



# Science Frontiers

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[Issue Contents](#)



## Synchronous Rhythmic Flashing Of Fireflies

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### Other pages

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- [Home Page](#)
- **Science Frontiers Online**
  - [All Issues](#)
  - [This Issue](#)
- [Sourcebook Project](#)
- [Sourcebook Subjects](#)



We humans are pretty smug about our ability to communicate complex messages via sound waves. Of course, we recognize that whales and other cetaceans also seem to "talk" to one another, and that many animals employ their sense of smell for relaying messages. But most of us do not realize that lowly fireflies congregate to communicate en masse, with untold thousands of individuals cooperating in huge synchronized light displays. In reading some of the descriptions of these great natural phenomena, one recalls the light displays used to communicate with the aliens in the movie Close Encounters of the Third Kind.

J. Buck has been studying flashing fireflies for over half a century. In fact, his first review paper was published in 1938. Buck has now brought that paper up to date in the current Quarterly Review of Biology with a 24page contribution. It is difficult to do justice to this impressive work in a newsletter. Our readers will have to be satisfied with a mere two paragraphs, in which Buck summarizes some of the in synchronies.

"More than three centuries later Porter observed a very different behavior in far southwestern Indiana in which, from the ends of a long row of tall riverbank trees, synchronized flashes '...began moving toward each other, met at the middle, crossed and traveled to the ends, as when two pebbles are dropped simultaneously into the ends of a long narrow tank of water...'

"In 1961 Adamson described a still different type of display, the first from Africa: 'It is then too that one sees the great belt of light, some ten feet wide, formed by thousands upon thousands of fireflies whose green phosphorescence bridges the shoulder-high grass. The fluorescent band composed of these tiny organisms lights up and goes out with a precision that is perfectly synchronized, and one is left wondering what means of communication they possess which enables them to coordinate their shining as though controlled by a mechanical device.' A generation later, a flurry of full- dress bioluminescence expeditions had obtained photometric, cinematographic and electrophysiological measurements from congregational displays in Thailand, New Britain, New Guinea and Malaysia, confirming the reality of mass synchrony and uncovering a variety of types. Contemporaneously, Otto and Smiley photographed group wave synchrony of flying fireflies in central Texas, Ohba recorded two frequencies of synchrony in a Japanese species and Cicero described spectacular and enigmatic bouts of chain-flashing, tightening into synchronized strings, by fireflies on the ground in, of all places, the Arizona desert. Thus, work of the past 20 years has shown that 'synchrony' is a complex of behaviors."

(Buck, John; "Synchronous Rhythmic Flashing of Fireflies. II," *Quarterly Review of Biology*, 63:265, 1988.)

**Comment.** Most theorists take the simplistic view that firefly displays are connected with mating and reproduction. Perhaps related are the complex, geometrical, luminous displays seen at sea, and attributed to bioluminescent organisms in the water. See GLW in the Catalog, **Lightning, Auroras, Nocturnal Lights**. This book is described [here](#).

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### Other Sites of Interest

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