amongst the stars should be noted at short intervals. In the case of a streak enduring ten minutes, a series of diagrams showing the positions of the streak and neighbouring stars every two minutes would be valuable.

There is a large amount of data available from past observations, but it is for the most part of very rough imperfect character, and we require more exact and complete records before we can determine the exact heights of the streaks and the motions of the outer atmosphere. However, the discussion so far as it has gone proves that the streaks are usually from fifty to sixty miles high, and that their motion is often more than one hundred miles an hour. A very destructive hurricane on the earth's surface would about equal this, so that it is certain that the upper tenuous air is influenced by currents of far swifter character than the atmosphere immediately overlying the earth.

If observers of meteors will only carefully record meteoric streaks and trains whenever they are seen we shall soon be in a position to ascertain more trustworthily and definitely the behaviour of these curious afterglows. From balloon ascents it has been concluded that the general drift of the air in the region of ten or fifteen miles altitude is to E. and S.E., and this precisely accords with the direction of the majority of meteoric trains between about fifty and sixty miles high.

W. F. DENNING.

Bristol, July 13.

Climatic Change.

I HAVE just seen the translation of Prof. Albrecht Penck's lecture on "The Shifting of the Climatic Belts," printed in the *Scottish Geographical Magazine* for June, 1914. The main line of the author's argument is that certain lakes—*e.g.* Lake Chad in the Sahara, the lakes of Mexico City, and of the Titicaca basin, being very slightly salt, indicate an *increasing* precipitation, and during the so-called "pluvial period" were drier than at present, owing to a shifting of the arid belt equatorwards.

Surely it is more reasonable to attribute the comparatively slight salt content to the fact that the basins have only recently ceased to have an outlet, owing to a *decrease* in the precipitation. A slow fluctuating decrease in the rainfall of Mexico has been practically proved by Prof. Ellsworth Huntington (*e.g.* "The shifting of climatic zones as illustrated in Mexico," Bull. Amer. Geogr. Soc., vol. xlv., 1913, Jan.–Feb., and also his recent memoir on the "Climatic Factor"). In the case of Lake Chad, K. v. Zittel, an accomplished observer, describes evidence of a former greater extent (*Palaeontographica*, vol. xxx., 1883, p. 39). Information as to whether the lake has an old outflow channel would be valuable.

So long ago as 1876 A. Agassiz, in his "Hydrographic Sketch of Lake Titicaca" (Proc. Am. Acad., vol. xi., 1876 p. 268), wrote: "The whole of this district is receiving a much smaller waterfall than in former times."

Prof. Penck is unfortunate in his examples; the weight of evidence against him, pointing to a former moister period on the equator side of the arid belts, is too great to be ignored. And as he admits desiccation on the poleward sides of these belts, the facts suggest that the dry area may vary in breadth as well as in position, and that the "pluvial period" had a real existence—*outside the glaciated regions*.

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July 17.

THE PLUMAGE PROHIBITION BILL.

BEFORE these lines are published the fate of the Plumage Prohibition Bill may have been decided. It seems little to our credit that London should be the chief market for the nefarious traffic which this Bill was framed to abolish; and this view was surely endorsed by the House when, on the second reading, the Bill was passed by a majority of nearly three hundred. Nevertheless, during the committee stage the Bill was virulently opposed by a small, well-organised minority, including some actually engaged in the sale of plumage for millinery purposes.

Unfortunately, the hands of the opposition have been strengthened by the action of "The Committee for the Economic Preservation of Birds"—a committee which, strangely enough, does not contain the name of a single ornithologist of repute. So completely have these opposing forces contrived to play into one another's hands that it is probable that, to save the Bill, it will have to be modified. For total prohibition a schedule will have to be substituted, which must be so framed as to secure the safety of such species as are at present in actual danger of extermination.

It would be useless to urge the need of preserving these threatened species because of their immense value as living witnesses of the evolution theory; for science, and scientific problems, have little weight in this country. But, if for no other reason than that of its inhumanity, this ghastly traffic should be ended.

The contention that if this Bill passes a large number of workpeople will be thrown out of employment has been shown, on figures furnished by the trade itself, to be without justification. Equally groundless is the assertion that the placing of the Bill on the Statute Book will simply divert the trade to Paris without saving the life of a single bird. If there were any sort of foundation for this, the French Chamber of Commerce would not have implored the British Government to throw out this Bill. Furthermore, we are assured that if this Bill passes, Germany will follow our lead. This done, the plume-trade in Europe is dead.

If only an emasculated Bill succeeds in running the gauntlet of trade interests a step in the right direction will have been achieved. If, on the other hand, the present Bill is defeated, then it is fervently to be hoped that a new Bill will be introduced at the earliest possible moment; and having regard to the voting on the second reading of the present Bill, there is every reason to regard its success as assured.

SPACE AND TIME.[1]

"FROM this time forth space and time apart from each other are become mere shadows, and only a kind of compound of the two can have any reality." So spoke Herrmann Minkowski in 1908. But his statement has not yet been realised.

[1] H. A. Lorentz, A. Einstein, H. Minkowski: Das Relativitätsprinzip. A Collection of the Classical Papers in the Development of the Theory of Relativity, from 1895 to 1910. Pp. 89, with portrait of Minkowski. (Leipzig: B. G. Teubner, 1913.) Price 3 marks.