The Higher Ministry of Nature: viewed in the Light of Modern Science, and as an Aid to Advanced Christian Philosophy. By John R. Leifchild. (London: Hodder and Stoughton, 1872.)

MR. LEIFCHILD is already known as a careful writer on matters connected with economic geology; he now appears before the public in the avowed character of ambassador between the opposing forces of Theology and Science. This bulky volume of upwards of 500 pages appears to be a kind of commonplace-book of thoughts which have occurred to him in solitary wanderings; the title means to express that the author concerns himself with subjects higher than those which "subserve our present individual and collective interests." We must acknowledge that works of this kind, endeavouring to reconcile in detail the conflicting theories of theologians and men of science, are little to our taste; we suppose, however, they have their public; and in the case of the volume before us, the large type, wide margins, and handsome binding, are all in its favour. With this preliminary objection, that portion of Mr. Leifchild's work which comes within our scope—for the greater part does not—seems treated with considerable care and knowledge, and with a higher degree of impartiality than is usually to be met with in such works. The Darwinian doctrines of evolution and natural selection of course come in for some severe criticism; we are surprised that Mr. Leifchild should reiterate the superficial and often refuted objection that geology has not yet revealed a single fossil *in transitu* from one species to another, as if it were possible that geology should reveal anything but the successive connecting and connected links, which it has done, and is doing every day. Those who delight in speculations on the border-land between the natural and the supernatural will find much to interest them in the volume, and to such we commend it.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

Spectroscopic Nomenclature

YOUR columns were not long since opened to a discussion, rather long drawn out, on a point of nomenclature. They are now, as ever, open to all reasonable discussion on that most interesting aspect of Nature presented by the spectroscope. I cannot help thinking that some advance might be made if the faculties exhibited in the one were now brought to bear on the other. There seems to be a lamentable tendency in zealous but disorderly minds to pay as little attention as possible to those aids to reasoning—those signs of ideas, which ought to be current coin.

I do not in the least propose to myself to attempt to mount the breach just now. But I would fain challenge attention, and urge a fair amount of consideration, on some few points in which I have noticed very diverse methods of expressing the same thing. And in so doing I may find it necessary to give my voice in favour of one or the other. But it is not my object to advocate so much as to indicate.

Observations have recently been made of the sun during eclipse of a kind which, if not so novel as some think, is intensely interesting, and must be constantly referred to. I mean with a free prism. Now it occurs to me that it would be easy to reserve the spectroscope for that instrument which we have been accustomed to call such and to characterise these other observations as *prismatic*, as distinct from *spectroscopic*. It would then be known at the very outset that there was no slit. This would not prevent a juvenile disciple of Newton from repeating his prismatic examination of a chink, and getting his linear spectrum; it would only keep before him the origin and constitution of that spectrum in a way which the sole use of the spectroscope appears not to do. The prismatic and the spectroscopic methods of examining a luminous object are totally distinct. Thus the Poodocottah observations were of one kind, those at Dodabetta of the other; those at Bekul, of both. It is of no consequence, for this matter, where the prism is, it is the absence of the slit that makes the difference. Thus, for the purpose of illustration, I may allude to the planetary nebula seen *prismatically* unaffected in the midst of a star cluster turned into streaks. And the prominences seen in an open slit are to all intents seen prismatically. It is obvious that there is here a distinction of idea which may be advantageously fixed by a distinctive use of words. Let the spectroscope mind its own business, which is to make and examine linear spectra. The moment it ceases to do so it ceases to be a spectroscope.

This brings me to the next point. Since the prism does not require a slit,—on the contrary, is a very valuable tool, as we have seen, without,—it ought never to see *lines*, except as it sees other forms, *i.e.*, out lines. There is a confusion of ideas—rather, I should say, a contraction of ideas—in setting a prism to look for lines. It is the spectroscope which sees lines, the prism sees images, forms. It is an accident of the case if the form happens in any of its parts to be at the same time linear, and having its linear portion in a certain direction. Thus, when in a prismatic examination of the solar crescent immediately before eclipse, the cusps become linear—albeit curvilinear—there is a failure of grasp in speaking of the dark cusp-images as dark lines; or, at any rate, there is an opportunity lost of exemplifying the principle which pervades the whole of the phenomenon, and of fixing the prismatic idea.

The same kind of misuse of terms I have had occasion to point out on the occasion of the first prismatic examination of an eclipse, when what are now called, happily, zones, were unhappily and mistakenly called by the technical term "bands."

I now pass on to the confusion which exists in the nomenclature of lines. The subject fully treated would embrace the whole range of spectral analysis; but I must confine what I have to say to solar spectra.

In the early days of solar examination with the spectroscope, I made my venture, in the direction which I am now pursuing, and it failed. Ignorant that I was already distanced—no matter how or why—I suggested certain symbols for certain lines, foreseeing somewhat of what has come to pass. Aiming to avoid an affiliation which further knowledge might prove false, but admitting the great probability that the lines at C, F, 2796 (K) were really due to hydrogen, I would have called these solar bright lines α, β, γ, the hydrogen lines being already known as Hα, Hβ, Hγ; that which is now variously called "D_3," "D^3," "near D," or sometimes plain "D," I would have had known, in the same category, as δ. And other Greek letters expressed, and would have sufficed to express, as many more as the memory would require to hold. The venture failed, as I say; and considering that no little confusion has resulted, I cannot help thinking it a pity that it did. Soon after appeared a work on spectrum analysis, in which Hγ is ignored, and the bright solar line which corresponds with 2796 (K) and with Hγ is persistently called and identified with G, to the great scandal of the ghost of Fraunhofer and (I doubt not) the living Plücker. The blunder has often been repeated since, indeed I have seen it in NATURE more than once in the last few days. If it was not to have a Greek letter, at least it had a better right to be known as "2796 (K)" than has the coronal line to be called "1474 (K)." Failing that, it has been paraphrased, the shortest form being "near G." Surely it is time this were put right.

And now we have "1474." No one knows what the true position of that line is. The line 1474 (K) is an iron line, and it is to the last degree improbable that the coronal line is identical with it. The misnomer has carried with it, naturally, the idea that the source is iron. As this is an improbability of a higher order still—because there is evidence against it in the absence of a few hundred other iron lines—a false idea is in process of being fixed.

And all this arises, and much more will follow, from the laziness of mind, if I may so call it without offence, which adopts a name belonging to something already, instead of first reserving judgment, and giving it an independent standing with a name of its own.

Then there is the confusion of idea, and uncertainty in understanding exactly what is intended in speaking of the extension of the spectrum, and of position in it, as right and left, or left and right, as the case may be; or the confusion is avoided by the precise but cumbersome reference to degree of refrangibility, This is quite unnecessary. This is so exact an analogy between the *degree* of refrangibility and the *degree* of heat that no one