

The two sets of seeds were thus in exactly similar conditions, except for the increased atmospheric pressure and the compression of the atmosphere in the one case as compared with the other. The following was the course of development:—By 9 a.m. of the 9th three of the seeds under the  $2\frac{1}{2}$  atmospheres of pressure had protruded their radicles, and this protrusion by 12 p.m. of the same day had become considerable, while as yet there was no indication of commencing germination in any of the seeds of the second set. By 10 a.m. of the 10th these latter had just begun to germinate, the radicles of the seeds under high pressure being at the time a fourth and a third of an inch long.

Henceforward, however, the rapidity of development was reversed. The seeds, under ordinary pressure, grew rapidly, and their cotyledons became of a deep green colour; while the development of those under the high pressure became permanently arrested and the cotyledons of one that had entirely escaped from the seed-coats remained as etiolated as though they had been grown in absolute darkness.

They were allowed to remain untouched for eight days, when, as there was no change, the bottle was removed from the tube and simply allowed to stand inverted in the place it had formerly occupied. The two—out of the five—seeds which had hitherto remained unchanged now rapidly germinated, and grew into vigorous green young plants.

Does a greatly increased atmospheric pressure or a greatly compressed air prevent the development of chlorophyll, and while it stimulates germination does it prevent growth?

Liverpool, April 27

WILLIAM CARTER

[This is an interesting observation, and seems to suggest a new and comparatively unworked field of investigation—the effect of different amounts of atmospheric pressure on plant-life. With regard to the decomposition in the presence of chlorophyll and under the influence of sunlight, of carbon dioxide, it is remarked by Dehéralin ("Cours de Chimie agricole," pp. 25, 26) that the conditions are analogous to those affecting the combustion of phosphorus. This is not luminous in pure oxygen at ordinary pressure, but becomes so immediately the oxygen is diluted with nitrogen or hydrogen, and still more when the pressure is much diminished. Boussingault has shown that leaves will not decompose pure  $\text{CO}_2$  at the ordinary atmospheric pressure; but a small cherry-laurel leaf placed in the pure gas decomposed a cubic centimetre of it at a pressure of 17m. (*Compt. rend.*, 1865, t. lx, p. 872).]

#### The Magnetic Survey of Missouri

IT may interest some of your readers to know that, although our State Legislature absolutely refused to do anything to aid in the Magnetic Survey of Missouri, refusing by a "crushing" vote even to authorise county officers to have a true meridian established, the work will still go on. A gentleman of St. Louis, whose name is withheld at his own request, has assumed the entire expense, and we shall now begin a more minute examination of the Missouri, Grand, and Osage valleys. We shall hereafter travel by wagon, and shall do the work where it is most needed in order to disclose the real directions of the isogonic lines.

F. F. NIPHER

#### An Optical Illusion

THE illusion described by Mr. Wilson and commented on in an editorial note is anything but a novel one. An apparatus for the experiment was purchased by the Birmingham and Midland Institute, along with a quantity of optical apparatus, from Mr. Robert Addams, in, I think, 1857. Within the last few years I have noticed that the experiment is described and explained in Priestley's "Light and Vision." I am writing from home, or would give the exact reference.

C. J. WOODWARD

Cambridge, May 23

I SHOULD like to know whether the following is a general experience, or only a peculiarity of my own vision?

If I stand with a source of light—a lamp or a window—at one side of my head, so that the light falls strongly on one eye only, and look, successively or simultaneously, at the images of a piece of white paper as seen by my two eyes, the image seen by the eye next the light is greenish white, and that seen by the eye farthest from it is light buff.

If instead of white paper I use the gilt edges of a book, the

image seen by the eye next the light is of a beautiful golden green; the other is of a brassy yellow, almost orange.

This phenomenon does not appear to depend on any effect of dazzling, for the experiment succeeds perfectly with very moderate degrees of illumination.

JOSEPH JOHN MURPHY

Old Forge, Dunmurry, co. Antrim, May 23

#### The Speaking Tube Anticipated?

HAS the following appeared anywhere in this connection as yet, or not? If not, please allow it to appear in NATURE with this qualification only, that the italics are mine.

Describing the "speaking trumpets or pipes which ran, we are told, along the whole length of the Wall," Bruce says ("The Roman Wall," by the Rev. John Collingwood Bruce, p. 76), that Drayton long ago sang of them as follows in his "Polyolbion" :—

"Townes stood upon my length, where garrisons were laid  
Their limits to defend: and for my greater aid  
With turrets I was built, where sentinels plac'd  
To watch upon the Pict: to me my makers grac'd  
With hollow pipes of brass, along me still they went,  
By which they in one fort still to another sent  
By speaking in the same to tell them what to doe,  
And see from sea to sea could I be whispered through."

Ashton-under-Lyme, May 17

W. CURRAN

J. C. SHENSTONE.—A case of Phyllody of the calyx. "Ranunculaceæ particularly liable to this change" (Master's "Teratology," p. 246; recorded in *Anemone nemorosa*, *ibid.* p. 252).

#### ORIGIN OF THE ENGLISH MILE<sup>1</sup>

IT is known that the mile of 1609 metres long passed among English geographers and navigators as being the length of the terrestrial arc of 1'; in other words they made the degree equal to 60 of these miles. In reality it contains 69'; there is thus an error of about one-sixth. This error, if it existed long among our neighbours, which I do not know, must have caused many a shipwreck. It has had another very remarkable result; it nipped in the bud the discovery of the law of universal attraction. The first time that Newton's great idea presented itself to his mind the proof failed him, because he made use of the common English mile to calculate the radius of the earth. He renounced the idea for a long time, and only took the calculation up again when he learned the results of Picard's measurement of a degree in France. Whence comes this defective estimate? Certainly it does not proceed from any effective measurement, for the worst degree measurements, among those which have been really made, and not fictitious measurements, like that of Posidonius, are far from presenting errors of such magnitude. English geographers then must have committed some mistake in taking their mile from ancient documents.

So long as navigation was limited to the waters of the Mediterranean, and to coasting along the western shores of Europe, it was scarcely necessary to trouble about the value of this element; but from the time that the discoveries of the Spaniards and Portuguese opened out a much vaster field, sailors were compelled to make some inquiry into the matter. I suppose that the English navigators applied to their geographers, and that these found nothing better to consult than Ptolemy, the great, the only authority in these matters. But Ptolemy himself refers to Eratosthenes; he says that he verified the measurements of the latter and found the same result, viz. 500 stadia for the terrestrial degree. I have thus been led to examine the measurement of Eratosthenes. According to the documents which historians have preserved, Eratosthenes measured the great arc of meridian which separates the parallels of Syéné and Alexandria, and finally found 700 stadia to the degree. This is how he worked:—He observed at Alexandria, certainly by means of a gnomon, the zenith distance of the sun at

<sup>1</sup> Paper read at the Paris Academy of Sciences by M. Faye (*Comptes rendus*, xcii. No. 17).