the strictly socializing work of our actual high schools more definite, more effective and more nearly universal." The sixty-seven pages of bibliography at the close of the book deserve the highest praise. The titles are carefully selected, well arranged, and in part annotated. The editor has rendered a great service to students of secondary education, especially those offering courses in the subject.

Clayton C. Kohl

PLANT AUTOGRAPHS[1]

The importance of investigations on physiology of plants lies in the fact that it is only by the study of the simpler phenomena of irritability in the vegetal organisms that it is possible to elucidate the more complex physiological reactions in the animal. The difficulty of investigation lies in the apparent immobility of the plant. It is often impossible by visual inspection to distinguish even between specimens, one of which is alive and the other killed. Means have, therefore, to be discovered by which the plant itself is made to reveal its internal condition, and changes of that condition, by characteristic signals recorded by it. These responsive reactions may manifest themselves in change of form or in change of electric conditions. In his investigations the author has employed both methods of mechanical and electric response.

In recording mechanical response great error is introduced from friction of the writer against the recording surface. This has been overcome in the author's Resonant Recorder, where the record consists of a series of intermittent dots due to the vibration of the writing point. In this manner it is possible to record time-intervals as short as a thousandth part of a second. Moreover in order to eliminate completely all personal equation, the apparatus has been made perfectly automatic. Thus the plant attached to the recording apparatus is automatically excited by a stimulus absolutely constant. In answer to this it makes its own responsive record, goes through its period of recovery and embarks on the same cycle over again without assistance at any point from the observer.

Mimosa exhibits a remarkable periodic variation of excitability; the response being practically abolished in the early hours of the morning, the sensibility is gradually increased to a maximum by noon. The latent period of the leaf is one six hundredth part of a second. Crucial tests of the excitatory character of transmitted impulse are afforded by physiological blocks produced by the local application of cold, of poison and electrotonic block. These prove that the transmission of excitation in *Mimosa* is a process fundamentally similar to that occurring in the animal. The effects of drugs on plants are remarkably similar to the effects on animal tissues. The characteristics of the rhythmic tissues in animals and plants are precisely similar. There is hardly a single phenomenon of irritability observed in the animal, which is not also to be found in the plant.

[1] Abstract of a paper read before Section G of the American Association for the Advancement of Science at the Philadelphia meeting, by Professor J. C. Bose.

SPECIAL ARTICLES

INHERITANCE IN THE HONEY BEE

More or less time has been devoted by the writer, during the past four years, to a study of inheritance in the honey bee, as a project under the Adams Fund. Innumerable obstacles to the progress of this investigation have presented themselves, but sufficient data have accumulated to justify the announcement of a few interesting points.

The matings have been made, for the most part, at an isolated mating station on the Gulf Coast prairie, about forty miles northwest of Houston, Texas. The location of the station is almost ideal for this purpose, for there are no trees or shrubs affording shelter for bees and no bees occur except those purposely taken to the mating station.

The matings thus far have been confined to crosses between the Italian and Carniolan races. As is well known, the pure bees of the former race are distinctly yellow, while those of the latter are more or less gray, but always, when pure, devoid of yellow color. For the