

vowel *ē* very clearly. At half revolution per second, *ou*, *au*, were distinctly heard.

2. The vowel *ō* was sung while the cylinder rotated at different rates of speed. On reproducing the sounds, the cylinder being revolved more slowly than at first, the vowel *au* was heard, changing to *ō*, *ē*, *ē*, falling to *ē* again as the velocity was slackened a little.

3. The vowel *ā* was spoken while the cylinder made one revolution per second. On reproducing the sound, the rate being half a revolution per second, *au* was heard, changing to *ā* when the rate increased to one revolution, and at three revolutions per second *ā* was heard.

4. The vowel *ō* was spoken several times in succession, the rate of the cylinder being gradually accelerated. On reproducing the sound by a uniform and slow rotation, *au* and *ou* were heard; on rotating faster, *ē* and *ī*.

Several other experiments were tried in the short time during which the instrument was at our service, all of which were strikingly confirmatory of Helmholtz's theory. Difficulty was experienced in reproducing the highest vowels *ē*, *ī*, probably on account of want of readiness of response in the disc. The bell of a reed-pipe was placed over the mouth-piece of the instrument when the sound was to be reproduced, for which a horn of pasteboard was substituted in some of the trials.

We hope to render these experiments more rigorously quantitative, as the phonograph promises to be a valuable aid to research in this field. Very probably others may have worked with the same end in view, and if so it would be interesting to learn what has been their experience.

CHAS. R. CROSS

Boston, U.S., April 29

### The Telephone

WITH reference to the letter of Lieut. Savage which appeared in your last impression (p. 77) respecting the telephone, this gentleman has noticed that on removing the ferrotype disc of the sending instrument and tapping the magnet with a diamagnetic body, such as a piece of copper, the taps are distinctly heard at the receiving end. I have repeated this experiment. Not only can a diamagnetic substance be used for tapping, but the magnet may be removed altogether and a bar of soft iron substituted without causing any material difference in the results, and this bar of soft iron may be placed at right-angles to the line of dip. The vibrations of a tuning-fork are transmitted very distinctly. When held in the line of dip the results obtained are more marked. Taps and the tuning-fork vibrations are readily heard, and by covering with the ferrotype disc a conversation was actually carried on through this bar of soft iron. There is perhaps nothing very surprising in obtaining these phenomena with the bar in the "dip" line, but when the same bar of perfectly soft and recently annealed iron can be held in any position in a plane at right-angles to that line and used as a sender for powerful vibrations, such as those of a tuning-fork or the taps of a diamagnetic body on the naked end of the bar, we cannot but be struck by the surprising delicacy of the telephone as a test for the earth's magnetism.

The receiving instrument used in the above experiments was an ordinary bell telephone  $2\frac{1}{2}$  in. disc '007 of an inch in thickness.

9, St. John's Road, Bristol, May 18 ALFRED CHIDDEY

### Hereditary Transmission

IN 1837, Capt. D'Urban of H.M.S. *Griffin*, having captured, off the south coast of Martinique, a Portuguese slaver, called the *Don Francisco*, landed in this colony the living freight of 437 human beings, who, about two months previously, had been forced from their homes on the banks of the Congo, to be sold in Cuba.

William Laidlaw, one of the liberated slaves, who is now in a position of some trust on the Goodwill sugar plantation in the island, gives to me the following interesting details of hereditary transmission in the African, which I believe will be interesting to the readers of NATURE.

"I am about sixty or sixty-five years of age, and was born with six fingers on each hand. Soon after 'my freedom' I married a woman from 'our country.' We had four children, two being boys and two girls; they were born with six fingers on each hand, and one of the girls had six toes on each foot.

"My eldest son Robert, who is married and settled in Demerara, is the father of two boys, who have six fingers on

each hand. My second son, William, who is working with me on the Goodwill estate, married, and his wife had five children; they were born having the same peculiarity; but I regret to say none are living."

I yesterday sent for William Laidlaw, and have substantiated his father's statements. I measured the sixth fingers: the one on the right hand is exactly  $1\frac{1}{4}$  inch in length, and has a perfectly formed nail, the one on the left showed traces of having been partially amputated.

EDMUND WATT

Resident District Magistrate

Dominica, British West Indies, April 27

### What is a "Water-shed"?

SOME time ago the term "water-shed" was somewhat vaguely used to imply either the dividing ridge between two river basins or the slopes down which the water poured into the rivers themselves. Latterly, if I mistake not, it has generally been used by geographers in the former sense only. Mr. George Grove, F.R.G.S., however, in his excellent little Primer on Geography, uses the term "water-parting" for the ridge, and water-shed for the whole of the ground between the water-parting and the stream;—very clearly illustrating his meaning by reference to the ridge tiles and the slope of the roof of a house respectively.

There may be some reason, especially in a work of the kind, for substituting "water-parting" for "water-shed," in the sense first quoted, but is the use of the latter, to indicate the flow of water down the slopes, justified either by etymology, or even by the correct use of the word "shed" in ordinary conversation?

The derivation from Anglo-Saxon *scēd-an* or *scēad-an*, indicates the primary meaning to divide or sever. It is also used metaphorically in some of the north-country dialects, as "there is no shed (difference) between us." No doubt, by a very natural ellipsis it often implies flowing or falling. A woman sheds tears, or a tree sheds its leaves, and the consequent flowing down the cheeks, or fluttering down to the ground need not be specially expressed. But in this case the word is used distinctively, and should surely be used, if used at all, in its stricter and primary sense, while the fall or flow of water can be appropriately distinguished.

Of course this is merely a question of terminology, but I think it is one worth noticing if only for the sake of the youthful millions who are being brought to some knowledge of elementary geography, and will hardly be helped to appreciate the exactness of science if they find the same word is used by different authorities to describe things so different as the dividing ridge and the hill slopes of the land they live in.

R. H.

Savile Club, Savile Row, W.

### Abnormal Coccyx

IN NATURE for September 21, 1876, I gave an account of a peculiar abnormality in a girl aged eight, in whom the coccyx was turned backwards and upwards, and a little above it there was a circular depression in the skin, about  $\frac{1}{4}$  inch in diameter, and about  $\frac{1}{4}$  inch deep. On being dragged downwards the skin in this hollow became everted and formed a covering to the point of the coccyx. Shortly afterwards I had an opportunity of examining the other children of the family, with the following results:—

Boy aged six, normal.

Girl aged four, depression in the same spot as in the eldest sister, coccyx normal.

Girl aged two, normal.

Boy aged seven months, fairly deep hole (not measured) in same position, coccyx less curved forward than usual.

The parents were said not to possess this peculiarity; I could get no information as to the other members of the family.

A few days ago I met with another case of the same kind in a boy eight months old. The coccyx was curved sharply backwards, and there was a circular depression in the skin, about 5 mm. in diameter, a little higher up than in the other cases, which was easily raised to the level of the surrounding parts, and effaced by a little traction.

ANDREW DUNLOP

Jersey

### Lecture Experiment

A glass flask of about a litre capacity is partially filled with water and closed with a cork, through which a tube passes