

represent the blue ray that suffers most refraction of all the blue rays, and CEA the red ray which suffers most refraction of all the red rays.

It thus appears that of blue and red rays reflected from the sea at the same angle, the former may reach the eye of the observer and the latter not, because, though the refraction is sufficient for the blue it is not so for the red ray, and it will be lost in the upper air. Consequently the blue rays will appear highest, and the red lowest, the other colours occupying intermediate positions according to their refrangibility. It is evident that any of these rays may be reflected too vertically from the sea, and so not be refracted to the earth again, but a considerable proportion will be thus refracted, and as has been said, more vertically inclined rays of the blue than of any other colour.

When we consider the effect of rays falling to the left of C, the phenomenon becomes more complicated. The same refraction, dispersion, and reflection take place, but the rays after reflection will mostly fall short of A, and strike the sea at various angles, producing a great variety of colour. It is not necessary for the effect that both the blue and the red from the same pencil of light should proceed to A, although this is shown for the sake of simplicity in the figure. It is sufficient if we know that blue rays, on account of their greater refrangibility, must of necessity be the highest, and the red, on account of their least refrangibility, the lowest.

If the above suggestion as to the dispersive power of the atmosphere be admitted, it is probable that the question of the colour and scintillation of stars will be directly affected by it.

Little Bromley, Manningtree, July 12

R. ABBAY

Zoological Geography—*Didus* and *Didunculus*

MR. SEARLES V. WOOD will, I trust, pardon me if I again take exception to the terms in which (*suprà*, p. 301) he still writes of *Didus* and *Didunculus*. These two birds do not belong to the same group of *Columbæ*. The fact that certain authors may have included them under the designation of "ground-doves" is no proof whatever of their relationship, any more than it is of the relationship of either to any other birds so called—for instance those of the Neotropical genus *Chamaepelia*. I have studied pretty carefully the osteology of many forms of *Columbæ* with especial reference to their affinities. *Pezophaps* and *Didus* are of course nearly allied, though even these are not congeners. *Didunculus* is at least as distinct from them as from all other *Columbæ* with the possible exception of *Otidiphaps*, which last I have not had an opportunity of examining. Furthermore, I may remark that if Mr. Wood will but look at what has been published of the habits of *Didunculus* he will find that it is as much an arboreal as a terrestrial bird, so that the name of "ground-dove" is as unhappily applied to it as is that of *Didunculus* or its ridiculous translation, "Dodlet."

July 22

ALFRED NEWTON

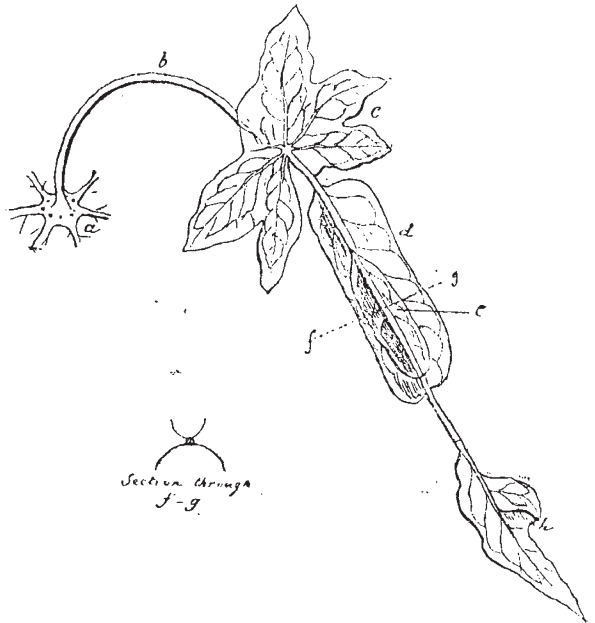
Autophyllogeny

THE following case of *Autophyllogeny*, observed in a leaf of *Papaya vulgaris* (the well-known papaw-tree) appears to me of sufficient interest to be recorded in the columns of your highly interesting journal.

The letter *a* designates the central part of the primary leaf, corresponding to the apex of the petiole on the upper side of the blade. It shows some small warty protuberances, and from amidst them rises a new petiole (*b*), about six centimetres long and one and a half millimetre thick. This new petiole bears an accessory leaf of somewhat pentagonal outline (*c*), slightly crumpled and partially concave towards the upper side (the one directed downwards in the figure), as if there had been some tendency of forming a leaf pitcher. A little onwards two boat-shaped appendices are observed (*d* and *e*), the midrib or petiole forming their keel. They are real leaf pitchers, though of a rather uncommon form. The small lateral diagram represents the shape of the transversal section through *f* and *g*. The two leaves are opposed to each other by their upper sides, which are of a dark green colour; the concave parts are their under sides, as is proved by their pale green colour, which is generally the case in the leaves of the papaw-tree. The end of the petiole bears a pointed leaf (*h*), slightly contracted, and with a pitcher-like contortion on one side. The figure is about three-fourths natural size.

The case belongs to those mentioned by Masters ("Vegetable Teratology," 355, 445) under the heads of Pleiophylly and Ena-

tion from foliar organs. His explanation is certainly correct, as there cannot be any doubt that the accessory petiole *b*, but for its development in another plane, is a true homologon of the ribs of the primary leaf, and the minute warts round its base may be regarded as small or checked beginnings in this same direction.



The described anomaly does not appear to be rare [in *Papaya vulgaris*. I have observed several less-developed instances; the specimen here described was given to me by one of our students, Señor Ramon Documet.

Caracas, June 16

A. ERNST

Microscopy--The Immersion Paraboloid

As I am responsible for exhibiting at the Conversazione of the Royal Society, May 1, the immersion paraboloid as being "designed by Dr. Edmunds," I should wish it to be known that, since that date, my attention has been directed to evidence establishing Mr. Wenham's priority to the invention.

Before exhibiting the paraboloid at the Royal Society, I had Dr. Edmunds' assurance that he felt justified in requesting me to describe it as designed by himself.

JOHN MAYALL, Jun.
224, Regent Street, London, July 16

THE GENESIS OF LIMBS¹

III.

I HAVE found much resemblance between the skeleton of the ventral and the dorsal fins in *Notidanus*, in *Chiloscyllium*, and in *Raia*; also between the anal and ventral fins in *Notidanus*. The ventral fins of elasmobranchs generally are so different from their pectoral fins, and so much more like the azygos fins than the pectorals are, that they serve well to bridge over the differences between the orders of fins. At the same time the value of the link is enhanced by the fact that in the very peculiar genera *Callorhynchus* and *Chimæra* the ventrals resemble the pectorals in a very remarkable and exceptional manner. But perhaps the most instructive ventral fin is that of *Polyodon*, the skeleton of which consists simply of a double series of simple parallel rays without any attachment to a pelvic cartilage which is altogether absent.

These conditions, then, appear to obliterate the distinctions which are at first apparent between the skeletons

¹ Continued from p. 311.