in the first chapter, a concise account is given of the means of naming and identifying stars, sufficient to make possible an intelligent observation of the diurnal motion of the celestial sphere; and in the next chapter, it is shown that the observations can be explained by regarding the earth as a spinning globe. The same method is followed throughout.

On the whole, the subject-matter has been judiciously selected, but a slight want of proportion is shown in introducing explanations of the phases of Mercury and Venus, while those of the moon are not referred to at all. The chapter on the determination of the size of the earth would have been a little more educational if the description of the methods employed had been accompanied by hints as to the amount of playground surveying which is possible by the use of a protractor and foot-rule.

The book forms an admirable introduction to astronomy, which stands a fair chance of fulfilling the author's hope "that this little book will help to revive the observational astronomy of pre-telescopic times." This branch of astronomical knowledge is certainly not without danger of being neglected in favour of the fascinating and rapidly-advancing study of the results obtained by the use of the camera and spectroscope. The explanations are models of clearness and accuracy, and the diagrams illustrating them are excellent. Many of them are new, and involve original ideas of the author; as, for instance, a diagram illustrating the sun's apparent path in winter and summer, and another showing the principle of Foucault's pendulum by a lecture experiment. Teachers of geography and physiography will do well to make themselves familiar with Mr. Gregory's methods.

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.*]

The Hodgkins Prizes.

THE time for the reception of treatises or essays offered in competition for the Hodgkins Fund Prizes of 10,000 dols., of 2000 dols., and of 1000 dols. respectively, closed on December 31, 1894, and all papers so offered are now in the hands of the Committee of Award.

In view of the very large number of competitors, of the delay which will be necessarily caused by the intended careful examination, and of the further time which may be required to consult a European Advisory Committee, if one be appointed, it is announced that authors are now at liberty to publish these treatises or essays without prejudice to their interest as competitors.

S. P. LANGLEY.

Washington, January 10.

The Artificial Spectrum Top.

As the spectrum top is exciting a good deal of interest at the present moment, perhaps I may be allowed to record some experiments which I have made with a view of arriving at a solution of the colour problem which it sets. I have observed the colours produced by the white light of the positive pole of the electric arc, and also by monochromatic light produced by means of my colour-patch apparatus. The top was rotated on a horizontal axis at any desired speed by means of an electromotor. The following colours were observed (No. 1, No. 2, No. 3, and No. 4 are the triple lines in order from the centre of rotation):

White light.

No. 1. Crimson.
No. 2. Olive green.
No. 3. Grey (slightly violet).
No. 4. Dark violet.

(When the yellow light of gas is used, the above results would be modified).

Red (C light).

No. 1. Red.
No. 2. Lighter red.
No. 3. Very light olive green.
No. 4. Darker olive green.

Green (Magnesium b).

No. 1. Bluish-green.
No. 2. Lighter bluish-green.
No. 3. Same as No. 2.
No. 4. Ruddy black.

Blue (near the blue lithium).

No. 1. Grass green.
No. 2. Lighter grass green.
No. 3. Same as No. 2.
No. 4. Ruddy black.

Violet (all the violet of the spectrum).

No. 1, 2, and 3. Light violet.
No. 4. Darker violet with a suspicion of red.

When a red a little below the red lithium line was employed, all the groups appeared dark red, and as in the 3 sensation theory this part and the violet are simple sensations, the results obtained in these last, were to be expected.

The next two series are interesting, observations being made in white light compounded by the mixture of two simple colours.

Mixture of red and green to make white.

No. 1. Indigo-blue.
No. 2. Reddish orange.
No. 3. Same as No. 2.
No. 4. Darker orange.

Mixture of yellow and blue to make white.

No. 1. Sky blue.
No. 2. Sage green.
No. 3. Same as No. 2.
No. 4. Bluish-black (perhaps black).

These results were confirmed by an independent observer. When the rotation was reversed the same order of colours was observed, but in the reversed order. These observations seem to confirm the original opinion I had formed regarding these phenomena.

Bearing in mind that none of the observed colours in the lines are pure colours, but mixed with a certain quantity of white, and are seen on a more or less dark ground, then if the order of persistency of the three colour sensations be violet (blue), green, red, the results would be as given above. Should this be so, the velocity of rotation must alter the position of the colours seen in white light, the violet being the last to be seen on No. 1 when rotated more rapidly, and this is the case. The effect of contrast also has to be taken into account.

I have made a good many more experiments under varying conditions of position and dimensions of lines and proportions of black to white; and it seems possible that this toy, when modified, may be adapted to give valuable information as regards certain problems in colour vision.

W. DE W. ABNEY.

WE have recently made a few experiments bearing on the phenomena exhibited by Mr. C. E. Benham's artificial spectrum top (see NATURE, November 29, 1894, p. 113), and the explanation of them suggested by Prof. Liveing (NATURE, December 13, 1894, p. 167), and have obtained results which we believe to be novel and of some scientific interest.

In the first place, if Prof. Liveing's explanation be correct, there seems to be no reason why the same effects should not be obtained with broad bands instead of lines, the bands being drawn in precisely the same manner as the lines upon the white half of the disc.

It appeared to us of some importance to determine if this were really the case, as we thought the effects obtained with Mr. Benham's top might possibly be due to irradiation being different in amount for the different colours, while the change in colour with reversion in direction of rotation was presumably due to the black lines succeeding, upon a given part of the retina, a previously white ground in the one case and a previously black one in the other.