each of the stages of growth a batch of larvæ was removed and surrounded by dark twigs, and at the end of the stage restored to the green leaves. By comparing the colours of the mature larvæ in the different batches, it is possible to determine the period of larval susceptibility.

The following forms of variation in butterflies of the genus *Heliconius*, of Tropical America were exhibited by Mr. W. F. H. Blandford. (1) Variation in *Heliconius erato*, L. There are three main types with the basal patch of the hind-wings, respectively, red, blue, or green. The green form is dominant in Panama; it occurs throughout Central America, but not in South America, except sparingly in Colombia and Venezuela. At Sao Paulo, on the Upper Amazons, the blue form alone occurs, or the basal patches may be obsolete. (2) Variation in *Heliconius thelxiope*, Hübn., and *Heliconius vesta*, Cram. Both forms occur together, and are very variable in Cayenne and the Lower Amazon Valley. Further west definite parallel geographical races occur of both. *Heliconius thelxiope* is connected by intermediate forms in Cayenne with *Heliconius melpomene*, L., a widely distributed species, which occurs in the Amazon Valley at Santarem and Obydos only, and is not found in the humid forest. In Bolivia *Heliconius vesta* merges into *Heliconius phyllis*.

Mr. W. Saville Kent showed interesting photographs and specimens illustrating the natural history and ethnology of Australia. The Hon. Walter Rothschild exhibited a group of recently described and other rare Birds of Paradise and Bower-birds.

During the evening four lantern demonstrations were given in the meeting room of the Society. Prof. A. C. Haddon showed a series of slides illustrating the evolution of the cart, and another which illustrated the evolution of the Irish jaunting-car. The Altels avalanche, which occurred in September 1895, was described with photographs by Dr. Tempest Anderson, and Prof. Herkomer gave a demonstration of his new gravure process. Prof. Dewar dealt with liquid air, and showed the following experiments illustrative of low temperature effects:—Filtering liquid air; vacuum vessels boiling at 350° F. below the freezing point; colour and absorption spectra; spheroidal state; solid alcohol; frozen soap-bubble; distilling mercury and phosphorus; liquefaction and solidification of gases; fusible metal spring; brittle indiarubber and its expansion by cold; the diamond burning in liquid oxygen; magnetic oxygen; photographic action and phosphorescence; ignition by means of a lens of liquid air; cooling a vessel 380° F. below the freezing point, until the air of the room condenses on the surface to the liquid state.

The Lords of the Committee of Council on Education have arranged for the public exhibition, in the Western Galleries of the Science Museum at South Kensington, of a number of the objects shown at the soirée. The exhibition will remain open to the public for about a fortnight.

ON THE ROTATION OF THE EARTH.[1]

THE recent discovery of periodical variations of terrestrial latitudes demands a revision of the actual theory of the rotation of our planet. This theory, based upon the hypothesis of the absolute rigidity of the earth, admits of variations of this kind, but very different in their laws from those of the observations. The period of revolution of the terrestrial poles given by the theory is one of about ten months. That which the observations give us lasts nearly fourteen months. Still further, the attentive analysis of the observations of the latitudes, executed of late by Mr. Chandler, shows us that the movement of the terrestrial poles is compounded of two others, of which the periods are, the one of 430 days, and the other of twelve months.

Following the order of the ideas established in the science by the celebrated cosmogenic hypothesis of Laplace, we ought to attribute this disagreement of the theory and the observations to the interior fluidity of the earth. But the illustrious physicist, Lord Kelvin, does not admit that the fluid nucleus of the earth may be of considerable enough dimensions. The greatest part of the astronomers of our day adhere to this opinion. They refer the said discordance to the terrestrial globe being elastic.

In considering the hypothesis of a thin rigid crust of the earth as contrary to all given physics, the celebrated English physicist affirms in his memoir "On the Rigidity of the Earth," *Phil. Trans.*, 1863, and in the first edition of the "Treatise on Natural Philosophy" (§§ 847 and 848), that this hypothesis is also incompatible with the observations of the precession and of the nutation. On subsequently withdrawing certain of these astronomical objections, he has replaced them by some others.

To be able to appeal to objections of this kind, the theory of the rotation of the earth considered fluid in its interior ought to have been previously established. Lord Kelvin has not done it. He has limited himself to enunciating in general terms the principal propositions of this theory. To be able to judge of the said objections of the celebrated English physicist, the theory in question must be previously established.

The problem of the rotation of the earth—supposed fluid in its interior—was approached by W. Hopkins in 1839 (*Phil. Trans.*, 1839-40-42); but the state in which hydrodynamics then was found, did not permit the English savant to treat the matter in a satisfactory manner. The more recent attempts to solve this difficult problem have not been more successful.

We shall endeavour in the present article to give a more perfect solution of this important problem. To render this task more easy, we shall assume that the nucleus of the earth is homogeneous, and of the form of a planetary ellipsoid.

The success of our task is assured by the beautiful researches of our clever geometrician, Prof. N. Joukovsky, relative to the movement of a solid body with cavities filled with an incompressible homogeneous fluid. We have only to apply these researches to our special problem. We hope to lessen the difficulties of this application by the supposition that the rotatory motion of the entire terrestrial mass differs very little from the uniform rotation. The proposition of the celebrated Laplace, relative to the effect of friction of the fluid parts of the earth upon its rotatory motion, affords us a solid foundation for the said supposition ("Œuvres Complétes de Laplace," tome v. p. 283).

We shall commence our article with an abridged exposition of the theory of the rotation of a solid body, which has a cavity filled with an incompressible homogeneous fluid. In the development of the principal formulæ of this theory we shall employ the most simple method, that of the illustrious Poisson. We shall equally profit by them in our transformations of the hydrodynamical equations.

(The final paragraphs, after thirty large octavo pages of intricate mathematics, are as follows.)

We have taken our problem with some considerable restrictions relative to the form, to the position, to the structure, and to the movement of the terrestrial nucleus. This renders almost useless the detailed comparison of our results with the given astronomical ones. We will only say some words relative to one of these results, of which the generality is indubitable.

The hypothesis of a fluid nucleus of the earth being admitted, and the exterior forces neglected, the movement of the terrestrial poles ought to be composed of two periodic movements. The period of the former of these movements is perhaps of twelve or fourteen months, that of the second ought to be pretty nearly a day.

The astronomical observations do not show us this second movement of the poles. Is not this a reason for taking exception to the hypothesis of the fluidity of the earth in its interior? By no means. It is in the first place possible that the smallness of the amplitude of the movement in question may make it unrecognisable. The smallness of the factors μ_2, ν_2, renders this supposition probable. Secondly, it may also be admitted that the want of the appropriate observations causes us to ignore for the present this movement, although its amplitude may be appreciable. One may also suppose that the period of the movement in question, from the usual order of astronomical observations, appears to us to be a period of twelve or of fourteen months. For instance, should the said period be equal to twenty-four sidereal hours exactly, and the observations of the latitude of any astronomical observatory be made every midnight during a good many years, the result of them will be the period of twelve months.

This last supposition appears to us worthy of attention, because according to our opinion the explanation of the period of twelve months by meteorological causes, as is adopted at present by some astronomers, wants probability.

[1] Abridged translation of a paper by Th. Sloudski, Professor at the University of Moscow (*Bulletin de la Société Impériale des Naturalistes de Moscou*. Année 1895, No. 2).