into a shape something like the pointed half of the bowl of a spoon. Another statement appears to me of questionable accuracy. The author notices the earth pillars on the southern slopes of the Eggishorn, describing them correctly, but saying of them, "Les pyramides des fées, aussi appelées 'blocs perchés.'" Surely this is an unwonted extension of the latter term.

The pamphlet, in short, is rather disappointing. It is beautifully printed on quarto pages with large margins, and is illustrated with three photogravures of glacier scenery, which would be improved by the omission of the human figures, for these by contrast look like negroes in mourning; but it tells us little that is new, and is a "popular" article rather than a scientific memoir.

T. G. BONNEY.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Panmixia.

PRIVATE communications which I have received from naturalists interested in this controversy, and from Mr. Romanes himself, have thrown light on the apparently irreconcilable difference of the views which have been expressed.

I think it desirable that an explanation should be afforded to the readers of NATURE.

When Mr. Romanes contends that cessation of selection leads to a dwindling in the size of a useless organ, he now tells me that he assumes that the mean size of the part in all born (what we may call the birth-mean) was smaller than the mean size of that part in those individuals surviving under selection. Hence the withdrawal of selection substitutes in the adult survivors the lower birth-mean for the former higher selection-mean.

Mr. Romanes had not specifically stated that he made this assumption.

On the other hand, I had—for the purpose of estimating purely and solely the result of panmixia and cessation of selection—assumed that birth-mean and selection-mean were identical, in which case the withdrawal of selection would, of course, not alter the mean.

To assume that birth-mean is smaller than selection-mean in a given case seems to me to be introducing causes other than panmixia or cessation of selection.

It is evident that cases are *possible* in which the mean given by selection is identical with the birth-mean—others in which it is *smaller* than the birth-mean, and others in which it is *larger*. Special causes of a complex character determine whether the ratio is one or the other. If we are to consider the effects of cessation of selection alone, apart from other causes, it seems to me that we must not introduce causes which affect the ratio of birth-mean and selection-mean; we must eliminate them altogether by assuming the ratio to be one of equality. Hence my conclusion that panmixia or cessation of selection alone cannot produce the dwindling of an organ.

If, however, we admit the assumption that the selection-mean is larger than the birth-mean, Mr. Romanes has my full concurrence in stating that cessation of selection leads to dwindling, and I am of course aware that, given that assumption, Weismann and Galton are of the same mind.

The point of interest therefore shifts. The question is, whether we are justified in assuming that in organisms generally in a state of nature the mean size of an organ or part in the selected survivors is larger than in all born, or, to put it fully, larger than would have been the mean size of the part in all born supposing that they had all reached maturity.

I do not think that we have data which warrant this assumption. It is, I think, certain that some cases must sometimes occur in which this is the case, and others in which the selection-mean-size is *smaller* than the birth-mean-size. It is not improbable that in well-established species there is identity of the two means. This is, however, a question which ought to be settled by observation—*not* of domesticated races, but, if possible, of wild forms.

It seems to me that this assumption is precisely what Mr. Darwin considered, and refused to make, so that he avoided attributing dwindling of parts to the cessation of selection. He says ("Origin," 6th ed., p. 401): "If it could be proved that every part of the organization tends to vary in a greater degree towards diminution than augmentation of size, then we should be able to understand how an organ which has become useless would be rendered, independently of the effects of disuse, rudimentary, and would at last be wholly suppressed." Mr. Darwin says, "If it could be proved." This is really the whole point. If the greater size of selection-mean than of birth-mean could have been proved, Mr. Darwin was ready to formulate the doctrine of dwindling by cessation of selection. But, apparently, it could not be proved then. It has not been proved yet. I do not think it at all impossible that it may be proved. The facts are as yet not recorded.

E. RAY LANKESTER.

May 10.

Bertrand's Idiocyclophanous Spar-prism.

IT is a good thing that Prof. Silvanus Thompson has brought the above prism to the notice of the Physical Society (see NATURE, vol. xli. p. 574); it is certainly remarkable that M. E. Bertrand himself has never thought fit to publish any description of his interesting invention. Perhaps it may be worth while to mention a fairly simple method of constructing the prism (which may easily have occurred to others besides myself, and) which has the advantage of requiring only two artificially-worked surfaces, and hence of interfering as little as possible with the natural rhombohedral crystal of Iceland spar.

Four plane, polished faces are required for the prism, which is, in fact, a four-sided parallelopipedon, having two opposite sides parallel to the optic axis, while the two others make an angle of 45° with it.

Now, since in Iceland spar the faces of the natural rhombohedron make angles of very approximately 45° (strictly, 45° 24′) with the optic axis, two of these faces can be utilized for the last-mentioned pair of prism-sides.

Take, then, a cleavage-rhomb of spar, about 1 cm. in thickness, and having edges about 4 cm. in length (Fig. 1); observing

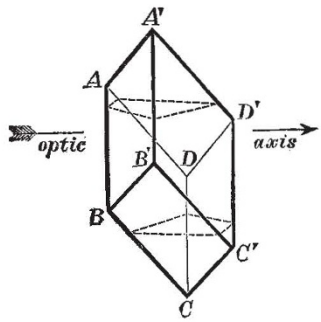

FIG. 1.

that both the face A B C D and the opposite one, A′ B′ C′ D′, are flat and free from blemishes (such a crystal is easily found, even in these spar-famine days). Grind away the solid angle A′ down to about the level shown by the dotted lines, working the face thus obtained so that it makes an angle of 45° with the natural face A B C D. Cut away the opposite solid angle C in a similar way, so as to make another plane, parallel to the first. Polish the two cut surfaces, and the prism is complete in all essential particulars.

Thus, if a beam of common white light is allowed to fall normally on one of the worked surfaces, A, Fig. 2 (which is a section of the prism), it will be (1) totally reflected at the natural face B (corresponding to A B C D in Fig. 1); (2) pass on through the crystal parallel to the optic axis; (3) undergo another total reflexion at the opposite natural face C; and (4) finally emerge through the second worked plane D. An eye placed close to D will then observe the well-known pair of ring-systems side by side, one set complementary to the other.

A very convenient source of illumination seems to be a lamp-