to be in millimetres, for the longer (which I will call A), 228·4; for the shorter (which I will call G), 227·3; the length of 9 English inches in millimetres being 228·6. The "handle" penetrates into the sheath about 17·7 mm. These handles are tapered to the end penetrating the sheath. The two "sheaths" are not alike in interior form: the sheath A is hollowed out conically to a depth of 46·5 mm., the remainder of its length having a hole drilled through it of about 2·6 mm. diameter; the sheath G is 70 mm. long, is hollowed out to a depth of 50·5 mm., and has no hole through the bottom or end part.

I was led to conjecture that these tubes or "sheaths" might be musical pitch-pipes; and on blowing across their orifices, the shorter produced the sound of high G, the longer or perforated one that of high A. By stopping with the finger the hole which passes through the bottom of the "sheath" A, the sound of high G sharp was produced. These notes I tested with a pitch-pipe.

This led me to further conjecture that they should present an interior diameter in accordance with the condition laid down therefor by Lyng-Lun; that is, such as to give an interior circumference equal to 9 grains of *Sorghum rubrum* laid lengthways. Having carefully calibered the interior diameters, I obtained a series of values, giving for the interior circumference of the G sheath or tube a mean value of 28·32 mm., and for that of the A tube 28·44. Through the kindness of Messrs. J. Carter and Sons, of High Holborn, London, I obtained a sample of *Sorghum rubrum*, and operating on this, as also on a sample obtained in Dublin, I got for the length of nine millet seeds placed end to end the following values in millimetres: 26, 26·50, 27·10, 27·38, and 28. I took as mean the value 27 mm. (the exact mean being 26·995 mm.), so that the difference from that of the interior circumferences found is only 1·44 mm. in the mean. I may add that from a series of ten measurements kindly made micrometrically by Dr. McNab, it appears that the lengths of the grains measured by him vary, and would give for the lengths of nine placed end to end, the limits 28·804 mm. and 24·689 mm.

I consider therefore that, so far, the interior circumferences determined point to the "sheaths" being pitch-pipes having the standard interior dimension laid down by Lyng-Lun.

I thought it worth while furthermore to verify the cubical contents of the tubes in millet seeds. The pipe G gave a contents of 421 red millet seeds, and the pipe A of 375; or a mean capacity in seeds of 398. The white seeds gave me for G 400.

What, however, is interesting, is that the end of the "handle" which penetrates the G sheath is hollowed out cylindrically, and this space holds 39 red seeds, and would seem to represent a standard of one-tenth volume. The corresponding end of the A sheath gives for two measurements 37 seeds, or as near as possible one-tenth the capacity of that sheath measured in seed contained.

With the measures of lengths of millet seed determined, we may attempt to fix the probable or approximate length of the fundamental pitch-pipe; that is, the length of 81 millet seeds placed end to end. Taking 27 mm. as the approximate length of nine grains, this length, or rather depth, would be $9 \times 27 = 243$ mm. Now there is found for the combined lengths of the "sheaths" and "handles" when placed end to end, the values:

$$\begin{aligned} &\text{mm.} \quad \text{mm.} \quad \text{mm.} \\ &\text{For the G tube, } 227{\cdot}3 + 17{\cdot}65 = 244{\cdot}95, \\ &\text{,, A tube, } 228{\cdot}4 + 17{\cdot}7 = 246{\cdot}10; \end{aligned}$$

both differing little from the approximate value found above.

Taking, on the other hand, the mean interior circumferences of the two tubes as probably representing the lengths of nine millet seeds, we have from the measurement

$$\begin{aligned} &\text{mm.} \quad \text{mm.} \\ &\text{Of the G pipe, } 28{\cdot}32 \times 9 = 254{\cdot}88, \\ &\text{,, A-pipe, } 28{\cdot}44 \times 9 = 255{\cdot}96. \end{aligned}$$

It is worthy of remark that by multiplying the mean, end or bottom, diameters of the two sheaths, $\frac{12{\cdot}96 + 12{\cdot}47}{2} = 12{\cdot}715$, by 20, the product comes out 254·3 mm.

Such coincidences can hardly be fortuitous, and to some extent justify the presumption that the two jade instruments which I originally took to be "brushes," are either original standard measures of very great antiquity, or copies more or less exact therefrom. A further determination of the lengths of the Chinese red millet seed is evidently desirable as a matter of metrical and historical research.

J. P. O'REILLY

The Cambridge Cholera Fungus

IN reply to Dr. Klein's letter, I wish to state that although the specimens figured by Prof. Roy in the Royal Society's Proceedings appear to be branched, the one shown to me did not.

Dr. Klein is of course perfectly right as to his statements concerning branching Bacteria; and his remarks, if he rigorously distinguishes between real and false branching, are true also of all the Schizomycetes. At the same time, the existence of such a form as *Cladothrix dichotoma* is not without interest, more especially since Cienkowski has described for it an involution form.

WALTER GARDINER

Clare College, Cambridge, January 31

As bearing on the subject of the "Cambridge cholera fungus," it may interest some readers to learn that methylene-blue has long been known as a good stain for fungi. My friend Mr. T. Hick, Botanical Lecturer at Owens College, showed me, some years ago, beautiful preparations of moulds stained with this substance, and I have frequently used it for the same purpose, as also chinoline-blue, known as "blue No. 13" of the aniline dyes. It is impossible to keep an aqueous solution of the latter for any length of time free from fungoid growth, the hyphæ of which, at a certain stage of development, exactly resemble the forms described by Messrs. Roy, Brown, and Sherrington, and my specimens, when grown on a slice of potato, developed into *Aspergillus glaucus*. Remembering the very varied appearances assumed by the barren hyphæ of fungi, depending on nature of substratum, relative amount of moisture, &c., I believe that morphological agreement of vegetative parts by no means proves specific identity, even when both can be examined in a fresh state—a great advantage, as the chemical and physical properties of the hyphæ can be compared; but an expression of opinion as to relationship based on the comparison of barren hyphæ with drawings is simply valueless, and only proves a very slender acquaintance with the characters of admitted specific value in the determination of fungi. Members of the Chytridiaceæ are common only in books; during years of practical mycological work I have only once met with a species belonging to this group, and this one I could not succeed in staining with either methylene- or chinoline-blue, but Bismarck-brown gave good results. I was inclined to attach a certain amount of value to this selective power exercised by fungi in connection with dyes, until I discovered that the hyphæ producing the zygospores of *Syzygites megalocarpa* could not be stained with blue, but readily with methyl-green, while the hyphæ of the conidial stage (grown by us from the zygospore) readily absorbed methylene-blue, but had no affinity for green. Interstitial swellings and knob-like outgrowths are not uncommon on mycelium belonging to widely separated groups, especially when the spores are caused to germinate under abnormal conditions, as described in the *Journal of Botany* for October 1882. The protoplasm frequently becomes concentrated in these portions, which are then cut off from the thread by a septum, and serve as centres for a fresh growth, when placed under favourable conditions. The absence, presence, or relative number of septa vary much in the same plant at various ages and under different conditions of growth.

Kew G. MASSEE

Earthquakes

IN NATURE of October 14 (p. 570) you published a letter from Prof. O'Reilly regarding the great earthquake of Carolina, and drawing attention to the tendency of earthquake-lines to assume the direction of great circles. So far his observations were identical with a theory I had myself elaborated, and which I embodied in a paper written at the beginning of the year 1884, now in the hands of the Committee of the Geological Society of London, but never presented to the Society. So long ago as