

numbered, as you see, from zero to nineteen. Every one of these resulting monthly positions of the pole indicated by the centres of the small circles is thus the mean result of about 300 single determinations.

The accompanying figure is drawn on a scale of two millimetres to one-hundredth of a second of arc, and the maximum amplitude of the curve is nearly 50-hundredths, or half a second. The amplitude of these movements of the pole on the surface of the earth is between 40 and 50 feet.

You see the general character of the movement quite in accordance with what has been mentioned concerning its complicated and somewhat spiral character. The sense of the motion is turning from west to east. The velocity is apparently very variable, and it seems as if we now approach an epoch in which the amplitude considerably diminishes. It is also evident that such

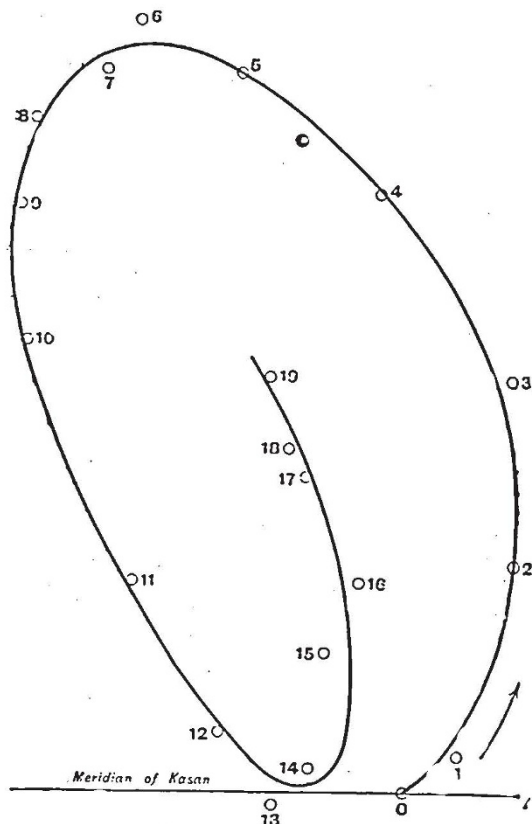


FIG. 1.—Movement of the North Pole of the rotational axis of the earth. Derived from observations made at Bethlehem, Strassburg, and Kasan:—

0 = 1892 Oct. 20	13 = 1893 Nov. 1.
1 = " Nov. 1.	14 = " Dec. 1.
2 = " Dec. 1.	15 = 1894 Jan. 1.
3 = 1893 Jan. 1.	16 = " " "
4 = " " "	17 = " " "
5 = " " "	18 = " " "
6 = " " "	19 = 1894 Mar. 30.

a character of movement can very easily produce slow progressive motions, and also from this reason the whole phenomenon wants to be watched incessantly and very carefully.

The astronomers and geodetists who are now associated in the International Geodetic Union, have invited the geologists to associate with them in this common research. Such an international organisation will be also useful and almost indispensable for a great part of the work of astronomical observatories.

It is to be hoped that Great Britain will now participate in this international union, embracing all other civilised nations. Such organisations, with their clear and reasonably limited aims, involve not only real economies and refinements of mental work, combined with diminutions of material expenses, but it is hoped that they will also have a great importance as slowly growing foundations of human and terrestrial solidarity.

SCIENCE IN THE MAGAZINES.

MR. HIRAM S. MAXIM gives, in the *National*, a brief description of his experiments on flying by means of aeroplanes. His flying machine, when finished and loaded with its water, its fuel, and three men, weighed very nearly 8000 lb., and the actual horse-power developed on the screws was 363 horse-power, with a screw-thrust of rather more than 2000 lb. The total width of the machine was over 200 feet. It was found that upon running the machine at thirty miles an hour very little load remained on the lower track, and at thirty-six miles an hour the whole machine was completely lifted.

The *Fortnightly* is remarkable this month for two critical articles by Prof. Karl Pearson and Mrs. Lynn Linton, respectively. Prof. Pearson assails Lord Salisbury's address to the British Association, and moans over the fact that Lord Kelvin courteously said that throughout it "there was the spirit of the student, the spirit of the man of science." Here is his opinion on it: "We find nothing in it which shows the spirit either of student or of man of science; it teems with fallacious conclusions, and whatever may have been intended by the author, it can only serve as an appeal to that gallery which is occupied by the reconstructed theological party." Mrs. Lynn Linton outpours the vials of her wrath upon Prof. Henry Drummond and his "Ascent of Man." "He brings his subject," says she, "which only the educated can rightly understand, down to the level of the ignorant. He strips science of her divinity, and sends her out as a cottage-maid, or rather as a young priest, of whom no one need be afraid. But he lets slip truth in this endeavour to extract milk for babes out of the meat for men; and his rendering of synthetic philosophy is both inadequate and shallow. Whatever is true is borrowed; whatever is false, strained, and inconclusive, is his own. His sin is the sin of plagiarism, with the additional offence of distortion in the lifting." Surely a writer never received a more terrible flagellation than this.

Brief descriptions will suffice for other articles of more or less scientific interest in the magazines received by us. Sir Robert Ball contributes to *Good Words* a paper on Galileo. The *Century* contains a continuation of Messrs. Allen and Sachtleben's account of their journey across Asia on bicycles; and a fine picture of an aurora, observed and sketched at Godthair on September 3, 1892, by Mr. F. W. Stokes, one of the members of the Peary Relief Expedition. Dr. Carl Lumholtz describes in *Scribner* the life and costumes of the Tarahumaris, the inhabitants of the Sierra Madre. In *Chamber's Journal* we find a diversity of instructive articles. Among the subjects scientifically treated are "British Ring-Snakes," "Dynamite," "Sweet Lavender," and "Sources of Power in Nature." Lovers of nature will find pleasure in an article entitled "In a Rock Pool," contributed by the Rev. Theodore Wood to the *Sunday Magazine*, and geographers will be interested in a description of the inhabitants of the Andaman Islands. Under the title "Spirit and Matter," Emma Marie Caillard philosophises, in the *Contemporary*, on such psychical subjects as were touched upon by Prof. Oliver Lodge in his British Association address in 1891.

SCIENTIFIC SERIALS.

*Bulletin de l'Académie Royale de Belgique*, No. 7.—Comparative study of the isothermals observed by M. Amagat and the isothermals calculated from M. Van der Waals's formula, by MM. P. de Heen and F. V. Dwelshauvers-Dery. A comparison of the theoretical and experimental isothermals shows that the molecules which constitute carbonic anhydride expand regularly as the temperature increases. The coefficient of mean molecular expansion, for temperatures between 30° and 255°, is sensibly equal to 0.001, a number which closely approaches the coefficient of expansion of liquids in general. To this intramolecular dilatation corresponds the internal latent heat of dissociation, made evident by the variability of the specific heat of carbonic anhydride in the gaseous state. Since Van der Waals's equation furnishes fairly accurate values for the part of the isothermals situated to the right of the minimum, one might feel tempted to introduce another constant and to force the curve to pass through a supplementary point conveniently chosen to the left of that minimum. This would give much more satisfactory results, but they would have no value with