About nine years ago the writer obtained from Mr. Crevecoeur, of Onaga, Kansas, some burs of *Xanthium* which contained many seeds to the bur. A brief description of these burs and an account of their origin have been given in another place,[2] under the name *Xanthium canadense,* var. *globuliforme* Crevecoeur, and the suggestion was made that they may represent a reversion to the ancestral type from which the evolution of the two-flowered condition of to-day proceeded. Recently Collins[3] noted a case of floral modification in *Crepis capillaris* which he interpreted as a reversion to remote ancestral condition. In this particular case, the reversion of *Crepis* to a form having bract-like paleae subtending the achenes was preceded by hybridization of two strains originally from Sweden and Holland, respectively. In the F_1 generation one of the hybrid offspring had this presumably ancestral type of flower cluster, whereas in the normal flower head the receptacle is smooth.

Collins believes that the evolution of species in *Crepis* may have been brought about by separation of a large group of interacting factors into smaller groups no longer capable of producing the generalized ancestral condition. Hybridization then may simply bring back the full combination of factors necessary to somatic expression of the ancient character.

In the case of *Xanthium* recorded above, the burs were collected in immature condition, and had been stored in an herbarium for some years before they were placed in my hands for study. Viability had been lost, and the opportunity of studying the morphological, physiological and genetic problems connected with this reversion was lost for the time being.

During the last year burs of this same type, with somewhat fewer florets, have been found again in a habitat hundreds of miles from Onaga, and separated by a time interval of fourteen years. The burs were found by Mr. A. A. Hansen, weed expert and extension worker in the Purdue Experiment Station, near Richland, Rush County, Indiana, during the autumn of 1922, and sent to the Field Columbian Museum for identification. Recognizing their scientific interest, Dr. Sherff called my attention to them, and kindly gave me the burs for propagation. Fortunately the seeds were found to be viable, and a number of vigorous plants are now growing in the garden of the Hull Botanical Laboratory. An abundance of material for study is assured.

It is not yet known whether hybridization precedes the appearance of this reversion or not, nor even whether it is a case of reversion. The original information furnished by Crevecoeur indicated that the plants might be hybrids. The writer desires additional field data regarding the frequency with which this peculiar modification arises in nature. The infrequency with which it is reported may be due in part to lack of close observation in the field. Field botanists, ecologists, naturalists and students of local floras from all parts of the United States are requested to observe the *Xanthium* population in their respective localities, and to communicate to me the finding of burs which show a many flowered capitulum.

These modified burs may be recognized by the replacement of the two terminal beaks of the bur by a double circlet of beaks surrounding a depression in the outer end of the bur. The photographs reproduced in the paper cited will assist in identification of burs. Any information regarding the occurrence of this type in nature will aid very materially in its interpretation.

CHARLES A. SHULL
THE UNIVERSITY OF CHICAGO

[2] Shull, Charles A., "An interesting modification in Xanthium," *Amer. Jour. Bot.,* 3:40–43, 1917.

[3] Collins, J. L., "Reversion in Composites," *Jour. Hered.,* 12: 129–133, 1921.

THE IOWA ACADEMY OF SCIENCE. II

Botany

The flora of the Olympic peninsula, Washington: ALBERT B. REAGAN.

The Pyrenomycetes or Black Fungi of Iowa: JESSIE PARISH.

The leaching of calcium from soil: WINFIELD SCOTT.

The relation of moisture content to the viability of seed corn: WINFIELD SCOTT.

Notes on the flora of Pine Creek Hollow, Dubuque county: L. H. PAMMEL.

Notes on plants at Whitehall, Michigan: L. H. PAMMEL and R. I. CRATTY.

The Burdock rust (Bullaria Bardanae) in Iowa: GUY WEST WILSON.

Polygonum in Iowa: G. L. WITTROCK. Examination of material in the herbaria of Grinnell, Ames and Iowa City reveals the presence of twenty species in the state. The distribution of each species is given.

Cuscuta in Iowa: G. L. WITTROCK. Examination of material in the herbaria of Grinnell and Ames reveals the presence of eleven species in the state. The distribution of each species is given, and a key to the species.

Citation of authority for Latin names: HENRY S. CONARD. The writer insists that for all persons who are not specialists in systematic botany, citation of the author of a name is meaningless. It is much more significant to name the manual or monograph consulted in determining the names.

The importance of the aerial environment in the growing of wheat in nutrient solutions: A. L. BAKKE. Growing wheat at three different seasonal periods, it has been

found that there is considerable variation in the composition of the culture giving optimum growth. The kind of culture is dependent upon the kind of environment under which the plant is grown. An optimum or "best" solution can be so regarded only according to the particular environment under which a plant is grown.

Plant observations in the field: B. SHIMEK.

Studies on the cytology of Melilotus alba: E. F. CASTATTER. The paper will cover the development of the anther, the behavior of the pollen mother cells, with special reference to the reduction of the chromosomes, and the formation of the pollen grains.

Some introduced plants in Fiji: ROBERT B. WYLIE.

The arborescent flora of a midwest farmstead: T. J. FITZPATRICK. The paper contains the results of observations made during August, 1922, in Buffalo county, Nebraska, upon dooryard and forestry plantings with respect to the prevalent environmental conditions.

The task of the botanist in Florida: THOMAS H. MACBRIDE. Threefold: 1, to understand the wonderful flora of the peninsula; 2, to save and conserve the forest resources of the state; 3, to aid the entomologists and chemists in the culture of citrus fruits.

A collection of Fiji and New Zealand Myxomycetes: THOMAS H. MACBRIDE.

Some Polypores found in Henry county: MARYE CARNAHAN.

Methods of modeling the Agaricaceae: KATHRYN GILMORE.

A study of growth of trees as revealed by the annual rings: MAX W. VAN HORN.

The germination of some trees and shrubs, and the juvenile state: L. H. PAMMEL and CHARLOTTE M. KING.

A day in Muskogee, Oklahoma: L. H. PAMMEL.

The occurrence of the dwarf Juniper (Juniperus horizontalis) near Rockford, Iowa: L. H. PAMMEL. A number of years ago Mr. Clement Webster and C. Harold Brown, of Charles City, sent to the writer a specimen of what he determined to be the above juniper. He wanted to make sure that the plant was not introduced. He had an opportunity last summer to not only confirm the identification previously made, but to determine that the plant was a native to the region; so far as he knows, the only locality in Iowa. Robinson and Fernald give the distribution as Newfoundland to New England and New York and northern Minnesota. This juniper is entirely out of its range. There are a couple dozen clumps on a clay hillside with a north exposure. Lime creek is about a quarter of a mile away to the north. The associated plants are interesting: the western woolly thistle (*Cirsium canescens*), the most eastern locality in Iowa; also *Petalostemum violaceum, Astragalus canadensis, Panicum virgatum* and *Phlox pilosa.*

The structure of some nectar glands of Iowa honey plants: WILLIAM S. COOK.

Geology

An excellent example of high clay bank erosion in Lee county, Iowa: BEN H. WILSON.

White clay in Clinton and Jackson counties: S. L. GALPIN.

Fossil Annelid jaws from the Devonian of Iowa: WALTER V. SEARIGHT.

The occurrence of a black bituminous shale near Palo, Linn county: GLENN S. DILLE.

An unusual well record in northwestern Iowa: JAMES H. LEES. The well recently drilled for the town of Holstein is remarkable in showing in its lower part, beneath the St. Peter sandstone and the Prairie du Chien limestone, a rather thin series of shales with an intercalated sandstone layer, which probably represents the great Cambrian sandstones of the Mississippi valley. Below these is about forty feet of somewhat quartzitic sandstone, a part of which is very red. This may correspond to the thick body of the Sioux quartzite, which is exposed less than a hundred miles to the northwest. Beneath this bed is a pink hard granite, which was penetrated for thirty feet. The total depth of the well is 2,040 feet, from a curb altitude of 1,439 feet.

Lake Huron winter beach forms: MAX LITTLEFIELD. Accumulations of pebbles and cobbles piled on a Lake Huron beach by wave action in re-entrants of the fring ing shore ice.

Phosphate in Iowa limestones: JOHN E. SMITH.

Experiences of a well digger: JOHN M. LINDLY.

The geographic distribution of Iowa Devonian echinoderms: A. O. THOMAS. Distribution of species is practically limited to the confines of the state and a given species seldom ranges through more than one formation. The genera in most cases have considerable geographic range, being found not only in the Devonian of neighboring states but some of them in more remote parts of the continent. *Arthracantha* and *Agelacrinus* are examples of the latter, while *Dactylocrinus* and *Xenocidaris* are found in the Devonian of Europe.

Some giant Stromatopora from near Iowa City, Iowa: A. O. THOMAS. A recently opened quarry in the Cedar Valley limestone has been the source of colonies of Stromatopora over a foot in diameter. They are of the multilamellar type common in the Iowa Devonian, but hitherto represented in this locality by individuals only a few inches in diameter.

Fossils from an outcrop in Des Moines, Iowa: A. O. THOMAS. The pit of the Capitol City Clay Company is typical of several highly fossiliferous exposures of the Henrietta beds in Des Moines and vicinity. Brief descriptions and illustrations of the commoner species, it is hoped, will stimulate local students and collectors.

The eruption of Mt. Tarawera, New Zealand: A. O. THOMAS. A visit was made by the writer in July, 1922, to the area covered by the ejectamenta of the 1886 eruption. The debris of that eruption was spread over an area close to 6,000 square miles. About one fourth of this area was thereby rendered unsuitable for agriculture. Except in the immediate vicinity of the mountain, natural and artificial re-forestation have quite reclaimed the region. Near the south end of the Tarawera rift violent mud eruptions have occurred within the last five years. Observations on the geysers at Waimangu and Rotorua also are noted.

Numerical limitations to glacial epochs: CHARLES KEYES. The five glacial till sheets which Iowa presents

critically demonstrate a periodic phenomenon that doubtless has some cosmical cycle for basis. Beginning with the Nebraskan till which extends farthest south in Kansas and Missouri, later tills are successively less extensive. This circumstance suggests that if there were successive retrogression, there should also be successive progression, until a maximum extension was reached in the Nebraskan till. In recent deep excavations in Des Moines under the ancient, south-facing bluff of the Raccoon River, where traces of such old tills would be most likely to occur and be protected, there appear to be remnants of at least two tills older than the Kansan drift which overlies them. Pre-Kansan tills need careful scrutiny with the idea in mind of a possible multiple nature.

Stratigraphic position of Sweetland black shales: CHARLES KEYES. When the black shales of Louisa County were first described and designated the Sweetland Formation there was ascribed a Devonian age to them. Since the appearance of the report these shales were more properly correlated with the black shales occurring farther south in Missouri, best assigned to the Carboniferous period. Recently a new interest is awakened in this formation. It has to be considered in its relations with similar shales now known to extend to the eastward to Ohio, and southeastward to Alabama. Through all this wide range there are many names attached and the new problem has to do with the adjustment of them in no less than nine states.

Water table of the loess: CHARLES KEYES. Writers on the loess frequently note the presence of curious ferruginous bands, two or three inches in thickness, traversing the deposits obliquely. So far as he is aware no one alludes to their possible cause. In certain extensive street grading in Des Moines a short time ago these "iron bands" were unusually well developed. They were plainly subparallel to the present surface of the ground and about eight feet down. They passed at this depth from the Wisconsin till above, through the loess bed in the middle, into the Kansan drift beneath. These bands manifestly marked the position of the old groundwater level before the hills were tapped by various excavations and the ground waters lowered or drained off. Old wells long since filled up and forgotten in the growth of the city but unearthed by the recent cuttings all go down to this old iron band.

Apparent fossil fruits from the Fort Union beds: M. A. STAINBROOK.

Chemistry

Iowa Section, American Chemical Society

An interesting deposit of lime: F. C. STANLEY.

Electrometric titration of chlorate, bromate, iodate with titanous ion: W. S. HENDRIXSON and N. L. CRONE. These substances may be thus directly determined, and the voltage curves show that the reduction takes place in two phases.

The incomplete oxidation of sulfite by dichromate: W. S. HENDRIXSON and P. W. HUSH. The dichromate reduced was four per cent. too low, probably due to formation of dithionate as in the action of sulfurous acid on permanganate.

The decomposition of double salts: NICHOLAS KNIGHT.

Substances dissolved in rain and snow: H. S. FRIES and NICHOLAS KNIGHT. A continuation of the work on the various substances dissolved in rain and snow. Forty-one samples of rain and snow were collected and analyzed from September 19, 1921, to June 2, 1922, inclusive. There was a total precipitation equivalent to 17.46 inches of rain, calling 12 inches of snow equal to an inch of rain. It was found that the precipitation of the latter part of October and the latter part of April happened to be identical. The nitrogen in nitrates and nitrites, free and albuminoid ammonia, chlorides and sulphates were determined.

Concerning the action of urease: E. W. ROCKWOOD.

The reaction of nitrogen trichloride with some unsaturated hydrocarbons: G. H. COLEMAN and ELIZABETH PICKERING.

Further observations and summary of results obtained in the study of the migration of acyl from nitrogen to oxygen: L. CHARLES RAIFORD.

(a) *Methods of acylation and effect of relative weights of acyl radicals:* J. R. COUTURE.

(b) *Effect of relative positions of amino and Hydroxyl Groups:* E. P. CLARK.

(c) *Effect of acidity of acyls:* H. P. LANKELMA.

(d) *Behavior of bases derived from condensed nuclei:* J. C. COLBERT.

Studies in orientation, I.: L. CHAS. RAIFORD and C. CARROLL HILMAN.

A study of the equilibrium between iodine and barium iodide in aqueous solution: J. N. PEARCE and W. G. EVERSOLE.

A study of the equilibrium between bromine and strontium bromide in aqueous solution: J. N. PEARCE and J. V. O'LEARY.

Further work on the equivalence of the activity of the halide ions: J. N. PEARCE and A. R. FORTSCH.

A sensitive test for copper in the electrolytic determination of copper: STEPHEN POPOFF and C. W. TUCKER.

Critical study of standardization of solutions used in iodimetry: STEPHEN POPOFF and J. H. WHITMAN.

The electrometric titration of tin: STEPHEN POPOFF and F. L. CHAMBERS.

A solubility survey—solubilities in sulfur dioxide.

III. *Solubilities in the 5th series of the periodic system at 25° C.:* I. C. BROWN and P. A. BOND.

IV. *Solubilities in the 8th series of the periodic system at 25° C.:* S. H. BOBROV and P. A. BOND.

V. *Solubilities in the 4th series of the periodic system at 25° C.:* F. W. PERISHO and P. A. BOND.

Notes on the mechanism of methylation reactions: HARRY F. LEWIS, SHERMAN SHAFFER and RUSSELL MORGAN.

The tetraalkylthiuramdisulphides: HARRY F. LEWIS and SHERMAN SHAFFER.

Synthetic hypnotics in the barbituric acid series: ARTHUR W. DOX.

The effect of impurities on the physical properties of oxychloride cements: BEN H. PETERSON.

JAMES H. LEES,
Secretary