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## Oldest Flowering Plants are From Iowa

Charles Keyes

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only that portion above the coral reef, and known as the Hutchison formation. All the numerous Callaway fossils common to the two states come from this uppermost Cedarian horizon. In view of the Callaway being the first title proposed for the formation it is now introduced into Iowa terranal terminology.

DES MOINES, IOWA.

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## EXTENSION OF MARYVILLE LOWLAND INTO IOWA

CHARLES KEYES

In the recent description of the major physiographic provinces of Iowa (Pan-American Geologist, volume LXX, p. 39, 1936) the Loessial Hills belt and the Dividal Upland division were represented as reaching quite to the Missouri boundary, in the southwestern quarter of our state. Notwithstanding the circumstance that this is quite so, there is yet obvious diminishing force of the two provinces mentioned towards the extreme south. The area south of the Red Oak fault is very noticeably flattened and hollowed, and is occupied in the down-throw depression by little-resistant shales. This shallow basin is rimmed all about by limestone escarpments, and to a notable extent impresses its form upon the larger provincial features as to almost over-shadow them at times.

The basin feature is really a continuation, from Missouri, of what Marbut long ago defined as the Maryville lowland. And this title now seems very appropriate for the Iowa part of the physiographic province also.

DES MOINES, IOWA.

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## OLDEST FLOWERING PLANTS ARE FROM IOWA

CHARLES KEYES

Recent analysis of an abundant coal flora dislodged from "coal-balls," or "sulphur balls" of the miners, obtained near Des Moines, reveals a number of fine flowers showing all the essential structures of present-day forms. These occur near the base of the local coal measures. Stratigraphically the horizon is very low in the Mid Carbonic general column. Above this level are now known no less

than four miles of Des Moines coal shales, all of the Pennsylvanian coal series, of perhaps equal thickness, and all of the Missourian coal measures of corresponding thickness. This places the plant horizon only a few feet above the great erosional unconformity which planed off the Early Carbonic limestones and older strata, and carried the flowering plants twice the distance into the abyss of time than heretofore supposed or recorded. The determinations were made by Dr. William Darrah, of Harvard University, foremost paleobotanist of our day, the particular specimens involved being collected by Mr. Frederick O. Thompson of Des Moines. A large amount of additional material located by Mr. Thompson and others awaits detail-inspection and description, the results of which will soon place Iowa in the forefront in this country in interest in histological study of coal measures plant structures.

DES MOINES, IOWA.