Japan for that year (vol. ix. p. 40). Further, in publishing an account of the horizontal pendulum seismograph, I pointed out that the way to get a steady-point with respect to one component of earthquake-motion, is to pivot a body in nearly neutral equilibrium, with the corresponding kind of freedom, and to use the centre of percussion as the steady-point, the steadiness of the steady-point being increased, if need be, by pivoting a second mass there. So far as I am aware, this obvious principle was first explicitly recognised and applied in my horizontal pendulum seismograph; and on this point I shall appeal from Mr. Gray of 1886 to Mr. Gray of 1881:—

"I believe the first time special attention was paid to the application of this well-known dynamical principle to seismometers is to be found in a paper communicated by Prof. Ewing to the last meeting of this Society" (T. Gray, *Trans. Seis. Soc. Jap.*, vol. iii. p. 5).

(2) Mr. Gray's second charge is that I am using his vertical motion seismometer without acknowledgment. I am not using his instrument; and I have acknowledged fully his service to seismometry in this connection. A horizontal bar, loaded at one end and held up by a spring, was used for vertical motion by the British Association Committee at Comrie in 1842. In 1881, Mr. Gray, holding the bar up by a long spiral spring, made the suspension astatic by adding a trough or tube containing mercury (*Trans. Seis. Soc. Jap.*, vol. iii. p. 137). After seeing this, I devised another and simpler method of making the suspension astatic, and in describing it I said:—

"At a recent meeting of the Society, Mr. T. Gray described a seismometer for vertical motion, in which the problem of supporting a heavy mass, so that it should be free to move vertically and yet remain in neutral equilibrium, was for the first time (so far as I am aware) successfully solved" (*Ibid.* p. 140).

My method is entirely different from Mr. Gray's. He now says that it was anticipated by a paper of his, dated May 1880. He did not suggest this at the time; and, on reading the paper now, I can find no trace of the alleged anticipation. In the passage quoted above, and in other writings ("Earthquake Measurement," p 48; NATURE, vol. xxx. p. 152; "Encyclopædia Britannica," Art. "Seismometer"), I have tried to do justice to Mr. Gray's priority in the solution of this problem of vertical astatic suspension; but I prefer, and use, my own later solution.

J. A. EWING

University College, Dundee, December 11

How to make Colourless Specimens of Plants to be preserved in Alcohol

IN your last number (p. 149) Prof. H. de Vries described a valuable method for making botanical museum specimens colourless; but, as it is more important in many cases to keep the original colour, you will allow me to call your attention to a note in the *Berichte der deutschen botanischen Gesellschaft* (1886, No. 8), where Dr. Tschirch describes a method for retaining the colour (green or other) on specimens preserved in spirit. He discovered some time ago that tannates and colouring-matters (as found in plants), with the exception of xanthophyll, form compounds with lead and barium which are insoluble in alcohol, and he based his method on this discovery. He recommends the specimens to be put into solutions of compounds of lead or barium before transferring them to spirit, or simply to add concentrated solutions of acetate or nitrate of lead, or chloride or hydrated oxide of barium, to the spirit. I may add that I have tried this method, but I have not yet got quite satisfactory results. My best results were obtained by plunging the specimens first of all into boiling water before putting them into the above-mentioned mineral solutions.

SELMAR SCHÖNLAND

Botanic Garden, Oxford, December 18

The Recent Weather

MY barometer, at 250 feet above sea-level, fell to 28·20 at 5 a.m. on December 8, and to 27·82 at 8 p.m.

Birstal Hill, Leicester, December 18 F. T. MOTT

I GATHER from your notice of the great storm on the 8th that readings of the barometer taken during its passage across the country will be of some interest. I therefore place at your disposal copies of the records made at Belvoir Castle. An indication of an approaching storm was given by a falling barometer on the 6th, its reading at 9 a.m. on that day being 29·380. The depression increased on the 7th, reaching 28·960; at 9 a.m. on the 8th it had fallen to 28·200, and then went down rapidly, until at 9 p.m. it reached its lowest point, 27·800, the lowest I have registered at this place during a period of thirty-two years. During the 8th the wind was strong from the south, amounting to a gale, and was accompanied with rain, 0·60 being recorded, but it was less violent than the indications of the barometer led me to expect. That the pressure was less intense here than in the storm on October 14, 1881, was evidenced by the escape of timber-trees; some 400 to 500 were blown down in 1881, and not half a dozen in the woods adjacent to the Castle on the 8th. Belvoir Castle is in the northern division of Lincolnshire, about twenty miles east of Nottingham. The height of our station, but not of the Castle, is 237 feet, lat. 52° 53′ 39″·9 N., long. 0° 3′ 7″·4 W.

WILLIAM INGRAM

Belvoir

Electrical Phenomenon

I BEG to inclose extract from a letter just received from a young friend at Yloilo, and shall be glad if you will insert it in your next issue. Some of your readers may have further information respecting this interesting sight. THOMAS HIGGIN

Ethersall, Roby, Liverpool, December 15

"*Yloilo, October* 1, 1886

"Last night a most extraordinary phenomenon was visible in the heavens. About 9 o'clock the sky was perfectly clear, all the stars visible, but no moon, when suddenly the whole heavens were lit up as if by electric light, a very large globe of fire became visible (about the size the moon appears when full) and floated slowly northwards. I was in rather a bad position for seeing where it actually went, a house being between me and the horizon. This ball was followed by smaller ones, which were close to the big one, and gradually got smaller, till they appeared like falling stars, only they went much more slowly."

Electricity and Clocks

WOULD any of your readers aid me in carrying out this idea: To make the works of a small striking clock strike the hours on a large bell by an electrical connection. T. WILSON

Rivers Lodge, Harpenden, St. Albans

BOTANY OF THE AFGHAN DELIMITATION COMMISSION

WHEN, in 1884, it became known that the Government intended sending a Commission to settle the boundary of North-Western Afghanistan, representations were made to the Marquis of Ripon, then Viceroy of India, that it was desirable in the interests of science and commerce that a naturalist should be attached to the staff, and Brigade-Surgeon Aitchison was accordingly appointed in that capacity. Certainly no better choice could have been made, at least as far as botany was concerned, because no other person had the practical knowledge of the vegetation of the region possessed by Dr. Aitchison, who, moreover, is unsurpassed as a collector. As long ago as 1859 he began collecting plants in the Punjab, the flora of which he fully investigated; and later he collected in Scinde and some parts of Kashmir; but this was all done during his leisure hours. In the winter of 1878 he accompanied the troops under the command of General Sir F. Roberts in the advance on Kuram, and subsequently he was attached to the force as botanist, and commenced operations in April 1879. Botanists of all countries know full well what excellent and extensive collections he made during that and the following year, for, with assistance from the Government of India, the results were promptly published by the Linnean Society. Large and interesting as those collections were, the present equals them in extent and exceeds them in importance, inasmuch as Dr. Aitchison paid special attention to the investigation of the many

vegetable products of the Perso-Afghan region which are articles of commerce with India and other countries. Much uncertainty existed respecting the plants yielding some of these drugs, dyes, and other substances, and no more welcome contribution to botanical knowledge could be made than the removal of this uncertainty.

The Commission left Quettah in September 1884, taking a south-westerly direction as far as Nushki, and thence the course was north-westward across Northern Baluchistan to the Helmund River, which was touched in about 63° E. long. This section of the journey produced little, as the country is very barren and the season in which it was traversed the worst of the year for botanising. Nevertheless a few interesting things were picked up, notably ripe fruit and seeds of *Stocksia brahuica*, which were previously unknown. The fruit, or seed-vessel, is an inflated capsule, similar to that of the Chinese *Koelreuteria*, near which *Stocksia* is placed, and so brightly coloured that it bears a name equivalent to "mountain peach."

That part of the journey from the Helmund northward to Kuhsan, a little to the north-west of Herat, was accomplished at the rate of twenty miles a day, therefore there was little opportunity for collecting. Indeed the fatigue attending the travelling was so great that frequent dismounting to secure specimens of natural history was out of the question. In spite, however, of all drawbacks and difficulties, specimens of about one hundred species of plants were dried; and this collection was despatched to India, by way of Herat and Candahar, where it arrived in a rotten condition, having apparently been immersed, probably in crossing some stream, during the transit. The small collection made in Baluchistan had in the meantime reached Kew safely.

The main collection of dried plants, consisting of about 800 species in 10,000 specimens, was made in an irregular tract of country lying between about 59° and 64° of longitude and 34° and 37° of latitude, with Herat near the south-eastern, and Meshed near the north-western limits. This collection was the result of one year's work; yet it by no means represents the entire flora of the area in question, partly in consequence of the difficulties attending the daily transport of collections constantly increasing in weight and size, and partly on account of the necessity for keeping with the main party. These contingencies, rather than the resources of the country, determined the extent of the collection. Thus, for instance, Dr. Aitchison rarely reached an altitude of more than 5000 feet, so that he collected no portion of the vegetation of the upper zone of the country. However, as the mountain flora is of more purely botanical interest, while that of the plains is of special commercial importance, on account of the number of economic plants it contains, its absence is, from the economic point of view, the less to be regretted.

At present the collection has not been fully worked out; but it is estimated that it comprises about a hundred species previously unknown to science, besides largely supplementing the material in herbaria of many obscure plants. Its principal value, however, as already mentioned, lies in the number of usually very complete specimens of economic plants and their products.

Foremost in importance, and the characteristic and dominating feature of the vegetation of the plains, are the *Umbelliferæ*. Some of these are of gigantic size, for herbs, and several of them yield valuable gum-resins, known in commerce as gum ammoniacum, gum galbanum, asafœtida, &c. A special paper on these plants was read by Dr. Aitchison on December 8 before the Pharmaceutical Society, therefore it would be superfluous to enter into details here. Early next year will be published a full and illustrated Report on the whole collection, in which prominence will be given to the economic plants: such as have not previously been figured, or only inadequately figured, will be selected for illustration. Remarkable among the *Umbelliferæ* not known to yield gum-resins are *Ferula oopoda*, Boissier, *F. suaveolens*, Aitchison and Hemsley, and *Dorema serrulatum*, Aitchison and Hemsley. The first we have identified with a described species, though the specimens are very fragmentary, and the description incomplete. It is a most singular plant, in which the bases of the cauline leaves are developed into large circular bowls, through a succession of which, gradually smaller upwards, the stem passes. The largest of these bowls are as much as a foot in diameter, and about two quarts in capacity. From his investigations on the spot, Dr. Aitchison is of opinion that these bowl-like expansions of the petioles do not serve the plant as reservoirs of water: possibly they may prevent the ascent of insects which infest and consume the fruit of many of the Umbelliferæ of the region. *F. suaveolens* furnishes a kind of sambal, and the *Dorema* is a very distinct new one. These *Umbelliferæ* form very beautiful miniature forests; *D. glabrum* growing as much as 10 or 12 feet high.

Among other economic products whose sources have been traced and good specimens of the plants secured, a yellow dye, largely imported into India, may be mentioned. It is furnished by an apparently undescribed species of *Delphinium*. Another dyeing material turns out to be the roots of a species of *Prunus* (*P.* (*Cerasus*) *calycosus*, Aitchison and Hemsley), remarkable in being apetalous; the petals being replaced by the coloured petal-like calyx-lobes. *Pistacia vera* Dr. Aitchison regards as undoubtedly indigenous in this region, and numerous other interesting facts of the same nature will be described in his Report.

In conclusion, it may be mentioned that Dr. Aitchison succeeded in bringing home his extensive botanical and zoological collections by way of the Caspian and Black Seas, in an admirable state of preservation. Of course, it will be understood that there is no difficulty in drying plants in Afghanistan and Persia. In fact, they are likely to get too dry, and consequently break and crumble to pieces in transport, especially when, as in this case, they are carried on camels and mules day after day; and it was only by the most careful and elaborate packing that the plants were prevented from being rubbed into powder.

W. Botting Hemsley

DEPOSITS OF VOLCANIC DUST

In several recently-published papers,[1] Prof. George P Merrill has called attention to some interesting deposits which are shown by careful microscopic study to consist of volcanic dust.

Samples sent by Mr. Zahn, of Nebraska, to the United States National Museum were supposed to be "geyserite," and similar materials are said to occur in Western Kansas, Eastern Colorado, and Wyoming. They were found in small patches or in beds up to four feet in thickness, covered by a considerable thickness of other deposits. Of this material Prof. Merrill writes as follows:—

"A glance at the samples was sufficient to convince the writer that they were not the result of geyser action, but were probably of volcanic origin. One was of almost chalky whiteness, very finely pulverised, and of a sharp, gritty feeling when rubbed between the fingers. The second was gray in colour, slightly coarser, and had, even to the naked eye, a flaky appearance. Submitted to microscopic examination, both samples were found to consist almost entirely of the minute particles of amorphous glass, such as originate from the fine pulverisation of a glassy pumice, with only occasionally a fragment of a greenish mineral that was apparently hornblende."

[1] "On Volcanic Dust from South-Eastern Nebraska" (*Proc. Nat. Mus.* vol. viii. 1885, p. 99; "Notes on the Composition of Certain 'Pliocene Sandstones' from Montana and Idaho" (*Am. Journ. Sci.* vol. xxxii. 1886, p. 199).