must be free to be turned in any position for study. Only the color is lost in boiling. In some of the genera the critical determination of the species is scarcely possible without this treatment, which loosens up the connectives between the segments so that hidden, retractile parts may be exposed.

## DIAGNOSTIC CHARACTERS.

Stoneflies are the most primitive of winged insects. Metamorphosis is very slight, even nymphal gills in several genera being carried over into adult life. There is little of that specialization which in the higher insects fixes color patterns and the finer details of structure along sharply defined specific lines. All characters of coloration, venation, size and form vary enormously. Even secondary sexual characters, the ultimate criteria of species here as in other groups, are relatively inconstant. The form of the subgenital plate of the female has been much used to distinguish American species and a most useful character it is; but it should be used with discretion, for it is subject to malformation and to shrinkage and distortion on drying, and is altered somewhat with the age of the specimens. A critical study of the numerous species that have been based on variants of color patterns and variants of form of subgenital plate, has led us to the suppression of a good many names as synonyms, including some of our own. He who, familiar with the relative fixity of small characters in the higher orders, turns to the study of the Plecoptera, will soon learn that he is dealing with differences of another order and of wider latitude.

In the following pages we propose to give a brief review of those characters that have proved most useful in the systematic study of this order of insects; also, to point out certain limitations in the use of these characters.

Stoneflies are soft-bodied insects less constant in structural details, as already stated, than are the higher orders. Most readily observable and least distorted in drying are the wing venation and the proportionate length of the tarsal segments, and these will serve for recognition of the larger groups, while here, as elsewhere, the ultimate criteria for species are found in genitalia.

The head is broad and flattened, widest across the eyes, that are set far forward in Kathroperla (Pl. 1, fig. 11) and well to rearward in Acroneuria (Pl. 1, figs. 1, 2, 3, 5 and