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THE GEOGRAPHIC DISTRIBUTION OF IOWA DEVONIAN ECHINODERMS¹

A. O. THOMAS

In connection with a paper recently prepared for the Iowa Geological Survey, entitled "Echinoderms of the Iowa Devonian," some interesting facts regarding the geographic distribution of the echinoderms of this system were ascertained.

Forty-three species and two varieties constitute the total number studied. Of these four are cystids, four are blastoids, thirty are crinoids, and five are echinoids. The two varieties consist of one camerate crinoid and one echinoid. Seven of the species are known to occur in the Devonian of neighboring states. These are:

<i>Nucleocrinus obovatus</i> (Barris)	Iowa, Wisconsin, Michigan
<i>Nucleocrinus meloniformis</i> (Barris)	Iowa, Michigan
<i>Melocrinus nodosus</i> Hall	Iowa, Wisconsin
<i>Megistocrinus nodosus</i> Barris	Iowa, Michigan
<i>Euryocrinus barrisi</i> Springer	Iowa, Michigan
<i>Synbathocrinus matutinus</i> Hall	Iowa, Michigan
<i>Deltacrinus barrisi</i> (Worthen)	Iowa, Illinois

This indicates that only a relatively small percentage of the species occur beyond Iowa's boundaries and that these do not range far beyond the confines of the state, being practically limited to the Dakotan sea and the Traverse basin of Schuchert. Further study of the faunas of the Dakotan sea will doubtless extend the geographic range of some of these species and discover others not yet known beyond Iowa. In the Devonian of Missouri, for example, some of the crinoids of Calloway county and vicinity are quite like some of those of the Cedar Valley—they may prove to be the same species—and it is quite likely that closely related or identical species may be represented in the Devonian faunas of Manitoba and the Mackenzie valley. Within the state the geographic distribution of some of the species is limited to one or two counties, for example, *Megistocrinus clarkei* is known only from the vicinity of Waterloo, *M. fitzpatricki* only from near Iowa City, and *Hexacrinus occidentalis* has been reported only from the outcrops at and below Davenport. On the other hand some species

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like the blastoid *Nucleocrinus obovatus* and the cystid *Strobilocystites calvini* range widely in the state, the first of these being known from Scott, Johnson, Benton, and Buchanan counties and the second from Johnson, Benton, Buchanan, and doubtfully from Floyd.

Some localities which have furnished good specimens are of interest. Certain zones in the vicinity of Iowa City, especially near Linder's boathouse, have yielded several good crinoids and blastoids. In other beds a little higher up stratigraphically and within the limits of Iowa City *Strobilocystites calvini* is found, although sparingly. At the quarries southwest of Solon and along the stream courses in this part of Johnson county are found a notable crinoidal limestone, named by Calvin the *Megistocrinus* beds. This locality, it is thought, has furnished more individual specimens of Devonian crinoids than any other in the state. The species which contributed the crinoidal part of this rock has long been called *Megistocrinus farnsworthi*. Comparison of specimens from the Solon beds, however, with the types of *M. farnsworthi* collected north of Iowa City, proves the former to belong to a larger, coarser and high-domed species, described in the paper alluded to under the name *Megistocrinus robustus*. Another *Megistocrinus* horizon may be seen near Brandon in which highly nodose plates and segments of a large stem occur abundantly and with them are separate plates and occasional calyces of *Strobilocystites calvini*. In outcrops of the Independence shale near Brandon, there occur occasional plates of the remarkable spiny crinoid, *Arthracantha*, the occurrence of which was reported before this Academy by the writer three years ago. At Waterloo a horizon has long been famous for a species of crinoid, *Megistocrinus clarkei* mentioned above. During its lifetime this crinoid was the unhappy host of a large parasitic snail. Over half of the specimens thus far found preserve parts of the snail (*Platyceras*) or the scar of its attachment. The locality has of late years been partly built over and the small quarries are either filled up or overgrown with brush and weeds. The longest known locality in the state is at Davenport and in the ravines between that place and Buffalo. There Owen, Hall, Worthen, Barris, and others have collected fine species of blastoids and crinoids during the last three-quarters of a century. *Nucleocrinus*, *Megistocrinus*, and *Stereocrinus* are the genera most commonly found here. The rarer species belong to the genera *Codaster*, *Melocrinus*, *Hexacrinus*, *Euryocrinus*, *Eutaxocrinus*, *Taxocrinus*, and two or three others.

Between Rockford and Nora Springs in Floyd county a zone can be traced along the left wall of the valley of Shell Rock river in which have been found calyces of two new species of *Hexacrinus*; separate plates and bits of the stem are common. The remains of this genus are more abundant here than at any other place known to the writer in North America. The horizon is higher than the Cedar Valley as known farther south and east and is called in the paper the Shell Rock limestone.

In certain zones of the Lime Creek beds in Floyd and Cerro Gordo counties occur abundant remains of the remarkable sea-urchin, *Nortonechinus welleri*. This urchin was briefly described before this academy some years ago. The best localities for its remains are on the hills to the west and northwest of Rockford, and a few have been found at Hackberry Grove. In the same beds and at approximately the same localities, though at different horizons, have been found two other sea-urchins, namely, *Xenocidaris americana*, and *Devonocidaris jacksoni*. These sea-urchins are new not only to the Iowa Devonian but the species are unknown elsewhere. In fact the locality proves to be unique for the whole world. The Lime Creek beds have also yielded four species of crinoids. They are rare and belong one to each of the following genera, *Melocrinus*, *Dactylocrinus*, *Clidochirus*, and *Cyathocrinus*.

A study of the genera represented in our Devonian shows that of the twenty-two represented only three are wholly limited in their distribution to Iowa; these are *Strobilocystites*, *Nortonechinus*, and *Devonocidaris*. Nine of the twenty-two occur also in the Devonian of Illinois, Wisconsin, Missouri, and Michigan; twelve in the New York Devonian; one in Tennessee; six in the Kentucky-West Virginia-Ohio region; three are reported from Canada; and eight from Europe.

The finding in Iowa of *Arthracantha*, heretofore limited to the vicinity of Lake Erie, of *Dactylocrinus*, a rare but world-wide genus, of the meagerly known *Xenocidaris* of the German Devonian, and of the genus *Agelacrinites*, are important contributions to the distribution of these genera. Perhaps the most interesting fact in the study of distribution is the recognition of genera and species of European affinities, especially those related to the Rhenish Devonian. Further study, in the opinion of the writer, will further emphasize the relationship of our Devonian with that of the Eifel beds of Europe.