

retreatings of the cells, here and there, but which soon become prominent from furrows, and at last the whole form stands boldly out.

After proceeding with this subject in an able manner and to some considerable length, the learned author says:

If, in this discussion of some of the highest relations of physiology, we have not wandered too far from our subject proper, which we have thereby sought to illustrate, indirectly, we will revert to the thread of its discourse for a few concluding remarks:

The final question now is, what is the legitimate interpretation of these reproductive phenomena of the Aphides we have described? My answer to this has been anticipated in the foregoing remarks. I regard it as nothing but a rather anomalous form of gemmiparity. As already shown, the viviparous aphides are sexless; they are not females, for they have no proper female organs, no ovaries and oviducts. These viviparous individuals, therefore, are simply gemmiparous, and the building is internal instead of external, as with the Polyps and Aculephs; it, moreover, takes on some of the morphological peculiarities of oviparity, but all these similar conditions are economized and extrinsic, and do not touch the intrinsic nature of the processes concerned therein." — *Proceedings of the American Association—Annals of Science*

The Trenton species thus appear to lose their value in Middle Tennessee, as characteristic of a subdivision of the Lower Silurian rocks.

It is very different, however, with the species of the other New York groups. The Stones River group has throughout (excluding the Trenton species) a well marked Black River fauna; and so the Nashville group, which succeeds it, has a decided Hudson River fauna, while at the same time there is no blending of these characteristic species.

To illustrate these remarks, I have constructed the table on the following page, using all the described species common to the two States, excepting those found, either in both the Tennessee groups, or, in both the Black River and Hudson River groups of New York, for these do not bear upon the points before us; this excludes such species as *Orthis testudinaria*, *Pleurotomaria umbilicata*, *Leptæna sericea*, *L. alternata*, *Chonetes columnaris*, *Murchisonia bicincta*, &c., &c. Several doubtful species have also been excluded.

This table illustrates the blending in Tennessee, of Trenton with Black River species below, and Hudson River species above; and, also, the fact, that the characteristic Black River species are confined to the Stones River Group, while those characteristic of the Hudson River rock, are confined to the Nashville Group.

On the parallelism of the lower Silurian groups of Middle Tennessee with those of New York.*

BY PROF. J. M. SAFFORD.

The Lower Silurian rocks of Middle Tennessee are divided into two natural, and well characterized groups. The Lower division, which has been named the *Stones River Group*, is a series of bluish and dove-colored limestones from 250 to 300 feet thick. These rocks are the lowest visible in this part of the State.

The Upper division, named the *Nashville Group*, is, in great part, dark bluish limestone, about 400 feet in thickness. We are acquainted with 200 species from these rocks, of which one half are new, the others being identical with New York species.

The Tennessee strata, under consideration, are the equivalents, generally, of the following New York groups: first, the Black River group (including the Chazy, Birdseye and Black River limestones); secondly, the Trenton limestone; and thirdly, the Hudson River group (including the Utica slate.)

This general parallelism is very clear and satisfactory. When we come, however, to search, in Tennessee, for the Trenton limestone, separated, as a distinct group, from the Black River rocks below, and from the Hudson River above, we are entirely lost.

The difficulties are these: First, many of the species, belonging exclusively to the Trenton limestone in New York, occur, in Middle Tennessee, mingled in the same strata with Black River fossils; in fact, many of them occur in a lower position than some of the Black River species, for instance the following group, *Stromatocerium rugosum*, *Streptoplasma profunda*, and *Columnaria alveolata*, is highly characteristic of the uppermost member of the Stones River Group; notwithstanding this the central part of the same group affords such Trenton fossils as the following: *Retepora fenestrata*, *Subulites elongata*, *Cyrtolites compressus*, *Bucania vidorsata*, *Bucania expansa*, &c., &c. In the second place, if we take the Nashville group, and study its Trenton, and Hudson River fossils, we find the same blending of species, some of the Trenton running up to the very top of the group, and some of the Hudson River appearing at its base.

* *Proceedings of the American Association—Annals of Science.*

	NEW YORK.					TENNESSEE.			
	Chazy.	B. & B. R.	Low. Trent.	Up. Trent.	U. S. H. R.	Low. Stones R. Group.	Up. Stones R. Group.	Low. Nashville Group.	Up. Nashville Group.
1. <i>Marlurea Magna</i>									
2. <i>Columnaria alveolata</i>									
3. <i>Streptoplasma profunda</i>									
4. <i>Stromatocerium rugosum</i>									
5. <i>Gonioceras anceps</i>									
6. <i>Litites undatus</i>									
7. <i>Orthis fusiformis</i>									
8. <i>Rathionerphus carinatus</i>									
9. <i>Retepora fenestrata</i>									
10. <i>Leptæna filicata</i>									
11. <i>Orthis tricenaria</i>									
12. <i>Bucania vidorsata</i>									
13. <i>Bucania expansa</i>									
14. <i>Pleurotomaria rotuloides</i>									
15. <i>Cyrtolites compressus</i>									
16. <i>Phacops calliopterus</i>									
17. <i>Elmophila ventricosa</i>									
18. <i>Ammonychia amygdalium</i>									
19. <i>Euboceras proteiforme</i>									
20. <i>Subulites elongata</i>									
21. <i>Spirifer lynx</i>									
22. <i>Orthis pretinella</i>									
23. <i>Murchisonia bicincta</i>									
24. <i>M. subcylindrica</i>									
25. <i>Atrypa imbecilis</i>									
26. <i>Modiolopsis ananoides</i>									
27. <i>Favosites stellata</i>									
28. <i>Ammonychia radiata</i>									
29. <i>Avicula dentata</i>									
30. <i>Cyrtolites ornatus</i>									

In view of all these facts it follows; First, that the Trenton limestone, as a distinct group, cannot be recognised in Middle Tennessee; and, Secondly, that the Nashville and Stones River groups are, respectively, the representatives of the Hudson River, and Black River groups of New York, and that the former rests directly upon the latter.

It may be added too, that the facts, thus developed in Tennessee, show that it will hardly be satisfactory to unite, as has been suggested, the Trenton limestone, as a group, with the Hudson River rocks, for the blending of species takes place