

to be determined by the greatness of its magnifying power. On the contrary that instrument must be considered the most efficient which renders the details of an object perceptible with the lowest power. Distinctness of definition, by which is meant the power of rendering all the minute lineaments clearly seen, is a quality of greater importance than mere magnifying power. Indeed, without this quality mere magnifying power ceases to have any value.

At present there is an honorable competition between Spencer and Tolles, of America, Powell and Lealand, of England, and Zeiss, of Germany, as to who shall produce the most perfect microscopical objectives; and it would be a difficult matter to decide which of these firms possesses the greatest merit in workmanship. Zeiss, with his oil immersion system, may have obtained the credit of a temporary advantage, but similar forms of objectives are now being manufactured in this and other countries with success.

These makers are bringing to bear on their work all the most recent discoveries in optical science, and if any advance is made in the magnifying power of objectives, we shall expect to find it produced by such skilled opticians.

#### PALÆONTOLOGICAL RESEARCHES.

BY PROF. HENRY S. WILLIAMS, Ph. D., Cornell University.

##### I.

Genesee Slate. Fauna and Flora of Station xxxiv. d., H. S. W.

On the eastern shore of Cayuga Lake, N. Y., near the head, is a fine exposure of the boundary strata of the Hamilton and Chemung periods. Careful examination has been made of the upper part of the Genesee slate as it occurs in Burdich's Ravine, the face of the high fall. (Station xxxiv. H. S. W.) Here the lowest Portage sandstone lies about 60 feet above the surface of the lake, and the characteristic Genesee slate follows immediately under it. The following species were obtained in the slate between four and five feet below the sandstone stratum, forming the base of the Portage group:

*Discina lodensis*, Van.—abundant.

*Discina truncata*, Hall—frequent.

*Lingula spatulata*, Van.

*Lingula concentrica*—(of Vanuxem's Rep't, but not Conrad's species). See beyond.

*Tentaculites fissurella* H.—abundant. (See beyond).

*Leiorhynchus quadricostatus*, Van.

*Chonetes lepida*, Hall.

*Aviculopecten fragilis*, Hall.

*Orthoceras*—(subulatum?).

*Ambocelia umbonata*, Con.

*Avicula speciosa*, Hall.

Impression of part of *Goniatites*?

Plants, three well marked forms.

This fauna has several interesting forms in it.

The recurrence of *Marcellus* forms noticed by Hall, in Geol. 4th Dist. N. Y., p. 222, 1843, is seen to be more marked than was observed by him.

The *Tentaculites fissurella*, Hall, may prove to be *Styliola* (2 p.) but if so, the same form is repeated in the Genesee slate from the *Marcellus* shale.

It is difficult to be satisfied with the recognition of this form in *Styliola*, since annulated forms occur together with the smooth ones, and except in the annulations are not to be separated from the true *Styliola* forms. The shells are very frail and crushing may account for the longitudinal folds in part, as it does in some of the *Orthoceratidæ*.

This fact is noticed by Hall in the *Marcellus* forms (in Illustrations Der Fossils, Pl. xxvi.) and the "prevailing form," fig. 14, is the prevailing form in the Genesee, and among the specimens just collected the annulated forms do not differ in size from the smooth ones, and the latter are often larger.

*Discina lodensis*, Van. occurs in abundance, and with some variation, but the form called *D. truncata*, H. is distinct and does not show gradation into the former. Still this is also distinct from the *Lingula* which Vanuxem figured, but did not describe in Geol. of 3d Dist., N. Y., p. 168, fig. 4. Vanuxem refers the species to Conrad's *Lingula concentrica*, which is evidently a mistake since Conrad's species, *L. concentrica*, is from the Helderberg mountain, in limestone, and is  $\frac{3}{4}$  inch long (see Geol. Rep't, N. Y., 1839, p. 64). The species found in association with *L. spatulata* is nearly 5 millimetres long and 3.3<sup>mm</sup> broad, and the cardinal margin is broadly, evenly rounded, and not attenuated as in *spatulata*.

*L. spatulata*, Van. is nearer the size figured by both Hall and Vanuxem (from 4 to 4.5<sup>mm</sup>) instead of approaching 7.5<sup>mm</sup> ( $\frac{3}{16}$  inch) as stated by Hall in the description (Pal. of N. Y., vol. 4, p. 13). These are of the ordinary size of *Lingula spatulata*, Van. as they have been observed by the author. The *Lingula concentrica* (of Van. not Con.), is distinguished from the *Discina truncata* by the absence of the indentation or truncation, and the extension of the margin beyond the umbo, as well as other characters not as easily observed.

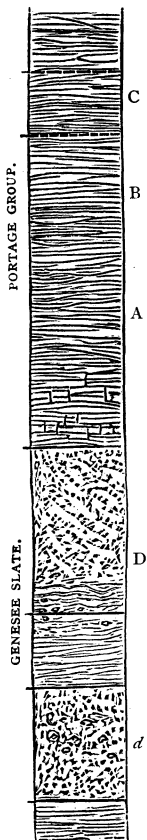
The *Chonetes* found is distinctly the *Chonetes lepida* of Hall, and not *setigera*. Still this may prove a variety of *setigera* upon further study; the two occur together in the Moscow shales and *Marcellus*, and in other strata of the Hamilton.

Only a single specimen of *Aviculopecten fragilis* was found, but this distinct and characteristic.

*Ambocœlia umbonata*, Con. was found in several beautifully preserved specimens.

And one of the dorsal valves is marked on the outer surface by concentric rows of minute short interrupted radiating lines, and when magnified resembles very closely the figure of *Spirifer prematura* on plate 33 of Hall's Pal., of N. Y., Pal. 4, fig. 32. Further study of these forms will probably develop interesting facts.

SECTION AT  
STATION XXXIV.  
H. S. W.  
SCALE 1 cm 1 ft.



*Avicula speciosa*, Hall. This species is represented by several specimens small and large, some of quite large size, but showing the characteristics of the Portage representatives.

This fact is especially interesting as the form has not been recorded from outside Portage rocks, and though this stratum is but a few feet below the base of the Portage, it is distinctly below and in the midst of characteristic Genesee slate.

It will be observed that this brings the species into the Hamilton Period. There are also some well marked plant-remains, one linear grass-like form, another sturdy branching form the relations of which have not been made out.

The dip of the base of the Portage in one direction was determined. Three stations were examined a thousand feet apart, and in nearly a straight line running North and South, and the elevation of the base of the stratum A of the Portage determined relative to the level of the lake.

St. XXXII.	base of A above lake level.....	7	ft.
" XXXIII.	" " " ".....	35½	"
" XXXIV.	" " " ".....	57.9	"

These being 1000 feet apart, the dip is nearly 50 feet in 2000 feet.

The first 1000 feet showing 28½ feet and the second 1000 feet showing 22½ feet nearly. Thus the dip is not uniform, a fact further shown by a study of the rocks further South where the dip is much less, as was determined by careful survey of strata near the top of the Portage.

The accompanying diagram shows the general nature of the section at the three stations XXXII., XXXIII., and XXXIV. The scale is one centimeter to the foot. C, and A, and lower part of B contain concretionary nodules of iron pyrites; A, and C, sandstones, are separated by the shale B, which is more or

less arenaceous and differs decidedly from the Genesee slate below, which is the characteristic mud shale, black, and very fine in texture with arenaceous streaks in it toward the top.

The fossiliferous stratum whose fauna is described, is *d*, lithologically scarcely defined from the shales above and below.

#### THE TELEPHONE AMONG THE INDIANS.

The United States Fish Commission has lately connected, by telephone, its Salmon Hatching Stations at Baird, on the McCloud river, California, with the establishment for breeding the California trout five miles further up the river and the apparatus is now in thoroughly good working order. The Indians look on in blank amazement and call the instrument the *Klesch-teen*, or speaking spirit.

#### A REMARKABLE METEOR.

BY EDWIN F. SAWYER.

While engaged in recording meteors on the evening of Oct. 9th, I observed a very remarkable one at 10 h. 25 m. C. M. T., low down in the east, which calls for special mention. My attention was first attracted to what appeared a stationary meteor > 1 mag. near  $\gamma$  (Gamma) Orionis, and of a deep orange color. While noting its accurate position, the meteor very slowly (motion hardly perceptible) began to descend towards the horizon, where it disappeared behind some houses. It remained perfectly stationary for at least a second after it was first observed, and it occupied 6 seconds in traversing an observed path of 10°. The meteor's brightness decreased slowly as it approached the point of disappearance being at this point of the 3d mag. No streak was observed. The exact point of appearance was at R.A.  $76^{\circ}+5^{\circ}$  and it vanished at R.A.  $76\frac{1}{2}^{\circ}-5^{\circ}$  near  $\beta$  Orioms (Rigel). Duplicate observations of this meteor would be of value.

Cambridgeport, Mass., Oct. 10, 1880.

#### THE "YELLOWS" OF THE PEACH TREE.

BY PROF. T. J. BURRILL, Illinois Industrial University.

A peculiar disease of the peach tree known as the "yellows," has long been the scourge of the principal peach growing districts of our country. Its appearance somewhat recently, in Michigan, caused much alarm, and since its occurrence throughout great orchards in some of the best fruit districts of the State, special attention has been called to it.

In "SCIENCE" for September 25th, 1880, page 162, there appeared an abstract of a paper read by me before the American Society of Microscopists at Detroit, upon the blight of pear and apple trees. In this paper I expressed the opinion that the "yellows" of the peach tree would be found due to an organism similar to that found to be the cause of the pear tree blight. This opinion was based upon my knowledge of the latter disease, upon the thoroughly confirmed contagious character of the "yellows," and upon the failure of competent investigators to find, after extended re-