tainment of either orthoscopic or pseudoscopic binocular effects was described by Sir David Brewster as long ago as 1844 (*Edinburg Transactions*, 1844, Vol. XV., Part III., p. 360), and quite fully discussed in his book on 'The Stereoscope,' published in 1856. On the optical illusions due to cross vision Brewster based his geometric theory of binocular vision, which was fully elaborated in his book. In 1855 and 1856 the same theory was applied by Professor W. B. Rogers, founder of the Massachusetts Institute of Technology, in a series of articles published in the *American Journal of Science*. It has since been applied by various writers. The incorrectness of this theory is conclusively proved by the possibility of binocular vision by optic divergence (*Am. Jour. Science*, Nov. and Dec., 1881, March, April, May, Oct. and Nov., 1882).

Nevertheless, the subject is attractive, and the results attainable when the visual lines are made to cross at a high angle, such as 50° or 60°, suggest some interesting and perfectly legitimate geometric applications. But these experiments are somewhat trying to the muscles of the eyes.

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August 3, 1901.

SHORTER ARTICLES.

ADAPTATION IN VISION.

APPARENTLY no one has noticed formally the bearing upon brain physiology of one of the commonest phenomena of vision. Within certain very wide limits the percept we have of any object does not change at all while we approach or recede from it. If, for instance, I look at a chair thirty feet off and then walk straight toward it, the appearance of the chair does not alter. Now the retinal elements excited are totally different according to the distance I am from the object. We have then a succession of different physiological processes in the retina with the final result in consciousness of a constant feeling. We naturally suppose that a continuance of the same feeling is due to a continuance of substantially the same physiological processes in the central nervous system. If this is true we can account for the phenomenon mentioned only by supposing that all the differing successive processes in the end organ somehow get shunted into the same central process. This involves a practical infinitude of associative systems of the subtlest and most complex sort. For with each of the objects of which we thus have a constant perception in spite of varying retinal conditions, different sets of associations are needed corresponding to different views of the object. Moreover, totally new objects suffer like treatment. This latter fact almost tempts one to put faith in a mysterious mental construction on the basis of sense stimuli. Surely if the brain itself does the work of unifying these multitudes of series of retinal events into constant processes corresponding to our percepts, the complexity of its mechanism has never been fairly stated. This, I take it, is what we must believe. We must find in this commonest case of vision a notable example of the fact that our feelings do not parallel outside events or even the sensory processes aroused by them, but are the results of selected adaptations, adaptations in this case presupposing much more involved neural action than the common reflex-arc conception of the brain seems to permit.

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THE INJURY OF FUNGICIDES TO PEACH FOLIAGE.

THE writer has devoted several seasons to an investigation of the injury produced by fungicides to peach foliage. A bulletin giving the results of this work is soon to appear from the Tennessee Agricultural Experiment Station. A preliminary report on this investigation may not be out of place here. Following are some of the points established or rendered probable:

1. Pure copper hydroxide, copper oxide, or even metallic copper spread on the leaves is injurious to the foliage of the peach, but without visible injury to that of either the apple or the grape.

2. A solution of copper sulphate 0.00005 normal (=0.000795 per cent.) proved fatal to water cultures of the apple, while grapes and peaches under like conditions, though evidently injured, soon recovered, and the peaches thus

treated on October 8 remained alive over winter.

3. Peach foliage protected from rain and dew, as in a greenhouse, sustains no externally visible injury from spraying with either Bordeaux mixture or copper hydroxide. Under normal orchard conditions the leaves sprayed with Bordeaux in a situation so as to be partially protected from falling rain or dew are the last to succumb to the injurious action of the copper.

4. The presence of deliquescent salts (as $Ca(NO_3)_2$ and $CaCl_2$) greatly accelerates the injurious action of copper hydrate on the foliage of the peach.

5. Peach seedlings growing in a saturated atmosphere are not injured by Bordeaux mixture and but slightly by pure copper hydrate.

6. Peach leaves growing in a saturated atmosphere possess a thinner and much more easily permeable cuticle than those growing in a dry or less moist atmosphere. Following is a summary of measurements of paraffine sections stained with chloroiodide of zinc:

Peach leaves.	Thickness of cuticle of upper surface.
Orchard Knoxville.....1.17	micromillimeters
Orchard California.....1.21	"
Seedling greenhouse.....0.86	"
Seedling in moist chamber.....0.60	"

7. The presence of a certain excess of lime accompanying the copper hydrate on peach foliage retards or possibly entirely prevents the injurious action of the latter. This holds true of lime applied either as the hydrate or at once as the carbonate. The sulphate of lime does not produce this effect.

The writer believes that the above results go far toward explaining the conflicting testimony of different investigators along this line in this country. So far as shown to date, no injury will result to peach foliage sprayed with ordinary Bordeaux mixture until a certain proportion of the lime carbonate is washed out by heavy dews or rain, when it at once begins to manifest itself. One would thus expect but little injury in an arid region like parts of California. On the other hand, an atmosphere containing abundant hygroscopic moisture, such as is to be found in Georgia and Florida, would supply conditions similar to those produced in the moist chamber as stated above, and thus atone to a certain extent for the washing out of calcium carbonate caused by precipitated water.

The practical application of this principle is readily suggested. It may be possible to follow up a spraying with Bordeaux mixture with one or more of milk of lime and thus prevent the injury which would otherwise occur. Experiments carried out here this season thus far show this method to be a success. Whether it will remain so to the end of the season is yet to be determined. There are, of course, other questions to be taken into consideration, such as the practical application of the method in the commercial orchard, the effect of the lime on the fungicidal action of the copper, etc.

It is hoped in the forthcoming publication above mentioned to describe in detail the experiments above outlined, in addition to a number of others finished and now nearing completion, looking toward the physiological explanation of the results obtained.

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Current Notes on Physiography.

The Northern Adirondacks.

A 'Preliminary Report on the Geology of Franklin County,' N.Y., by H. P. Cushing (18th Rep. State Geol., Albany, 1900, 73–128, 8 pl., colored outline map) describes the northern side of the Adirondack mountains and the drift-covered paleozoic plain at their base. The transition from one area to the other is rather abrupt, but the height of the mountains decreases with some regularity towards the plain, and branches of the plain enter valleys among the hills. An old baselevel is inferred from the systematic northward decrease of summit heights, although its horizon is admittedly not closely definable. The present valley system is explained as of later origin, the result of erosion following a slanting uplift. No dates are given in this connection, although it is said that 'the Adirondack region has been continuously above sea level since Lower Silurian times' (78), a statement that seems open to doubt. The step-like descent of the mountains toward Lake Champlain is explained 'by a