some trial radiant-points for any remarkable shooting-stars or large meteors of the two past years' expected maximum *Bielid* periods which may have been recorded.

Observatory House, Slough, A. S. HERSCHEL.
December 16th, 1899.

Is New Zealand a Zoological Region?

WILL you allow me to make one remark on the letter of Mr. H. Farquhar (p. 246), advocating an affirmative answer to the above question. It is this: Throughout the whole argument there is an assumption which vitiates it, namely, that the amount of resemblance of the New Zealand fauna to that of *Australia* is what alone determines its resemblance to that of the *Australian Region.*

Apparently, Mr. Farquhar does not believe that New Caledonia and the New Hebrides belong to the Australian Region, otherwise he would not adduce the fact of the land-shells of New Zealand being related to those of the above-named islands as an argument in his favour; and if these are omitted, then must New Guinea be also omitted. And if Australia by itself is to become a "Zoological Region," New Guinea and its surrounding islands must be also a "Region," the Central Pacific Islands another, and the Sandwich Islands yet another! This indicates the difficulties that arise if the Australian Region, as originally defined by Dr. Sclater and myself—and which I still hold to be far more natural than any subdivision can make it—be rejected.

ALFRED R. WALLACE.

Molecular Structure of Organised Bodies.

PROF. VINES, in his "Physiology of Plants," says that the molecular structure of cells can only be inferred from their properties, and that a correct conception of this structure is essential for a proper comprehension of cell growth. In the same work the author also states that Naegeli argues: "Since the optical properties of these organised structures are apparently not dependent, like those of a crystal or a piece of glass, upon the relative position of their constituent particles, they must be inherent in the particles themselves. Each micellæ, then, possess the optical poperties of anisotropic crystals. Naegeli concluded, therefore, that the micellæ are crystals."

Naegeli's micellæ theory rests almost entirely on the failure of any effort to temporarily destroy the anisotropism of organised structure. Obviously, if it were possible to so act on or swell a vegetable fibre that its anisotropism were destroyed, and that this anisotropism returned after the treatment were discontinued, Naegeli's theory, as far as it relates to the optical properties of micellæ, would fall to the ground.

It is well known that organised structures cease to be doubly refractive at the moment when their organised structure is destroyed. This is usually explained by saying the micellæ are at the same time disintegrated.

As far as I am aware, it has never been shown that this property of double refraction, common to organised structures, can be destroyed by suitable swelling, and restored again when the body returns to its original condition. I have been able to do this, in the case of cotton fibre, and it seems to me to give the *coup de grace* to Naegeli's theory.

I take it that if in one instance the anisotropism of organised structure can be temporarily destroyed, it is a correct inference, that to do so in every case only requires a suitable medium; which will reduce the strains to a necessary degree without the destruction of the physical form of the organised structure.

In the course of some investigations on the destruction of nitro-cellulose fibres, by means of solvents, I observed that in one particular case the double refraction disappeared long before the physical structure, and that on getting rid of, or diluting the solvent, the anisotropism returned. It is because I think this observation will be of interest to biologists I am troubling you at length.

It is well known that on converting fibrous cellulose into nitro-cellulose, the fibres retain their optical properties as regards polarised light. Nitro-cellulose, however, has a very wide range of solvents, and the examination of organised fibres when treated with solvent, becomes very extended.

Most nitro-cellulose solvents, such as acetone, nitro-benzene, the ethers, &c., do not lessen the anisotropic properties. The fibres may be swollen to twice their diameter, but still polarise light, until their physical structure is quite gone. This is not so, however, if nitro-cellulose fibres are acted upon with a mixture of acetone, benzene and ethyl alcohol. With this solvent the nitro-cellulose becomes gelatinised, and the anisotropism disappears, yet on examination the fibres are seen to be present in great abundance. These isotropic fibres can be given their double refractive properties again, by diluting the solvent with excess of alcohol or benzene.

The accompanying photographs show this action very well.

Nitro-cellulose was prepared from cotton-wool, with large excess of acids, so that there should be no unnitrated fibres present. The resulting nitro-cellulose was practically all of the

FIG. I.

insoluble variety, and contained $13\cdot3$ per cent. nitrogen. It wa completely soluble in excess of acetone, and contained no cotton fibres.

Some of this nitro-cellulose was treated with ten times its weight of a solvent consisting of:

6 parts benzene
3 ,, alcohol
2 ,, acetone

and allowed to stand in a stoppered bottle twenty-four hours, a jelly resulted.

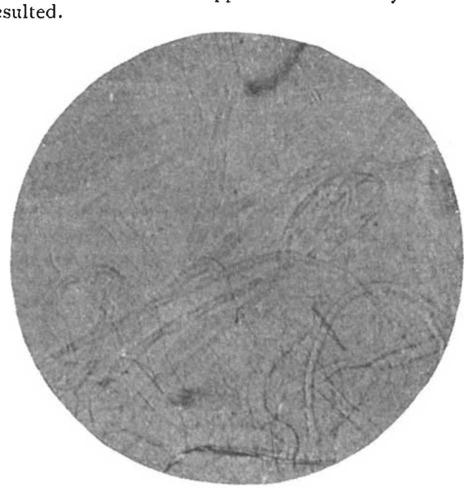

FIG. II.

Figs. I., II. and III. are from a little of this jelly, mounted with two crossed cotton fibres to fix the point of view, and give an object to focus and develop. The three photographs are taken from the same slide and the same point of view.

Fig. I. is a view under crossed nicols of the jelly, and taken immediately after mounting. It will be noticed that the object shifted slightly during exposure.