tion that determines the position of the Delaware Gap is regarded as warping or gentle transverse folding, rather than as a fault, as it has generally been considered (p. 338). The map of glacial striae included in this volume is constructed by Professor Lesley, from Mr. White's observations. It shows a general trend of striae S. 20 to 30° W., but with significant deflections on approaching Kittatinny and Pocono Mountains. A perched bowlder was found on the top of High Knob, 2,010 feet above tide, and glacial scratches were observed on Pocono Mountain at an elevation of 2,150 feet. W. M. DAVIS.

AN APPARENTLY NEW ANIMAL TYPE.

PROF. F. E. SCHULZE, who already ranks so high among zoölogists, has now another claim to distinction, through the discovery of an animal quite different from any thing hitherto known.

The animal was observed in the salt-water aquaria of the zoölogical institute at Graz. It is a thin plate, about 0.02 mm. thick, and only a few millimetres in diameter. It constantly changes its form. It is translucent, and grayish white in color. At rest it is rounded in outline, but may draw itself out into a long thread, which may so curl and twist, that it recalls a Persian or a Turkish letter. The movements are usually so slow as to be barely perceptible, as the animals creep along upon their under surfaces.

Microscopic examination shows that the whole surface of the body is ciliated. Close under the upper surface is a layer of highly refractile balls from 5 to 8 μ in diameter, and distributed pretty evenly. Besides these, there are other balls nearer the under surface, which seem to be essentially different from those first mentioned. There is no indication of internal organs, nor of only bilateral or radiate symmetry: the organism is uniaxial. Schulze names it the ciliated plate, Trichoplax, with the specific name adhaerens, because it clings so closely to the surface on which it is moving.

Such an organism one would expect to find related to the protozoa; far from it, for two different epithelial layers of cells form its upper and lower surfaces, and contain between them a fully developed layer of connective tissue. The upper epithelium is composed of large, flattened, polygonal cells: the lower epithelium, on the contrary, is composed of cylinder-cells, whose outer ends form a mosaic of small polygons, but whose inner ends terminate in processes that are lost in the connective tissue. This last, forming the middle layer of the body, consists of spindle-shaped and branching nucleated cells, which are probably contractile, and are embedded in a hyaline basal substance. The balls above mentioned are contained in large cells. There are, then, three layers, which from their relations would naturally be compared with the ectoderm, mesoderm, and endoderm of other metazoa; but the justification of this comparison must await a knowledge of the development of the organism.

Professor Schulze speculates as to the relationship of this creature, but finds it impossible to assign it to any known class. Although it has been watched for a year, no sign of metamorphosis or of reproduction has been observed; but Schulze thinks it possible that it may have multiplied in the autumn by division.

It seems to me that the animal bears a strong resemblance to a sponge larva. The surmise that it is the young of a porifer may be a useful hint for the further study of this singular form.

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THE COLOR-PREFERENCES OF THE HIVE-BEE.

DR. HERMANN MÜLLER, who does not accept the results of Sir John Lubbock's studies of this subject as very conclusive, has himself made a considerable number of observations in the same line (*Kosmos* for Jan.). Though too few to serve as a basis for very broad generalization, they give, so far as they go, a strong degree of proof to several points previously theoretical.

The colors experimented upon were not artificial, but actual floral colors, prepared for use by gumming fresh petals between two ordinary microscope-slides, care being taken that no protruding parts were left, and that the margin was sealed with gum-water, to prevent the possibility of any odor from the petals influencing the bees in their choice.

The bees to be observed were at first accustomed to visit uncolored slides, smeared with honey, exposed close by their hive, and gradually removed, in the course of several days, to a distance of twenty-six metres, where they were replaced by two slides of the colors to be compared, similarly smeared, and placed one decimetre apart. Each bee was marked on its back with an oil-color, by which it was recognized on its different visits. It was found later, that bees from distant hives, if caught on flowers a few steps from the place of observation, and transferred to the honeyed slides under a tumbler that had been sweetened in the same way, usually returned regularly.

In the different observations a number of marked bees were employed, both as a means of economizing time, and to compensate for the somewhat different preferences of individual insects. To eliminate the influence of location, the positions of the slides under observation were changed from time to time.

The general results reached are as follows: —

Leaf-green is less attractive to bees than the colors usually found in flowers adapted to pollination by them.

The colors of these, which may be conveniently called bee-flowers, are, without exception, preferred to fulgent colors, like the yellow of buttercups and the scarlet of some poppies, which usually occur in flowers open to a mixed circle of visitors, or adapted to humming-birds. The extent of their choice in each case may be seen from the annexed table; the figures indicating the relative number of visits, on a basis of 1,000 to each bee-flower color. (Table I.)

Fulgent colors are less attractive to bees than the neutral tint which precedes them in the development of the flower.

Bright yellow is less distasteful than other brilliant colors, but it is least acceptable of the colors found in bee-flowers. (Table II.)

Yellowish white and white are at least as attractive to Apis as many shades of purple, but less so than blue and violet. (Table III.)

Blue is preferred to the red of bee-flowers, or is at least equally acceptable, in the shades tested. Pure deep blue is even more attractive than violet. (Table IV.)

With the exception of blue, violet is more attractive than other colors experimented with. (Table V.)

Red, in the shades found in bee-flowers, constantly surpasses only yellow in its attractiveness for the hive-bee. It is equalled or surpassed by all other colors used for comparison. (Table VI.)

TABLE I.

Fulgent colors.	Bee-flower colors.	
Bright yellow (Ranunculus)	Honey-yellow (Diervilla)	615 : 1000.
" " "	White (Calystegia sepium)	437 : 1000.
" orange (Calendula)	Rose (Rosa centifolia)	310 : 1000.
" " (Esscholtzia crocea)	" " "	338 : 1000.
Red (Tropaeolum)	Violet (Viola tricolor)	362 : 1000.
Scarlet.	*Rose-color.*	
(*a*) Papaver rhoeas	Rosa centifolia	164 : 1000.
(*b*) Canna	" "	472 : 1000.
(*c*) Pelargonium	" "	530 : 1000.
Scarlet (Papaver rhoeas)	Pink-red (Dianthus armeria)	493 : 1000.
" " "	Blue (Centaurea cyanus)	167 : 1000.

TABLE II.

Yellow of bee-flowers.	Other colors of bee-flowers.	
Yellow (Potentilla anserina)	Purple (Trifolium pratense)	1000 : 1476.
	at first	1000 : 2250.
	later	1000 : 1000.
Golden yellow (Viola tricolor)	Yellowish white (Viola tricolor)	1000 : 1971.
Deep yellow (Oenothera glauca)	Indigo-blue (Aconitum napellus)	1000 : 2000.
Yellow (Helianthus annuus)	Pink-red (Silene armeria)	1000 : 2741.
Golden yellow (Viola tricolor)	Violet (Viola tricolor)	1000 : 3250.
Chrome-yellow (Paper)	Cobalt-blue (Paper)	1000 : 3636.

TABLE III.

Yellowish white and pure white.	Other colors of bee-flowers.	
Yellowish white (Viola tricolor)	Golden yellow (Viola tricolor)	1000 : 507.
White (Lathyrus odoratus)	Dark purple (Lathyrus odoratus)	1000 : 757.
Yellowish white (Lamium album)	Purple (Lamium maculatum)	1000 : 942.
" " (Viola tricolor)	Blue (Viola tricolor)	1000 : 1214.
" " " "	" " "	1000 : 1388.
White (Paper)	Sky-blue (Borago officinalis)	1000 : 1777.
Yellowish white (Viola tricolor)	Violet (Viola tricolor)	1000 : 2181.

TABLE IV.

Blue.	Other colors of bee-flowers.	
Cobalt-blue	Chrome-yellow	1000 : 275.
Indigo (Aconitum napellus)	Yellow (Oenothera glauca)	1000 : 500.
Violet (Geranium pratense)	Impure dark purple (Symphytum officinale)	1000 : 541.
Sky-blue (Borago officinalis)	White (Paper)	1000 : 562.
Pansy-blue (Viola tricolor)	Yellowish white (Viola tricolor)	1000 : 720.
Deep pansy-blue	Violet (Viola tricolor)	1000 : 700.
" " "	" " "	1000 : 826.
Sky-blue (Borago officinalis)	Bright purple (Geranium sanguineum)	1000 : 800.
" " "	Violet (Viola tricolor)	1000 : 877.
" (Echium)	Rose-color (Echium)	1000 : 947.
" (Borago officinalis)	" " (Rosa centifolia)	1000 : 1000.
Corn-flower blue (Centaurea cyanus)	Purple (Rosa)	1000 : 1000.
Violet-blue (Lathyrus odoratus)	Dark purple (Lathyrus odoratus)	1000 : 1000.
Pansy-blue, with some transmitted yellow	Pansy-violet	1000 : 1243.

TABLE V.

Violet.	Other floral colors.	
(Viola tricolor)	Golden yellow (Viola tricolor)	1000 : 308.
" "	Yellowish white (Viola tricolor)	1000 : 458.
" "	Purple (Rosa)	1000 : 698.
" "	Blue, with some transmitted yellow (Viola tricolor)	1000 : 804.
" "	Sky-blue (Borago officinalis)	1000 : 1140.
" "	Deep pansy-blue (Viola tricolor)	1000 : 1209.
" "	" " " " "	1000 : 1428.

TABLE VI.

Red of bee-flowers.	Other colors of bee-flowers.	
Pink-red (Silene armeria)	Yellow (Helianthus annuus)	1000 : 365.
Purple (Trifolium pratense)	" (Potentilla anserina)	1000 : 677.
Pure purple (Rosa)	Corn-flower blue (Centaurea cyanus)	1000 : 1000.
Dark purple (Lathyrus odoratus)	Violet-blue (Lathyrus odoratus)	1000 : 1000.
Rose-color (Rosa centifolia)	Sky-blue (Borago)	1000 : 1000.
" (Echium)	" (Echium)	1000 : 1055.
Purple (Lanium maculatum)	Yellowish white (Lanium album)	1000 : 1061.
Bright purple (Geranium sanguineum)	Sky-blue (Borago)	1000 : 1256.
Dark " (Lathyrus odoratus)	White (Lathyrus odoratus)	1000 : 1321.
Pure " (Rosa)	Violet (Viola tricolor)	1000 : 1432.
Impure dark purple (Symphytum officinale)	Violet-blue (Geranium pratense)	1000 : 1848.

W. TRELEASE.