

1 次のテキストには 18 の空欄(1)～(18)があり、各空欄に対する 4 つの選択肢が与えられています。各空欄に最も適切と思われる選択肢を 1 つ選びなさい。

For 300 years, Western travelers to Southeast Asia __ (1) __ with tales of enormous groups of fireflies blinking on and off in harmony, in displays that supposedly stretched for miles along the riverbanks. These reports, often written in the romantic style favored by authors of travel books, __ (2) __ to widespread
5 disbelief. How could thousands of fireflies orchestrate their flashings so precisely and __ (3) __ scale?

In the years between 1915 and 1935, *Science* published 21 articles on this mysterious form of light show. Some dismissed the phenomenon as a fleeting coincidence. Others __ (4) __ it to peculiar atmospheric conditions of exceptional
10 humidity, calm, or darkness. A few believed there must be a __ (5) __, a firefly that leads all the rest. The naturalist Hugh Smith wrote in exasperation that “some of the published explanations are more remarkable than the phenomenon itself.” But he confessed that he too was unable to offer any explanation.

For decades, no one could __ (6) __ a good theory. By the late 1960s, however,
15 the pieces of the puzzle began to fall into place. One clue was so obvious that nearly everyone missed it. Fireflies not only flash in harmony — they flash in rhythm, at a constant tempo. Even when __ (7) __ from one another, they still keep to a steady beat. That implies that each insect must have its own means of keeping time, some sort of internal clock. This hypothetical clock is still unknown but is presumed to be
20 a group of neurons somewhere in the firefly’s tiny brain.

The second clue came from the work of the biologist John Buck, who did more than anyone else to make the study of fireflies scientifically __ (8) __. He suggested that the fireflies must somehow be adjusting their rhythms in response to the flashes of others. To test that __ (9) __ directly, Buck and his co-workers conducted

25 laboratory studies where they flashed an artificial light at a firefly (to imitate the
flash of another) and measured its response. They found that an individual firefly
will shift the timing of its flashes __ (10) __, predictable manner, and that the size and
direction of the shift depend on when in the cycle the stimulus was received. For
some species, the stimulus always advanced the firefly's rhythm, __ (11) __ its clock
30 ahead; for other species, the clock could be either delayed or advanced, __ (12) __ on
whether the firefly was just about to flash, whether it was halfway between flashes,
and so on.

Taken together, the two clues suggested that the flash rhythm was regulated by
an internal, resettable clock. And that immediately suggested a possible
35 synchronization mechanism: In a mass of flashing fireflies, every one is continually
sending and receiving signals, shifting the rhythms of others and being shifted by
them __ (13) __. Out of the mass of flashing lights, synchronization somehow
emerges naturally.

Thus we are led to entertain an explanation __ (14) __ unthinkable just a few
40 decades ago — the fireflies organize themselves. No conductor is required, and it
doesn't __ (15) __ the weather is like. Synchronization occurs through mutual cuing,
in the same way that an orchestra can keep perfect time without a conductor.
What's odd here is that the insects __ (16) __ be intelligent. They have all the
ingredients they need: Each firefly __ (17) __ something like a little metronome __
45 (18) __ timing adjusts automatically in response to the flashes of others. That's it.