## LETTERS TO THE EDITOR.

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### Transport of Molluscs by Waterfowl.

YESTERDAY (March 19) I witnessed an interesting instance of the capacity of quite small waterfowl to carry aquatic molluscs of considerable size. A pheasant-tailed Jaçaná (*Hydrophasianus chirurgus*), which was at large, with partially clipped wings, on the tank in the Museum grounds, had attached to one of its feet a fresh-water mussel well over an inch long, which remained there for about an hour and a half to my knowledge.

The Jaçaná, although quite a small bird, only about the size of a turtle-dove, nevertheless flew quite as well with this burden as without, covering as much as sixty yards at a flight, with its legs naturally extended behind.

Of course the partial clipping of its wings hindered it from rising high and going off altogether; but had it not been thus handicapped I am sure it could have transported its burden for miles if forced to leave the tank.

I have had more than one specimen of this Jaçaná in which a toe, or part of one, was missing, an accident which might possibly be due to the pinch of a bivalve behaving as described above. A fish or turtle might more probably be guilty of such amputation, although the Jaçaná's slim green toes look very like weed-stems when it is swimming, and the resemblance might be protective so long as the bird floated quietly without paddling.

I find from my notes that six years ago I observed one of some Tree-ducks (*Dendrocycna javanica*) which I was then keeping on this tank, with what appeared to be a big water-snail remaining attached to its toe for some time.

Indian Museum, Calcutta, March 20. FRANK FINN.

### Preservatives in Milk.

I HAVE been astonished to learn from your English Government Blue-book about the scandalous, unnecessary and unnatural practice prevailing in England of putting drugs into milk for purposes of its preservation—a wrong and unnecessary act of adulteration. It is amazing that it should be pursued and for one moment permitted. Your highly appreciated publication will, I am certain, feel the necessity of defending nature's produce. All milk drawn from healthy cows is yielded sterile. The remedy against the use of drugs and late-refrigeration, &c., is to purify and preserve the milk in its natural sterile condition by quickly—on drawing it—aërating, cooling and refrigerating it down to the non-decomposing and non-fermenting temperature of 50° Fahrenheit or lower at the farms and rural factories before being sent off from the country, and having it conveyed, so chilled, into ordinary cold stores—the same as doubtless most of your butchers have, and with less reason—at the town dairy premises. Meat is so preserved and so conveyed, I understand, in England, and it is not nearly so susceptible to decomposition. The totally unnecessary consequences that are revealed by your recent official inquiry are scandalous. Dairy men evidently—and must constantly—find the milk they have to sell, not only in an advanced, but also dangerous state of fermentation, which, in self-interest, they can only, however, temporarily suppress by the processes of drugging, late-refrigeration and other disorganising practices, through neglect in the country of purifying and cooling the milk at once when drawn warm from the cow. There are plenty of simple portable appliances to use for the purpose, so why should not English farmers have them, and rural ice depots near railway stations for refrigeration of milk, as well as Continental, and notably American, country milk producers? Your farmers and milk distributors certainly need reform in their system, for you cannot possibly compete in quality of milk, butter or cheese with other countries where immediate purification by the practice of quick aëration and refrigeration of milk is pursued down to a non-fermenting temperature as soon as possible after being drawn from the cow. I have heard of a new method of milk preservation based on the infusion of gases (oxygen and carbonic acid) into milk. Whatever may be the merits of this new process I am not prepared to say, but if drugs are to be prohibited, this infusion of gases should be swept away with the rest of the doctoring methods of milk. By all means let the prohibition be utterly complete, and thus allow the consumer to drink nature's production and not chemical compounds. In this country (Belgium) the use of any drugs has long been prohibited, and our milk is superior and never complained about, and were drugs permitted a general protest would result. L. J. SERIN.

Mont-sur-Marchienne, Charleroi, Belgium.

[Mr. Serin does not seem to be aware of the fact that the Departmental Committee on the use of Preservatives in Food condemned the use of preservatives in milk. (See NATURE, December 5, 1901, p. 102.)—EDITOR.]

### Rearrangement of Euclid Bk. I., pt. i.

AS very widespread attention is being paid to the question of reform in geometrical teaching, and as a good many teachers are convinced that in this country the reform must be in the direction of a modification of Euclid's elements, I should be glad to elicit opinions as to the following rearrangement of the theorems in the first part of Book I. (to prop. 32, inclusive).

First the theorems relating to angles made by two intersecting straight lines, viz., I. 13, 14, 15.

Then those relating to parallels, viz. 27, 28, 29, 30. Prop. 27 can be proved by superposition; for, if a transversal EF crossing two lines AB, CD makes the alternate angles equal, the portion BEFD can be exactly superposed on CFEA, so that, if AB, CD meet towards B, D, they must also meet towards C, A, which is impossible, $\therefore$ AB, CD are parallel. I. 28 follows from I. 13; and 29, 30 from Playfair's axiom.

By taking these propositions early, we are enabled to rearrange the propositions respecting triangles in such a way that connected propositions are juxtaposed, which is of great assistance to the memory and to the growth of orderly ideas in the pupil's mind. The natural order would be to take those propositions which relate to a single triangle and then those which deal with the comparison of two triangles.

First, the fundamental theorem I. 32, with its corollaries, including I. 16, 17, and Euclid's axiom (which is the converse of 17).

Then 5, 6 with their extensions, viz. 18, 19, to which might be added the corollary that the perpendicular distance of a point from a straight line is the shortest.

Then 20, 21.

Then follow the *congruence* theorems 26, 4, 8, to which might well be added the conditions for the congruence of right-angled triangles in what would otherwise be the ambiguous case.

And lastly 24, 25, which are extensions of 4, 8 in much the same way as 18, 19 are extensions of 5, 6.

If to these are added the simple *locus* theorems regarding the locus of points equidistant from two given points, and the locus of points equidistant from two intersecting straight lines, the whole forms a well-rounded-off "First Part" of the deductive course.

The only innovation suggested here is the early introduction of the theorems relating to parallels. The effect of this is to render the course much more compact and orderly than is possible if the theory of parallels has to be approached through I. 16.

It is on the desirability (and the possibility, from the point of view of examinations) of this innovation that I earnestly desire opinions.

There is one other modification tacitly adopted in the above arrangement, and that is the cutting out of "constructions" from the deductive course. I believe this requires no defence. It is the first and greatest necessity, for any real improvement in geometrical teaching, that the course of constructions should be a parallel course to that of theorems, and not part of it.

Coopers Hill, April 2. ALFRED LODGE.

### Protoplasmic Networks.

IN a presidential address delivered at Yale (*Contrib.*, Botanical Laboratory, Univ. Pennsylvania, ii., 1901, p. 183), Prof. Macfarlane announces his discovery of a "linin and chromatin" network continuous with the nuclear chromatin distributed through the protoplasm of plant cells. Certain other observations lead Prof. Marfarlane to suggest that these run from cell to cell, so that there is continuity, not only of cytoplasm, but also of the "hereditary substance."

It is now some three or four years since I discovered fibrils, hovering upon the limits of vision aided by the best oil-immersion lenses, which ran from nucleus to nucleus in the retina of vertebrates. The first hints were slowly followed up, and I have now established the fact that all the nuclei of the retina are connected together, by fibrils coming from the intra-nuclear networks, into a nuclear system; that is, into a reticulum of which the individual nuclei are the nodes.

As a student of the retina, my first interest in this nuclear system pervading the cytoplasmic framework turned upon the fact that it might supply us with the hitherto undiscovered link between the retinal nerve strands and the rods. This I have found to be the fact; the full details are described in a paper which I hope shortly to publish.

The importance of this discovery cannot, however, be confined to the retina. Not only have I succeeded in discovering similar inter-nuclear connecting fibrils in other tissues, *e.g.* in the brain, but the simple fact that in the retina they supply the paths for the nerve stimuli shows that they must lie somewhere nearer the basis of the morphology and physiology of protoplasm than we have hitherto succeeded in reaching.

In discussing the nature of this nuclear network and its bearing upon the "cell" doctrine, I have described a number of observations tending to show its relations, on the one hand, to the chromatin stored up in the nuclei, and, on the other, to the cytoplasm which forms the supporting framework of the retina. I have, further, endeavoured to show that it brings fresh light upon more than one difficult problem, for example, on the morphology of nerves and the nature of their peripheral terminations.

Several lines of argument made it almost certain to my mind that a similar nuclear network must also exist in plants, and I have little doubt but that Prof. Macfarlane's suggested continuity of the "hereditary substance" from "cell" to "cell" will ere long be demonstrable under the microscope.

I have suggested the term protomitomic as applicable to this nuclear system, that being as nearly as possible simply descriptive. The nuclear filaments, it is true, seem to supply some of the requirements of Strasburger's hypothetical kinoplastic fibrillar system. But the term kinoplasm, which I should have preferred using, has already passed into current use for structures which may have little or nothing to do with this nuclear connecting system, a preliminary announcement of which I have felt justified in making since my attention was called to Prof. Macfarlane's address.

HENRY M. BERNARD.

Clapham, S.W., March 25.

## Beechen Hedges on Elevated Ground.

VISITORS to Buxton, who are observant of trees, have been exercised during the winter by noticing how the smaller beech trees, where isolated, and especially the beechen hedges, where unsheltered, have maintained their foliage through the winter, contrary to the habit of deciduous trees.

The spray enclosed was plucked, this morning, from a tree about 12 ft. high, one of a number similarly clothed, bounding the western side of the pavilion grounds where exposed to the force of the storm winds, and standing at the elevation of the town, about a thousand feet above the sea; and, in the park close at hand, are long lengths of beech hedges exhibiting this appearance. In Ashwood Dale, half a mile away and well sheltered, the larger beeches are as leafless as the lime and the ash.

I see nothing in Kerner's "Natural History of Plants" to account for this departure—this tree being spoken of as constant in dropping its leaves—except the remark that the beech is most resourceful and to be regarded as a "weed" amongst trees, and calculated to oust others, where unhindered by human agency. Is this holding of the leaves, until pushed off by the growing points, to be regarded as a protective device in exceptional circumstances, and is this occurrence observable in young plants in similar elevated and exposed positions?

WM. GEE.

Barlboro' Cottage, Spring Gardens, Buxton, March 31.

## Meristic Variation in Trochus *Zizyphinus*.

ON recently examining a number of specimens of *Trochus zizyphinus* collected at Plymouth in September 1900, it was noticed that one specimen exhibited a peculiar abnormality, viz. the presence of two supernumerary eyes on the right side (Fig. 1). On the left side of the animal both cephalic tentacle and ocular peduncle were perfectly normal. The right cephalic tentacle was also normal, and the ocular peduncle of this side, though bearing three eyes, presented only a slight furrow indicating a partial division between the original eye and the two which are secondary and supernumerary (Fig. 2). Several cases of supernumerary eyes in Gasteropods have already been recorded, and in some cases (for example, *Patella*, *Littorina*) duplication of the eye is accompanied by duplication of the cephalic tentacle.

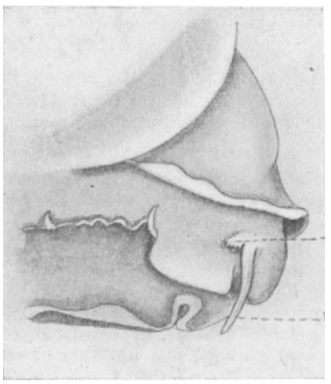


FIG. 1.—Head of abnormal specimen of *Trochus zizyphinus*, seen from the right side.

Double eyes have also been recorded in *Helix*, *Clausilia*, *Phidiana*, *Murex*, and *Sub-emarginula*[1]; in the latter, supernumerary eyes were found on both right and left sides, though in the majority of other cases they were present on one side only. It would thus appear that only double eyes have been so far recorded, and that the presence of three eyes on the right side of this abnormal specimen of Trochus is, apparently, unique. All three eyes are perfectly formed, each being provided with crystalline lens, retina, and optic nerve, thus all of them were, in all probability, functional during life.

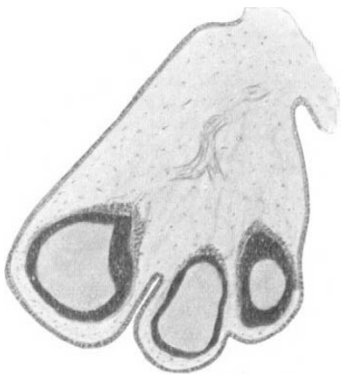


FIG. 2.—Longitudinal section of right ocular peduncle, showing the three eyes in section.

So far as can be made out from the examination of an unfortunately incomplete series of longitudinal sections through the right ocular peduncle, the innervation of the eyes is derived from a single optic nerve arising from the right cerebral ganglion. This nerve bifurcates, one branch going to the primary eye, the other branch again dividing into two, to supply the two secondary supernumerary eyes.

W. B. RANDLES.

Royal College of Science, London, March 25.

[1] For particulars and references, see Bateson's "Materials for the Study of Variation," pp. 279, 280.