

has a duration of four thousand years; men are fond of recording wonders; yet never has a useful and persistent human mutation been recorded.

Judging, then, from crucial examples, (1) natural varieties have evolved by way of fluctuations, but artificial varieties in great measure by mutations; (2) there is no Mendelian segregation, but only Mendelian reproduction; (3) blending is universal; and (4) apart from variations (including the results of blending), like, always and necessarily, begets like when parent and child develop under like conditions of nurture.

Surely it is evident that if we use precise language (as Darwin tried to do), and bring all the available evidence into court by means of crucial examples (as Darwin did), the dust which Neo-Lamarckians, Neo-Darwinians, and the rest of the sects have flung into our eyes will be washed away, and our very great man will come into his kingdom again.

G. ARCHDALL REID.

#### Methods of Improving Visibility.

THE observations of Prof. C. V. Raman (NATURE, October 20, p. 242) on a method of improving the visibility of distant objects by the elimination of reflected light by means of a Nicol's prism placed in the eye-piece of a telescope are certainly interesting, but at the same time they are thoroughly well known, and the idea of increasing the visibility by the elimination of polarised light has received a great deal of attention lately. During the war a considerable amount of experimental work was carried out by the Admiralty in connection with fog-penetration and the beamless searchlight, both of which dealt with polarisation phenomena. It was, however, found advisable to substitute for the Nicol's prism as used by Prof. C. V. Raman a few plates of plain glass placed obliquely at a suitable angle across the axis of the particular instrument, since it is extremely difficult to make really large Nicol's prisms, in addition to which the actual absorption by Nicol's prisms is rather excessive. The matter was also taken up by the late Sir William Crookes, and formed the basis for lenses cut from quartz crystals at right angles to the principal axis, thus utilising the rotary polarising effect of this material. I have lately been using tourmaline for obtaining a similar effect, and I have found that a very thin plate of tourmaline cemented as a semi-lens on to an ordinary pair of spectacles is best for this purpose.

Tourmaline is a mineral that has found a great deal of application lately, and particularly during the war in connection with the piezo effect, in the apparatus used for the detection of submarines and submarine-sounding, and is, in consequence, fairly abundant. For this purpose the plates of tourmaline are cut perpendicular to the vertical axis, but the maximum polarising effect is obtained from plates cut parallel to this axis. Thin plates of this material, when so cut and fixed into the spectacles as mentioned, give an effect the benefits of which can only be realised when put to the actual test. Thus, for example, when fishing, the injurious glare from the water is entirely eliminated. At the same time the eye is able to penetrate the water to considerable depths. This fact will, of course, be appreciated by those engaged in the study of pond-life.

A further application is the manufacture of spectacles for invalids and others residing at the seaside, whereby, again, the glare of the water is almost entirely eliminated and the delightful tone of the tourmaline is very restful to the eye. In photography a further application consists in using a sheet of

tourmaline as a light-filter, whereby reflection, and in particular that from shining objects, is largely eliminated; and while it is not possible to take photographs of water directly facing the sun, many pictures which are otherwise impossible can be taken by means of this screen.

A final application, and one with which my experiments originated, was the examination of photomicrographs, which, owing to their delicate nature, were of necessity mounted below a sheet of glass. The continued observation of these objects was found to be a very tedious process owing to the brilliant light required and the consequent reflection from the glass. This reflection was again eliminated by the tourmaline. The plates of tourmaline must, of course, be so mounted that the vertical axis is placed vertically in the spectacles.

These applications have already been provisionally protected at the Patent Office, but up to the present I have found no firm that will take up the manufacture of such glasses. I am confident, however, that a very useful industry awaits the firm with the necessary enterprise.

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Marlborough College, Wilts, October 28.

PROF. C. V. RAMAN's suggestion (NATURE, October 20, p. 242) for improving visibility at sea was put forward by me some years ago in "Elementary Seaman'ship" (Griffin and Co.), and is useful not only for objects above the surface, but for those—like coral-reefs—some little distance below the surface. In the last instance, when there is a slight ripple on the surface of the water it is often difficult to detect them even when navigating with the sun astern. The use of the Nicol prism clears up in a great measure this difficulty.

DAVID WILSON-BARKER.

Flimwell, October 28.

#### Penial and Genital Setæ of *Lumbricus terrestris*, L., Müll.

ON p. 172 of Prof. O'Donoghue's "An Introduction to Zoology for Medical Students," reviewed in NATURE of August 11, it is stated that in *Lumbricus herculeus* (the name is a synonym of *L. terrestris*) "in the fifteenth segment the two pairs of ventral setæ lying close to the male external aperture are modified to form the penial setæ." In Bourne's "An Introduction to the Study of the Comparative Anatomy of Animals," vol. 2, pp. 19-20 of the fifth edition, 1912, it is said that in the same worm "the chætæ of the clitellar region differ from those of the rest of the body, being finer and nearly straight, with hooked inner ends. There is also a pair of modified chætæ in somite 15." Borradaile, in "A Manual of Elementary Zoology," p. 217 of the third edition, 1920, says, "The ventral setæ of the clitellum, of the 26th and of the 10th to the 15th segments are straighter and more slender than those of other segments, which are stout and somewhat hooked. The modification is in connection with the use of the setæ of the 26th segment during coition, and of the other straight setæ during the formation of the cocoon in which the eggs are laid." Parker and Haswell, in "A Textbook of Zoology," p. 455 of the second edition, 1910, state that "the setæ in the clitellum, and those in the neighbourhood of the genital apertures, are much slenderer than the rest."

Systematic writers, however (to whom modifications in the form of the setæ are of importance as furnishing specific characters), do not appear to have recognised the presence of penial setæ in segment 15 of *Lumbricus terrestris*. Thus Beddard, in "A Mono-