a time. It is extremely difficult to obtain from the natives any correct estimate as to the amount of snow which fell in any place ; but at Dras, which has an elevation of about 10,000 feet, I estimated the snow-fall from the native account as having been from 30 to 40 feet thick on the level.

The effects of this enormous snow-fall are to be seen throughout the country. At Dras, the well-built travellers' bungalow, which had stood, I believe, some thirty years, was entirely crushed down by the weight of the snow which fell on it. In almost every village in the neighbouring mountains more or less of the log-houses have likewise fallen ; while at Gulmarg and Sonamarg, where no attempt was made to remove the snow, almost all of the huts of the European visitors have been utterly broken down by the snow.

In the higher mountains, whole hill-sides have been denuded of vegetation and soil by the enormous avalanches which have swept down them, leaving vast gaps in the primæval forests and choking the valleys below with the debris of rocks and trees.

As an instance of the amount of snow which must have fallen on the higher levels, we will take the Zogi-pass, leading from Kashmir to Dras, which has an elevation of 11,300 feet. I crossed this pass early in August last, and I then found that the whole of the ravine leading up to the pass from the Kashmir side was still filled with snow, which I estimated in places to be at least 150 feet thick. The road at that time was carried over the snow up the middle of the ravine ; the true road which runs along one bank of the ravine being still entirely concealed by snow. It seemed to me

quite impossible that even half the amount of snow then remaining could be melted during the summer.

I heard subsequently from a traveller who crossed the pass on the 5th of September, that the road was then just beginning to get clear from snow, and that some of his loads were carried along it, while others were taken over the snow in the ravine.

In ordinary seasons this road on the Zogi-pass is clear from snow some time during the month of June; if we refer to page 223 of Mr. Drew's "Jammoo and Kashmir Territories," we shall find that in speaking of this pass, he says, "About the beginning of June the snow-bed breaks up, and the ravine is no longer passable."

It is thus apparent that the road across the Zogi-la was not clear of snow during the past summer until three months later than it is in normal seasons, while the ravine early in September was still filled with snow. I crossed the same pass in August 1874, and at that time there was not the slightest trace of snow to be seen anywhere on the pass, or in the ravine leading up to it. As another instance of the great snow-fall, I will take the valley leading from the town of Dras up to the pass separating that place from the valley of the Kishenganga river. About the middle of August, almost the whole of the first-mentioned valley, at an elevation of 12,000 feet, was completely choked with snow, which in places was at least 200 feet in thickness. In the same district all passes over 13,000 feet were still deep in snow at the same season of the year. In ordinary seasons the passes in this district which are not more than 15,000 feet in height are completely cleared of snow at the beginning of August, except in a few sheltered ravines. During last summer, however, it was quite impossible, that the snow could have even melted on the passes.

Traces of this great snow-fall were even to be observed in the outer hills in September, since at the end of that month, I saw a patch of snow resting in a hollow of the Haji Pir ridge above Uri, which is only a little over 9,000 feet in height. The Thakadar of this place told me that he had never before seen snow there after the beginning of June.

It is almost unnecessary to point out, that if a snow-fall similar to the above were to be of constant occurrence in the Himalaya, the permanent snow-line would lie at a much lower level than it does at present, and that the glaciers would greatly increase in size, and descend much lower into the valleys.

In conclusion, it remains to notice the destruction of animal life caused by this unusual snow-fall. In the upper Wardwan valley I was told by some European travellers that they had several times seen numbers of Ibex embedded in the snow; in one place upwards of sixty heads were counted, and in another the number of carcases was estimated by my informant as

little short of one hundred. I myself twice saw some fifteen carcases of small Ibex embedded in the snow-drifts of the Tilail valley.

The most convincing proof, however, of the havoc caused among the wild animals by the great snow-fall, is the fact that scarcely any Ibex were seen during last summer, in those portions of the Wardwan and Tilail valleys, which are ordinarily considered as sure finds. Near saline springs in the latter valley, Ibex are always to be found in the later summer, but this year I only heard of one solitary buck, probably the sole survivor of a herd, having been seen at these salt-licks. The native shikaris say that almost all the Ibex have either been killed by the snow, or have migrated into Skardo where the snow-fall was less.

The Red-Bear *(Ursus isabellinus)* was also far less numerous during the past summer than in ordinary seasons, and the shikaris say that numbers of them have perished, owing to their winter quarters having been snowed up so long that the occupants perished from hunger.

The same explanation will probably account for the fact that in the higher regions I found many of the marmot burrows deserted.

Much has been said lately as to the destruction inflicted on the game of the Kashmir Himalaya by the rifle of the European sportsmen, but I think that the destruction caused by the snow of the past winter has far exceeded any slaughter which would be inflicted by sportsmen during a period of at least five or six years.

XV.—*Physiographical Notes &c. on Tanjore (Tanjá-úr).*—*By* Lieutenant-Colonel B. R. Branfill, *Deputy Superintendent, Great Trigonometrical Branch, Survey of India,—Communicated by* Colonel J. T. Walker, C. B., R. E., *Surveyor-General of India.*

The Tanjore district of the Madras Presidency is nearly contained within an equilateral triangle of 75 to 80 miles on each side, on the Coromandel coast (Chóramandal = Chólan's region) immediately south of the river Kollaḍam (*Anglice* "Coleroon"), which is the north and north-west boundary, running S. W. by W. 75 miles inland from the river mouth. The Bay of Bengal forms the east side, running from the same point nearly 75 miles due south to Point Calimere (Kalliméd). The third side is an irregular line of much the same length from Point Calimere to the "Cauvery" (Kávéri and Kollaḍam) 10 miles east of Trichinopoly (Trisirápalli). This triangular area contains about 3,000 square miles, two thirds of which is Kávéri delta, and two thirds of this portion, or about 1,400 square miles