In order to carry on the work a separate section of the laboratory has been established under the title of the "Department of Synthetic Chemistry," which will be under the immediate direction of Dr. H. T. Clarke, well known for his publications on organic chemistry.

In order to meet the need expressed in Professor Gortner's letter and to make available to research laboratories in this country the organic chemicals which they require, it is proposed that chemicals for research work shall be supplied at the lowest possible price. At first, no doubt, this price will necessarily be higher than that charged by the German firms before the war, but it is hoped that eventually the profit made on chemicals supplied for commercial purposes may enable the rarer materials made in small quantities for research work to be sold at a price which will be within the reach of all who require them.

At first, of course, the laboratory will be able to supply only a limited number of substances, and these in small amounts, but the department will be expanded to meet the demand and with the assistance of other laboratories interested in organic chemistry, and of the firms who are producing dyes and intermediates, it is hoped that after a time an adequate supply of synthetic organic reagents can be made available.

It is possible that laboratories may have in stock unusual reagents which they are unlikely to require. If any laboratories possessing such reagents will write to us we shall be glad to make an offer for the materials, thus making them available on the market.

Our thanks are due to many of the chief chemists of the country who have encouraged us to commence this work and especially to Professor Roger Adams for the way in which he has received our proposals and has assisted us by placing at our disposal the information as to this work which he has accumulated.

Communications regarding reagents should be addressed to the Research Laboratory, Eastman Kodak Company, Rochester, N. Y.

C. E. K. Mees

July 11, 1918

FIREFLIES FLASHING IN UNISON

In Science for February 4, 1916, I published a short note entitled "Fireflies Flashing in Unison" in which I gave my own observations with confirmatory notes of K. G. Blair regarding a European species. This note led to a discussion in the pages of Science in which various views were expressed; one writer throwing doubt on the correctness of my observations, another suggesting that I was deceived and the effect psychological, another that it was the result of coincidence and still another giving confirmatory evidence of the phenomenon in question.

In Science for September 15, 1916, I was able through the courtesy of Professor E. B. Poulton of Oxford, to note the advanced pages of a book entitled, "A Naturalist in Borneo," by Mr. S. Shelford, an old student of Professor Poulton. Mr. Shelford describes vividly the synchronous flashing of fireflies he observed in Borneo. In Science for October 27, 1916, Mr. F. Alex. McDermott, who has made a special study of the light emission of American Lampyridæ,[1] has found no periodicity in the phenomenon. In Science for November 17, 1916, Mr. H. A. Allard says:

> The synchronal flashing of fireflies appears to be a very rare phenomenon in North America. So rarely does it seem to occur that one may consider himself fortunate if he has observed the phenomenon once in a lifetime.

His observations were made at Oxford, Mass. A heavy thunder storm had passed over followed by a profound calm, the air was very warm and humid; thousands of these insects were sailing low over the ground flashing incessantly as far as the eye could see. After a while a most remarkable synchronism in the flashing appeared to take place, giving one the impression of alternating waves of illumination and darkness in the distance. Though Mr. Allard had given great attention to the flashing of fireflies since these observations were made twelve years before he had never since observed this phenomenon.

In Science for September 28, 1917, Mr. Frank C. Gates, of Carthage College, from ex-

[1] *Canadian Entomologist*, Vols. 42, 43, 44.

periments made on two specimens in a tent with a flashlight and observations made in the Philippines concludes that the synchronism in the flashing of a group of fireflies is accidental and of very rare occurrence

Mr. Olaf O. Nylander, of Caribou, Me., to whom I sent a copy of my firefly article, in a letter dated October 8, 1916, says that a number of years ago, while walking from Caribou Mills to his home, he noticed in a small clearing the greatest assembly of fireflies that he had ever seen; the ground and stumps were fairly aglow. The flashes were not perhaps as regular as an army officer would like to see in regimental drills but were so rhythmic that any one would take note of their action. He also observed that the air was very damp at the time.

In *The Scientific American* of January 19, 1918, Mr. John V Purssell, of Washington, D. C., records that

> In the town of Cotabato, Island of Mindanao, P. I., a few years ago, there were two trees about the size of apple trees, and perhaps a hundred feet apart, and every evening these were filled with fireflies which flashed in synchronism, first one tree lighting up and then the other. There must have been several thousand insects in each tree, yet the synchronism was so perfect that rarely or never did a single firefly flash at the wrong time.
>
> To the best of my recollection the illuminated period lasted about two or three seconds and the dark period perhaps twice that long. I can positively vouch for the accuracy of the foregoing for it seemed so strange, and produced so beautiful an effect that I thought it one of the most remarkable things in the Philippines, and it made a deep impression on me.

The independent observations of this synchronism in the flashing of fireflies by the author in Gorham, Me.; K. G. Blair in Europe; S. Shelford in Borneo; Dr. H. C. Bumpus near Woods Hole, Mass.; H. A. Allard in Oxford, Mass.; Olaf O. Nylander in northern Maine and John C. Purssell in Mindanao, Philippine Islands, are I think quite sufficient to establish the fact that these insects do at times flash in unison. The rarity of the occurrence is a mystery.

In this connection a coincidence might explain a well-known occurrence in a small group of individuals, as at a dinner party when they all cease talking for an appreciable time, but would not explain the quiet pause which one sometimes observes in a large dining hall containing hundreds of diners. I discovered the cause of this phenomenon some years ago. While dining with a number of friends at the Parker House the guests at a neighboring table had been noisy, even boisterous, doubtless we had been somewhat noisy too. The neighboring table suddenly became quiet and we stopped talking to see if the noisy ones had gone, but they were still there, other tables looked about for the pause and this hush spread rapidly through the hall. Dear old Dr. Virchow had often observed this pause and thought my explanation correct. He also told me that it was a saying in his country that when this hush occurred an angel was passing through the room, also that a lieutenant was paying his debts! So in regard to fireflies a dozen or more might flash for awhile in unison as a coincidence, but when thousands are observed to flash in unison no doctrine of probability or chance can account for it.

EDWARD S. MORSE

SALEM, MASS.,
July 2, 1918

THE VERO MAN AND THE SABRE TOOTH

IN determining the relative antiquity of the Vero man and the fossil plants and animals there associated, certain larger factors yet require attention. The direct evidence has been minutely examined from varying points of view: geologic, paleontologic, anthropologic. It seems conclusive that the man of Vero reached one of the last lairs of the sabre-toothed tiger, as Dr. Hay contends; while Berry discloses a degree of change in the local flora not to be ignored. But, on the other hand, the anthropologists show that the accompanying artifacts are like those elsewhere recent.

Perhaps the anthropologists have the best of the *argument,* as such. Florida has retained much its present outline since the close