on the recommendations of the commission. In fact, it is understood that it was Mr. Redfield's desire that congress should not take any action. He wholly ignored, and wished congress to ignore, the recommendations of the commission named by the National Academy of Sciences, the secretary of the Smithsonian Institution and the secretary of agriculture. It would be proper for the National Academy of Sciences, the official adviser of the government on scientific matters, to ask the president what action, if any, has been taken on the recommendations of the board which it assisted in naming; and if called upon again for expert advice, the academy would do well to inquire whether any attention would be paid to its advice when given.

The statement in *The Scientific Monthly* article that E. Lester Jones "has proved to be an efficient executive" was probably made without intimate knowledge of the facts. It is well known in the bureau of fisheries that just the reverse was true, as was clearly shown by the very extravagant and unbusiness-like administration of Alaska fishery matters of which Mr. Jones took entire charge. Two or three illustrations may be given. It is understood that the sending of supplies to the seal islands under Mr. Jones's management cost the government several thousand dollars more than it had cost before, and yet the natives suffered severely for want of food.

A certain important scientific investigation of the Alaska salmon, begun in 1910 and which required at least six years to reach conclusive results, was stopped in 1914, thus breaking the continuity of the investigation, with the result that the whole thing must be done over again if the results are to be of any value.

If these illustrations of inefficiency are not enough, inquiry might be made regarding the boat *Roosevelt* purchased by Mr. Jones for the Alaska service.

But if the appointment of a politician to the head of a scientific bureau is justified because the appointee proves to be a good executive, then President McKinley's appointment of Mr. Bowers as Commissioner of Fisheries is fully justified, as Mr. Bowers proved to be an excellent executive, who gave the bureau of fisheries a thoroughly business-like administration, during which more real productive scientific work was done than ever before by the bureau.

BARTON WARREN EVERMANN

FIREFLIES FLASHING IN UNISON

IN SCIENCE of February 4, 1916, page 169, I recorded for the first time an observation made fifty years ago of a large number of fireflies flashing in perfect unison. I have been on the lookout ever since that time for a confirmation of my observations, consulting every book on entomology and watching the fireflies ever since for the recurrence of this phenomenon without success. In *Nature* for December 9, 1915, is recorded a paper by W. G. Blair, Esq., entitled "Luminous Insects" in which reference is made to the remarkable synchronism of the flashes in certain species of European fireflies. A somewhat extended extract is given from Mr. Blair's address. A copy of this paper was sent to my friend Professor E. B. Poulton, of Oxford, and in return he has sent me a proof sheet from a book he is editing entitled "A Naturalist in Borneo" by R. Shelford, who died a few years ago, a former assistant of Professor Poulton. I am taking the liberty of presenting an extract from this advanced page:

> On the opposite bank was a small tree growing close to the water's edge, which was covered with thousands of fire-flies, small beetles of the family Lampyridæ; and I observed that the light emitted by these little creatures pulsated in a regular synchronous rhythm, so that at one moment the tree would be one blaze of light, whilst at another the light would be dim and uncertain. This concerted action of thousands of insects is very remarkable and not easy of explanation. Another instance of it was mentioned by Cox; certain ants that are found very frequently proceeding in columns along the floor of the jungle, when alarmed, knock their heads against the leaves or dead sticks which they happen to be traversing; every member of a community makes the necessary movement at the same time, and as the movements are rapid a distinct loud rattling sound is heard. In this case the action is probably a danger-signal, and we can understand—theoretically at any rate—how it was brought

about. But the value to the species of the rhythmic-light pulsation of the fire-flies is not obvious, and as it is doubtful if the emission of phosphorescent light is under the control of the insect, or is merely a simple automatic process of metabolism, its synchronism is a most puzzling fact.

Dr. Hermon C. Bumpus wrote me that some years ago in riding from Falmouth to Woods Hole his attention was arrested by noticing in a field along the road a large number of fire-flies flashing synchronously.

EDWARD S. MORSE

A FURTHER NOTE ON POLYRADIATE CESTODES

THE issue of SCIENCE for February 4, 1916, N. S., Vol. 43, No. 1101, page 170, contains a note by Professor Barker referring to my article on "Polyradiate Cestodes" published in the *Journal of Parasitology,* September, 1915, calling attention to the omission of his previously reported cases of triradiate specimens of *Tænia pisiformis* and *T. serialis,* and to my error in considering that the case of triradiate *T. pisiformis* which I reported was the first on record. This is a valid criticism and it is regrettable that Professor Barker's paper should have been overlooked. None of the other criticisms made by Professor Barker, however, seems justifiable.

In the first place, in regard to the specific identification of the parasite, it has been my experience in the course of several years, during which time a large number of specimens of dog tapeworms have been examined, that *Tænia pisiformis* may be readily determined upon the basis of the gravid segments alone.

As to the other criticisms made by Professor Barker, although I attach much less importance to the results of the feeding experiments which I carried out than Professor Barker apparently supposes (for the reason that the results of a single experiment of that kind are of no great value as a rule, except when supplemented by the results of other experiments) it seems proper to discuss briefly certain points in my paper which appear to have been misinterpreted by Professor Barker.

With reference to using, in feeding experiments, material which had been in formalin for a few days, it was noted in my article that the use of such material on several other occasions had always resulted in the infestation of the experiment animals. In fact it has been found by repeated experience by myself and others in this laboratory, that the ova of *T. pisiforis* are extremely resistant to the action of formalin. Rabbits fed segments of *T. pisiformis* which have been kept a few days in a solution of formalin, not infrequently die shortly afterwards and on postmortem examination show a massive invasion of the liver with the early larval stage of the parasite.

It is a well-known fact that in the case of several species of parasites, the ova of which are characterized by a relatively thick egg shell, the eggs are affected but little if at all by formalin solutions. Ascarid eggs for example may be kept alive for months or even years, in formalin. Morris[1] when examining some human feces which contained many eggs of *Ascaris lumbricoides* and which had been preserved in a 2 per cent. solution of formalin for two years, found that some of the eggs contained actively motile embryos. Four months later there was an apparent increase in the number of eggs containing embryos. In my own experience it has been found that a formalin solution is a very satisfactory medium in which to incubate ascarid eggs, as it prevents the growth of molds, bacteria, etc., without interfering with the development of the embryos. Various other substances commonly destructive to protoplasm have been found not to interfere with the development of ascarid eggs. Leuckart[2] notes that the eggs of *Ascaris mystax* may reach complete development in alcohol, chromic acid and turpentine, while Bataillon[3] has had ova of *Ascaris megalocephala* showing living embryos after having been for six months in Flemming's solution. The latter also finds that the embryos in the eggs remain intact and active in 50 per cent. alco-

[1] *Johns Hopkins Hospital Bulletin,* Vol. 22, August, 1911, pp. 299–300.

[2] "Die menschlichen Parasiten," Vol. 2, 1 Lief., 1867, p. 212.

[3] *Arch. Entwickelungsmech.,* Vol. 2, 1901, p. 149.