

THE WARSAW FORMATION¹

BY

J. MARVIN WELLER

Illinois State Geological Survey, Urbana, Illinois

Since Hall proposed the name Warsaw in 1857² for strata between the Keokuk and St. Louis limestones, the limits of this formation have been revised several times.³ In 1908, Stuart Weller⁴ correlated the upper eight feet of this formation at its type locality with the Salem limestone of Indiana and since that time it has been customary to recognize both the Warsaw and Salem formations in the Mississippi Valley. Because the Warsaw formation as thus restricted was considered equivalent to the Harrodsburg limestone of Indiana, the latter name has been abandoned.⁵

Practically all of the common Warsaw and Harrodsburg fossils are present in the Salem limestone of Indiana but in the Salem there also occurs a variety of small molluscs associated with innumerable shells of *Endothyra baileyi*. This is known as the Salem or Spargen Hill fauna and on its basis the Salem limestone was recognized in the Mississippi Valley. It is now known that this fauna is of no value for precise correlation but records a peculiar environment that existed at different times in different areas. It first appears in the Short Creek oolite at the base of the Warsaw formation in southwestern Missouri, and occurs in the Salem limestone of Indiana, in the so-called Salem of Ste. Genevieve County, Missouri (probably in part of lower St. Louis age), and in the Ste. Genevieve limestone at various places. Very similar forms occur in Chester and Pennsylvanian strata.

From Alton, Illinois, northward, beds referred to the Salem do not resemble the typical Salem limestone lithologically or faunally. Except for a small area in and adjoining southeastern Iowa where the so-called Salem is separated by an unconformity from the underlying Warsaw (restricted), there is no more basis for their differentiation than there would be for the recognition of the upper and lower divisions of the Warsaw (restricted) as distinct formations. It is doubtful that the so-called Salem-Warsaw (restricted) boundary in the Mississippi Valley is drawn at exactly the same horizon as the Salem-Harrodsburg boundary in Indiana or that the lithologic change at which the former is drawn occurs at even an approximately uniform horizon between Hancock and Monroe counties, Illinois. Because of these and other uncertainties it seems unfortunate that the Warsaw formation should have been restricted, thus causing the abandonment of such a well established name as Harrodsburg, particularly as it is impracticable to attempt any subdivision of these beds in some areas where a single name for this entire interval would be convenient.

It is proposed, therefore, to restore the Warsaw formation to its early status, assigning to it all beds between the Keokuk and St. Louis limestones as these are now limited. Where desirable the Warsaw formation may be subdivided into more or less local members.

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²Hall, James, Observations upon the Carboniferous limestone of the Mississippi Valley: Amer. Jour. Sci., ser. 2, Vol. 23, p. 193, 1857.

³Hall, James, Report on the Geological Survey of Iowa, Vol. 1, p. 97, 1858.
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⁴Weller, Stuart, *Op. cit.*
⁵Butts, Charles, *Op. cit.*; Cummings, E. R., The nomenclature and description of the geological formations of Indiana: Indiana Dept. Cons., Pub. 21, p. 493, 1922.