might be purely mechanical and analogous to the control of one vibrating body by another, the medium of control in this case being the sensitiveness of one insect to the stridulations of another. But the fact that they often start all at once seems to bar out this hypothesis, and, indeed, is a fact difficult to account for in any way.

As to the pitch, it certainly seems as if one 'orchestra' were from a semitone to a tone removed from the other, but, as Mr. Scudder suggests, this may be only apparent. In case it is real, however, may it not be due to the falling into beat of each insect with those to whose stridulation it is most sensitive—namely, those that produce sounds approximating to its own in pitch? ARTHUR P. BOSTWICK.

NEW YORK, November 5th.

THE SCIENCE OF MENTATION.

EDITOR OF SCIENCE: Some time since a reference was made in SCIENCE to a paper published with the above title in the *Monist* for July. The author was reported to have studied by experimental methods the development of certain forms of 'mentation' in dogs. As I have been greatly interested in the subject of comparative psychology for years, and have myself been devoting much time to the study of the psychic development of animals from birth onward with investigation of the contemporaneous changes of a physical kind especially in the brain, I looked up the article referred to, written by Mr. Elmer Gates. Many of the statements and conclusions are of so remarkable a character that I should be glad to get further information, as would, no doubt, others also. We are told that seven shepherd puppies were confined in a completely darkened room for nine months; that the mother was permitted to go in and out; but we are not informed as to whether the mother was admitted for the sole purpose of suckling the puppies, though this is the natural inference. Now, if a dam is capable of supplying *seven* puppies at nine months of age with all the nourishment they require, as one specially interested in dogs and who has for years made a special study of these animals and bred them extensively, I should like to know the facts; for nothing of like kind is, so far as I am aware, on record, and on the face of it I should doubt the possibility of such a thing. I see no necessity for any such drain on the dam, yet Mr. Gates' paper leaves the matter in doubt.

Again, though the most sweeping conclusions are drawn as to results both positive and negative following functional use and disuse, of certain portions of the organism, and though these experiments stand almost or quite alone, but meagre details are given either of the experiments or the anatomical appearances, and not a single illustration either diagrammatic or other accompanies the paper, nor is there any intimation that such details or illustrations have been or are to be published elsewhere. I should like to point out that such work is of but little use to scientific men in its present form, for at best it is only suggestive, not demonstrative. It is to be hoped that if Mr. Elmer Gates can furnish the details and illustrations necessary to meet scientific requirements he will lose no time in doing so, as, if his experiments, etc., are reliable and his conclusions correct, they are not only of great scientific interest but of much practical importance to educationists and others. Mr. Gates' paper abounds in very stimulating 'mentation,' and much of it seems to fit very naturally into my own mental moulds. In asking for more details I think that I am writing in the interests of a large class of scientists and others.

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INVERTED IMAGE ONCE MORE.

IF Prof. Woodworth (see SCIENCE, October 25, p. 555) will look into my little volume on *Sight*, pp. 87 and 88, he will find described and explained not only the phenomena he refers to, but all his experiments with the lids. I have been familiar with the phenomena all my life, but first described and explained it in 1871 (see Phil. Mag., Vol. LXI., p. 266, 1871). I afterwards discovered that it had been previously explained by Priestley. It is not due to imperfect accommodation, as Prof. Cattell thinks, but to *refraction by the concave watery meniscus between the two lids and the surface of the cornea.* The following figure will explain itself and the phenomena in question. The central ray $c\ c^1$