the state of Minas Geraes. This material shows no signs of luminosity at present, though it does not follow, of course, that it never was luminous.

The following note which I translate from "Viagem ao redor do Brazil," 1875–1878, pelo Dr. João Severiano da Fonseca, Rio de Janeiro, 1880, page 353, is much more to the point:

> On the head waters of Rio Verde (state of Matto Grosso, Brazil) we saw one night a surprising sight. One of the white ants' nests seemed to be covered with little lights, and these tiny stars made it look like a miniature tower brilliantly illuminated. It was near the tent of Captain Craveiro, the commander of the troops, and that gentleman invited us to share his surprise and pleasure. When the nest was struck with a stick the miniature lights went out as if by enchantment, but only to reappear again little by little, beginning where the blows had been weakest.

I know but one other reference to this phenomenon in the works of Brazilian travelers, and that is the following brief note given in Castelnau's "Expédition dans les parties centrales de l'Amérique du Sud, Histoire du Voyage," Paris, 1850, Vol. II., p. 103. In describing the travels in the neighborhood of the city of Goyaz the author says:

> On the night of the fifteenth in the vicinity of the Agoa Limpa estate we noticed a luminous mass in the middle of the campo that aroused our curiosity greatly. On approaching it we found it to be a termites' mound from which shone a great number of small points of light [petits foyers lumineux]. This phenomenon is produced by the presence of an immense number of small phosphorescent larvæ which withdrew into the galleries they had built when one tried to capture them.

The fact that I have lived and traveled in Brazil for ten years without ever having seen this luminosity at all; the surprise of Dr. Severiano da Fonseca at seeing a single instance in Matto Grosso; and the note by Castelnau, who traveled through tropical South America for four years, all lead me to surmise that this luminosity is probably confined to some particular species, or possibly to some special occasions or conditions of termite life.

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December 13, 1909

CORRELATIONS OF CLIMATIC CHANGES

HAVING taken into consideration the yearly mean temperatures of 1891 to 1900, from all available sources, and after having discarded all doubtful records, I have drawn maps representing the geographical distribution of annual departures from the normal temperatures, the means of the ten years' observations being considered as normal values. On those annual maps I call thermopleions, or simply pleions, the areas occupied by positive departures, antipleions those of negative departures. The pleions and antipleions are bounded by the quasinormal line.

On this line the departures are nil, the values being equal to the ten-year means.

The lines of equal positive and negative departures I call hypertherms and hypotherms. The pleions represent inflections of the isothermal lines towards the pole, or, more properly speaking, towards the regions of colder climate.

The antipleions, on the contrary, characterize a local abnormal descent of the isotherms towards the equator.

The maps of successive years, for the same country and those of different countries for the same year, show remarkable correlations in the distribution of the departures.

A pleion, in most cases, exists during several years, moving from place to place. When one compares the different maps, and especially those of European and Asiatic Russia, one is led to believe that the pleions are produced by immense waves intercrossing. It seems that for the whole world, the years are either too warm or too cold following the predominance of pleions or antipleions. For example, the year 1893 was exceptionally cold, 1900 on the contrary was too warm. The temperature of the earth's atmosphere was at least one half a degree Centigrade higher during the year 1900 than during 1893. It is a notable fact that neither the Alps, the Caucasus nor the Rocky Mountains form barriers,

not even the Himalayas interrupt the progress of a pleion or an antipleion. This demonstrates the fact that the thermopleions and antipleions are products of temporary alterations of the general circulation of our atmosphere. A full discussion of the question of which this is but a short summary is to be found in my memoir "L'Enchaînement des Variations Climatiques," published recently by the Belgian Astronomical Society. I am working at present on the dynamical problems connected with the results I have already obtained and hope to be able, in a short time, to propose a method of research by which it will be possible to successfully predict, several months in advance, the climatic anomalies of the different seasons of the year. In connection with this study I intend to examine the yield of cotton and grain.

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The Effects of Prolonged Rapid and Deep Breathing

In Science, December 3, D. F. Comstock calls attention to certain phenomena that follow upon a few minutes of enforced deep breathing. These phenomena, as he reports them, are in brief: (1) an apnœic pause, (2) mental stimulation, (3) increased physical endurance and (4) increased pulse rate.

Several years ago I published[1] the results of fairly extensive experiments upon the effects of forced respiration. A comparison of my results with those of Comstock may not be without interest.

In the first place, the apnœic pause is unquestioned. Some of my observers, without endeavoring to hold the breath at all, as did Comstock, furnished respiratory tracings in which two minutes of forced breathing was followed by two minutes of complete apnœa. A very common result was, however, not a pure apnœa, but a period of slow, shallow respiration with long expiratory phases.

Second, the immediate subjective effects of forced breathing were more or less dizziness, tingling and prickling sensations in the hands and feet, blackness before the eyes, and a feeling of confusion coupled with energy. There was often, too, a secondary experience of exhilaration.

Third, immediately after the cessation of forced breathing there was a noticeable improvement in strength and endurance of grip.

Fourth, a slight quickening of pulse occurred during the breathing, though not by any means so pronounced as that reported by Comstock.

Fifth, and most interesting: actual tests of reaction time, discrimination time, memory-span, visual discrimination of forms and precision of movement, all showed more or less impairment when administered immediately after forced respiration.

It is commonly stated that, while alcohol produces for a time distinct exhilaration and a feeling of exceptional mental readiness and fluency of thought, the actual performance under these conditions does not measure up to one's subjective estimate of it. I suggest, therefore, that, contrary to Comstock's view, forced breathing is probably not so valuable as a mental stimulant as it may appear on the strength of the feeling of exhiliration which it develops. My experiments, however, have no bearing upon the effect of forced breathing during longer intervals of time after normal breathing has been resumed.

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December 6, 1909

[1] *American Journal of Psychology*, IX., July, 1898, 560–571.

Quotations

The Antivivisection Campaign

The antivivisectionists so-called, that is, the misguided, ignorant, and the fanatics who have no objection to live-broiled lobsters, "live feather" pillows, spring traps for mice, sticky fly paper and other forms innumerable of torture of the brute creation, but shudder at the use of animals for the manufacture of vaccine and antitoxins or for the gaining of knowledge that will aid in saving human life, have opened their annual campaign by an attack on the Rockefeller Institute. A newspaper of this city, whose proprietor is said to have a