

The Statesman's Year-Book: Statistical and Historical Annual of the States of the World for the Year 1914. Edited by Dr. J. Scott Keltie, assisted by Dr. M. Epstein. Fifty-first annual publication. Revised after Official Returns. Pp. lxxix+1500. (London: Macmillan and Co., 1914.) Price 10s. 6d. net.

As the years go by, the growth in size and usefulness of this welcome summary of the world are signs not only of the value of the contents, but of the carefulness which marks its compilation. Much wants more, and many readers would, no doubt, appreciate the extension of the introductory tables to include world surveys of other commodities than coal, gold, etc. The maps this year deal with new political boundaries in Balkania and Mongolia, the extension of railway communications in America, and the position and number of the wireless stations of the world. Many portions of the main text have been subjected to a thorough revision by competent authorities, and no effort seems to have been spared to bring the fifty-first issue thoroughly up-to-date. The complete bibliographies add specially to the usefulness of this indispensable year-book.

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 intended for this or any other part of NATURE. No notice is taken of anonymous communications.*]

Man's Chin: a Dynamical Basis for Physical and Psycho-physiological Utilities.

To account for the presence of man's chin at least three different explanations have been brought forward and discussed:—(1) That the chin has been evolved by sex selection for its æsthetic value; (2) that it was needful for the development of the genio-glossal muscle and speech; (3) that with man's erect posture the chin has been chiefly useful in affording room for important structures in the throat, and in protecting them during combat, etc. These explanations have so far met with very little acceptance.

A conception of the chin as a *dynamical* factor in both mastication and speech does not appear to have received attention. An engineer examining the dental mechanism as a type of machine new to him would, on finding there was a considerable bulk of constructional material projecting from the chief moving member, be nearly certain to ask—What does this do? The chin mass is situated at the outer end of the jaw lever, where its momentum is greatest. It is built up in the heavier material used in the general construction. There is another point, too, that one should not too readily dismiss as a mere coincidence. Every rotation movement of the mandible during its elevation or shutting has combined with it a movement—obliquely upward and backward—of translation. The combined movements are so directed that at some parts of the jaw the resultant velocity is less than would exist if either component were to act alone; and at about a point situated between the jaw angle and the condyle, the resultant velocity is so small that some observers mistakenly believed it to be nil. At the chin, on the other hand, the directions of the component movements are such that the resultant velocity reaches nearly its maximum acceleration.

My suggestion is not quite that the chin is simply man's masticating hammer; something rather less crude than a purely percussive function is conditioned by the momentum of the chin. No doubt the momentum of the chin may appear to be a very small contribution to the considerable muscular force often used in chewing. Yet on the teeth themselves many morphological details that have been preserved as distinct specific features are so small that we do not yet know what the particular utilities are that determined their shape and survival. Further, there is another peculiarity in the mandible movement that may have some significance in this connection. During a (supposable) uniform movement of rotation about the condyle as horizontal axis, the accompanying translation movement is not uniform, but relatively varied—slow or small in the beginning, quicker in the middle, and slower again towards the end of the condyle path. This is favourable to the normal *rhythmical* movement of the jaw by giving in some degree a pendulum-like character to its swing. And it so happens that the position of maximum velocity (and momentum) coincides with the position of greatest resistance and food-strain in chewing—that is, when the cutting-edges of the external blades of the lower cheek teeth are just about to pass their upper opponents in the inward-and-upward shearing thrust. The chin momentum operates most strongly just about the point where it is most useful in preserving the rhythmical movement of mastication, so as to render less necessary any *consciously-directed* variation in the muscular effort put forth in any single chewing stroke.

Then, in the numerous smaller chewing movements for the finer reduction of food morsels, the chin mass (by both inertia and momentum) has at least some value as a "balance," controlling and guiding the niceties of direction in the thrust. The utility of balance influences the construction of many man-made implements (pen- or brush-holder, razor handle, spear, etc.) in the use of which some precision is required; this feature in construction has usually been adapted and has survived quite independently of any conscious or theoretical estimation of its special function. The obvious objection that animals manage the "niceties" of mastication without a chin could be met only by going more fully into the dynamics of the subject. This much at least can be stated here as being susceptible of proof—that as compared with the prognathous savage or the ape, the dental apparatus of modern civilised man is the "finer" machine, in so far as it is the better adapted for those shearing stresses by which tough foodstuffs are comminuted with economy of effort.

The above suggestion of "balancing" and "steady-ing" utilities can also be applied to the rapid and yet delicately controlled movements of the mandible in speech. The man who wrote a book on "The Speech of Monkeys" might possibly have had hope of more success in interpreting the "language" of these animals if only he could have subdued and steadied their jibberings and chatterings by providing them with good weighty chins.

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Meteoric Streaks and Trains.

PROF. C. C. TROWBRIDGE, of New York, has been conducting an interesting investigation, during recent years, into the heights and velocities of the streaks and trains of meteors. He has been collecting old records of these phenomena, and will be glad to receive any new materials which may be gathered during this year's Perseid shower. Every year brings us some brilliant Perseids leaving durable streaks, and it is important that when these appear the drift

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.

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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.