

the fact that in 1770—1773, Lagrange published an elaborate memoir at Turin under the title "Mémoire sur l'utilité de la Méthode de prendre le Milieu entre les resultats de plusieurs Observations," &c. *Vide* "Œuvres de Lagrange," edited by J. A. Serret, vol. 2.

I have never seen any notice of this memoir except a translation of a part of it into German by Encke, published in the *Berliner Jahrbuch* for 1853. Thus in the abstract of a memoir by Mr. J. W. L. Glaisher, given in the notices of the Royal Astronomical Society for April 1872, the name of Lagrange does not occur.

I think that the English mathematician, Thomas Simpson, busied himself with this problem about 1750, but I am not able to refer to his works.

ASAPH HALL

Washington, May 22

### The Volcanoes of Central France

AN unlucky error, perhaps mine, in the letter on the "Volcanoes of Central France," p. 80, will quite prevent any reader finding the paper I mentioned of May 1865, which, instead of being in the *Gentleman's Magazine*, was in the *Englishman's Magazine*, a short-lived periodical, begun and ended, I think, with that year. As your two correspondents, Prof. Corfield and the Rev. Mr. Webb, like the writer of that paper, repeat the late Dr. Daubeny's most marvellous "conclusion" that there might have been nothing more eruptive in the phenomena than "bursting out of flames" from earthquake fissures, and even that the fires mentioned by Sidonius and Avitus might be "domestic conflagrations," may I briefly indicate the grounds that make these suppositions to me incredible? These fires, as named in the portions of each document that I have translated—quite distinct from the conflagration of some public building on the Easter festival of a previous year, which both writers afterwards relate at greater length as an earlier and less known case of successful prayer by Mamertus, the memory of which had encouraged him under these "prodigies" and "portents," the *ignes* (not *incendia*) that both writers make a chief or the chief part of the "terrors"—(Sidonius, indeed, names the earthquakes before them, but Avitus twice over puts the fires first)—these were *crebri* and *assidui*, continual for two or three years, yet not a word of what they fed on or what valuables they destroyed, and they were only *sæpe flammati*. Their being so sometimes is plainly named by Sidonius as an unusual and greater portent. Now, I never heard of any "domestic" fires that were not "*flammati*," whereas volcanic eruptions, even severe, seldom if ever involve flame truly so called, though their strongly illuminated smoke may often by night be mistaken for flames, and has led them to be called in extreme cases, as Sidonius here said, *sæpe flammati*. He adds that when thus "*flammati*" they did, or rather threatened to do, the only mischief named as even apprehended from them at the capital, the endangering frail roofs by a load of ashes thrown over, *superjecto favillarum monte*. Now, surely this is not an effect of any ædile conflagrations however often repeated (a repetition that would anywhere have been regarded rather as suspicious of incendiarism than as "prodigious" and preternatural). Nor would any such accidents lead Avitus to ask in his sermon to those who remembered all, "Who would not dread the Sodomitic showers?" Again, Mr. Webb conceives that earthquakes might not only drive the wealthier part of the population out of the city, "but, as it would seem, the beasts into it!" I never heard of shocks producing so singular an effect as driving any living thing into cities or buildings, and cannot conceive what natural event could so drive them, unless what is here by both witnesses implied, "Sodomitic showers" of hot or cumbering *faville*. Such showers, which we know to be often carried, from eruptions involving no lava, scores or even hundreds of miles, in the direction of the prevailing winds, would be carried from any of the well-known cones of the Foréz or Vivarais, towards, or even far beyond, Vienne; and wild animals, fleeing north-eastward, would have no refuge but under roofs; and if private house doors were habitually shut (as now in England) might crowd into the colonnades (*fori latera*) of that capital city. This incursion of the wild deer, bears, and wolves into towns was so well remembered as to become, in the later chroniclers, Gregory of Tours, &c., dwelt upon among the main "prodigies" of the time, along with the earthquakes and burnings of buildings, though any other fires cease to be implied; and the reason of this is obvious on comparing their accounts.

They all copy one another, and the earliest, whose sole authorities were those two pompous and involved writers, mis-read them exactly as our moderns (except Sir F. Palgrave) appear to have done, confusing together the fires of the "prodigies," that led to the Rogation fasts with the earlier ædile conflagration at some Easter, said to have been prayed out by Mamertus, which occupies both the writer and preacher immediately after, and at greater length than these well-known "terrors" remembered by those they addressed personally.

The whole strikingly shows, as Sir F. Palgrave said, the fallacy of geological inferences from the "silence of history" (or what may be deemed silence) in times and places practically prehistoric, or at least preter-historic. He showed that, but for Pliny and a mere accident, we should probably have been as ignorant of even the Pompeii and Herculaneum eruption as of these equally attested ones. Again, the Spaniards would have preserved us no memory of the rise of Jorullo, in the very last century; and yet probably no part of Gaul in the generation when the Romans lost it was really more settled and populous than Mexico in its third century of Spanish rule. The only important colonies within moderate shower-range of the eastern volcanoes were Vienne and Lyons, the latter farther off, and not at that time a capital, indeed but little heard of in those early middle ages. And fires, not called damaging, only "prodigious" and terrifying to Vienne, and causing "Sodomitic showers" there, need not have been within a few miles, but far in the wilds, then hardly trodden, of its mountainous south-western horizon.

E. L. GARBETT

7, Mornington Road, N. W., June 1

### Temperature of the Deep Sea

WILL you allow me to ask, through your pages, if there be any rule for ascertaining the temperature of the sea at given depths below the surface? To practical electricians such a rule would be very valuable.

I will state a case. There is a submarine cable connecting two stations, A and B, 150 miles distant. The temperature at A is 75° Fah.; that at B, 68° Fah.; and the average depth at which the cable lies 120 fathoms: what is the average temperature of the cable?

If you could refer me to any work in which this point is treated I shall be obliged.

F.

### ENDOWMENT OF PROFESSORSHIPS

THE following correspondence between Professors H. E. Roscoe and B. Stewart, of Owens College, Manchester, and the Chancellor of the Exchequer, is published in the *Times* of Monday last:—

"TO THE RIGHT HON. ROBERT LOWE, CHANCELLOR OF THE EXCHEQUER.

"Owens College, Manchester, May 21, 1862.

"SIR,—In the *Times* of May 17 you are reported, at the presentation for Degrees at the University of London, to have pointed out 'how the endowment of Professorships naturally tended to make teaching inefficient (seeing that the revenues come in independently of the results of teaching), suggesting that those who had any money to spare for the advancement of education should rather make it available in the forms of Scholarships and Exhibitions.'

"While we gratefully acknowledge the many services which, as Chancellor of the Exchequer, you have rendered to the cause of knowledge, we yet feel most strongly that the above expressions are calculated to mislead, and that were your suggestions to be carried out, the result would be fatal to the higher education of this country.

"We therefore request permission to lay before you our own views on this most important subject. Writing from the very house once inhabited by Cobden, we feel proud to be connected with a city which was the birth-place of Free Trade; yet we feel equally privileged to form part of a very useful institution which never could have existed

except in apparent contradiction to the principles of Free Trade.

"That the foundation by the late John Owens of Professorships of Arts and Sciences in the midst of this great city was not thought by Cobden to be subversive of his principles is proved by the fact that he himself was one of the original trustees, yet this conclusion does not appear equally clear to all of his disciples.

"We are, in sober truth, utterly at a loss to conceive how the higher education of the country can be efficiently carried on without a moderate endowment of its Professorships. The necessity for such an education you yourself admit.

"A single example from our own staff, which, more or less, applies to other places and subjects, will render our argument clear. It is evidently of very great importance that in a place like Manchester the citizens should be taught by a master mind the principles of political economy, and they have been fortunate in being able to avail themselves of the services of such a man as our colleague, Professor Jevons. But, although here both elements of pecuniary success might appear to be present in an intelligent public and a first-rate teacher, the fact remains that without the (misguided!) endowment of our founder the few who attend his lectures could not have benefited from the teaching of Professor Jevons unless the fees of attendance had been enormously increased. Indeed, we question whether the great apostle of Free Trade himself would have ultimately met with success had he not first of all received some sort of protection and support.

"We are naturally led by the instance we have quoted to remark that endowments really tend to diminish the expenses of education, and, looking around us, we see that in University College and King's College (London), where there are no endowments, they cannot afford to give their education at so low a figure as is possible at Owens College and in the Scotch Colleges, where endowments exist.

"In the German Universities, again, where all the important Chairs are well endowed, the expenses of education are almost nominal. In Scotland the education is in some branches of a very high standard, and in others great improvements have recently taken place, chiefly in the direction of relieving the head Professors from the duty of teaching junior classes which pay, and of enabling them to devote their energies to senior classes which do not pay. Such, in Scotland, have been the effects of endowments. Again, with regard to Germany, we have never heard any complaints made of the inefficiency of the German Professors.

"We must candidly own that we were much surprised by your statement as to the advisability of simply founding Scholarships and Exhibitions, coming, as it does, from a distinguished Oxford man well acquainted with the present state of feeling in the older Universities. Is it not true that this feeling is strongly against the extension of the already too numerous Scholarships, Fellowships, and other incitements to study, and in favour of the application of these funds to increase the paltry salaries of the Professors?

"The excessive endowment of Scholarships appears to us to be objectionable, as an instance of unnecessary protection, where, by means of a hotbed regimen, young men are induced to enter a profession for which there is no subsequent career.

"While we admit that in a perfect state of society (unhappily still far distant) the laws of supply and demand may perhaps be applicable to all knowledge, yet we must point out that the teachers of the higher branches have too often now to create a taste for the commodity which they supply, and hence we believe that the moderate endowment of Professorships, such as exists in our own case, is essential to the progress of civilisation in this country.

"In conclusion, Sir, we cannot understand why endowment naturally tends to make teaching inefficient in

the case of a Professor of science or arts more than it does in that of a minister of religion or a statesman.

"Are they not all servants of the nation administering to its higher needs? The teacher of science or of the arts will, we venture to say, be no less conscientious and faithful to the true interests of a noble cause in teaching his class than the minister of religion in addressing his congregation, or the Minister of State in addressing his constituents.

"We are, Sir, your obedient servants,

"HENRY E. ROSCOE, B.A. (Lond.) F.R.S.

"BALFOUR STEWART, LL.D., F.R.S."

"11, Downing Street, Whitehall, May 23, 1872

"Gentlemen,—The speech which I made at the annual meeting of the London University occupied three-quarters of an hour, and was reported in a few lines. I never alluded to Professors, but spoke only of teachers, meaning those who do the drudgery or hard work of teaching, not those who are devoted to the investigation and inculcation of higher and more refined knowledge. I have the greatest respect for Mr. Jevons, and do not doubt that the endowment of his Chair is money well laid out.

"I also agree—indeed, I said—that the endowment both of Fellowships and Scholarships at Oxford and Cambridge is excessive; but I pointed out how hard the competition was for the London University, with strict examinations and hardly any endowment, against Oxford and Cambridge, with rich endowments and easy examinations. I added that in my judgment money was better spent in giving Exhibitions to young men, leaving them free to choose the place of their education, than in paying persons to teach them; since in the one case the inducement to the teacher to work was diminished, while in the other the student with money in his hand was sure to find the best teacher for himself.

"I am, Gentlemen, your obedient servant,

"ROBERT LOWE.

"I am an older Freetrader than Mr. Cobden, and am by no means prepared to assent to his views in all respects."

#### GLAISHER'S (HALL'S IMPROVED) RAIN GAUGE\*

IN the first paragraph of my "Notes on the Rainfall of 1871," which recently appeared in NATURE (vol. v., p. 481) your readers will probably have noticed certain reference to the above.

The improvement to which I refer consists of an *inverted rim* (similar to the rim or flange in which the receiver stands) fixed to the outside cylinder of the receiver, and made sufficiently large to admit of its dropping over the rim or flange, sometimes called "channel," fixed to the lower cylinder, *id est*, the one just mentioned in parenthesis.

The *inverted rim* is shown by a thick line on the right of the accompanying half-sectional diagram.

The reason that I suggested this addition was, that on one occasion, while registering the daily rainfall at Twickenham, during the winter of 1869-70, I was unable to take the receiver off, owing to the already existing channel being partly filled with water, which had frozen hard during the night.†

It is intended that water should be collected in the flange (Glaisher's) I have spoken of, and thus close the gauge against evaporation, scarcely a good idea theoretically, *certainly not practically*, inasmuch as the water

\* Vide *Scientific Opinion*, vol. iii. pp. 449, 450.

† In order to avoid the interference of houses and trees, my gauge was supported at this time on a bracket carriage, running in vertical slides from a staircase window to a point a few feet above the roof of my residence.