

[I] 次の英文を読み、下の問に答えなさい。

Low-frequency sounds originated as a reflection of aggression and dominance in the distant evolutionary past of vocal *vertebrates—in reptiles and *amphibians, which preceded the appearance of mammals and birds. To examine the evolution of a species or trait or some aspect of behavior that leaves no fossils, scientists can study living animals that can trace their lineages to [1] species. Unlike mammals and birds, amphibians continue to grow throughout their lives. In nature, bigger is usually better. With bullfrogs, for instance, large size is an accurate indicator of age and survivability. The bullfrog is also a classic illustration of the origin of low-frequency vocal signals.

The Ozark Mountains, where I grew up, are located in a temperate region along the Missouri and Arkansas border and are one of the oldest ranges on earth. They contain an unusual diversity of animals, including an orange-throated lizard that runs on its hind legs like one of the small raptors in *Jurassic Park*. In the spring and summer, the region looks a lot like a jungle. My grandparents lived on a remote hilltop and had a pond near their house that was thick with American bullfrogs, the [2] North American frog. Occasionally these frogs prey on small birds and snakes. It is a rare treat to see a bullfrog catch a bird. On summer evenings, male bullfrogs would gather at the water's edge and begin serenading the females with their deep, vibrant chorus. I would crawl slowly and quietly to the top of the red clay pond bank, being careful not to disturb the frogs, and listen to the concert. The females floated about 15 or 20 feet out from the bank, with their heads and ears raised above the surface, and their legs and flippers dangling behind them, like little scuba divers. When the females hear a deep and strong croak that they like, they swim to the male and lay their eggs for him to fertilize. Females prefer mates that have the [3] croaks, and those frogs naturally have the biggest bodies.

The evening bullfrog serenade is serious business. Before the concert, the males push and lunge at each other and wrestle with their forearms for the best positions at the water's edge. [4] males usually win conflicts with [5] males for favored territories on the pond's bank, but fighting can be risky, especially for the [6] bullfrogs. Somewhere in the evolutionary past, animals learned that a low, deep voice was a good indicator of size and strength. With the rise of communication as a substitute for violence, animals realized that 1) if [①] [②] [③], [④] [⑤] [⑥] [⑦] rather than [⑧]. Communicating rather than fighting was favored by natural selection, and the low-frequency sounds emitted by [7] animals came to be linked with successful aggressive encounters and dominance and thus became the basis of growls. Since the bullfrogs and other animals

that emitted the lowest sounds were bigger, they had the bonus of being favored by females, so that the force of sexual selection also came 1. Frogs that could expand their throats could get a [8], more resonating sound. Eventually, they developed the balloonlike sacs that enhance the resonance and low frequency of the croak. This trait, in turn, made some bullfrogs appear [9] and more intimidating to competing males, in front of which they [10] their throat sacs to appear as large as possible.

Looking big is universally important to mammals, including humans, and birds during aggressive conflicts. When I made myself look big to the hounds in Afghanistan, I was speaking their nonverbal language as well as my own. I spread my arms, squared my shoulders, and growled to say, "I'm bigger and scarier than you, so leave me alone." Birds will partially [10] their wings, or sometimes fold them back to appear larger. When they arrive at feeder in the backyard, they will raise their wings and sometimes lunge at each other as they jockey for the best position at the trough. I often put breadcrumbs out on the ledge of my balcony for the house sparrows during the late winter. Like most birds, sparrows are very aggressive with each other. When conflicts arise, their feathers stand up a bit as they chatter harshly. The older and larger male house sparrows, which possess a dark badge of dominance on their breast, usually win and get first pickings of the crumbs.

Among mammals, one of the primary ways of making oneself look bigger to an opponent is to raise the hair on the body. This cannot be done consciously. *Piloerection is an involuntary physiological response to fear that is common in both mammals and birds. It happens reflexively in us humans, too. ²⁾ If a person [①] [②] [③] and [④] [⑤] [⑥] [⑦], the fine hairs on the back of the neck and arms will stand up without any conscious will involved. When chimpanzees are threatened or frightened, the hair all over their bodies stands 2. During the filming of *Jane Goodall's IMAX film on the *Gombe chimps, one of the young chimpanzees, a toddler, became extremely curious about the large IMAX camera. He wanted to race over and explore it, but the camera was a new and frightening object. Finally, with his coarse dark hair raised all over his little body, the chimpanzee ran toward the camera, touched it, screamed, and ran away. (Tim Friend "Animal Talk" より)

注 *vertebrates : 脊椎動物

*amphibians : 両生類

*pilo- : 「羽毛の」の意味の接頭語

*Jane Goodall : 1939年英国生まれの野生チンパンジー研究者

*Gombe : タンザニアの国立公園

問1 [1]～[9] に下から最もふさわしい語を選びなさい。同じ語を何度使っても構いません。
ただし、文頭にくる場合の大文字化は無視します。解答は [1]～[9] の解答欄にマークしなさい。

1. deeper 2. deepest 3. larger 4. largest 5. older 6. oldest
7. smaller 8. smallest

問2 下線部1) の①～⑧に以下の選択肢の語(句)を入れて意味の通る文を作るとき、
⑤, ⑦, ⑧に入る語(句)の番号を答えなさい。解答は⑤は[10], ⑦は[11], ⑧は[12]の解答欄にそれぞれマークしなさい。

1. a deeper voice 2. an opponent 3. back off 4. had 5. it 6. paid
7. risk injury 8. to

if [①] [②] [③], [④] [⑤] [⑥] [⑦] rather than [⑧]

問3 1 に入る最も適切な語(句)を選びなさい。解答は[13]の解答欄にマークしなさい。

1. about 2. into focus 3. into play 4. into foresight 5. true

問4 【 10 】に共通する最も適切な動詞を選びなさい。解答は[14]の解答欄にマークしなさい。

1. enhance 2. expand 3. enrich 4. fill up 5. raise

問5 下線部2) の①～⑦に以下の選択肢の語(句)を入れて意味の通る文を作るとき、
①, ④, ⑦に入る語(句)の番号を答えなさい。解答は①は[15], ④は[16], ⑦は[17]の解答欄にそれぞれマークしなさい。

1. a darkened alley 2. from behind 3. into 4. senses 5. someone
6. walks 7. walking up

If a person [①] [②] [③] and [④] [⑤] [⑥] [⑦],

問6 2 に入る最も適切な語(句)を選びなさい。解答は[18]の解答欄にマークしなさい。

1. by 2. horizontally 3. on edge 4. on end 5. on head

〔Ⅱ〕 次の英文を読み、下の問に答えなさい。

In the 1950s, an American psychologist named Solomon Asch did a series of experiments that tested people's tendency to be intimidated into conforming. The subject entered a room where there were nine chairs in a semi-circle, and was seated next from the end. Eight other people arrived one by one and occupied the other chairs. Unknown to the subject, they were all ¹⁾ accomplices of the experimenter. Asch then showed the group two cards in turn. On the first was a single line; on the second there were three lines of different length. Each person was then asked which of the three lines was the same length as the line they had first seen. This was not a difficult test; the answer was obvious, because the lines were two inches different in length.

But the subject's turn to answer came eighth, after seven others had already given their opinion. And to the subject's astonishment the seven others not only chose a different line, but all agreed on which line. The evidence of his senses conflicted with the shared opinions of seven other people. ²⁾ Which to trust? On twelve out of eighteen occasions the subject chose to follow the crowd and name the wrong line. Asked afterwards if they had been influenced by others' answers, most subjects said no! ³⁾ They not only conformed, they genuinely changed their beliefs.

This clue was picked up by David Hirshleifer, Sushil Bikhchandani and Ivo Welch, who are mathematical economists. ⁴⁾ They take conformity as read and try to understand why it happens. Why do people follow the local fashion in time and place? Why are skirt lengths, fashionable restaurants, crop varieties, pop singers, news stories, food fashions, exercise fads, runs on banks, psychiatric excuses and all the rest so tyrannically similar at any one time and in any one place? Prozac, satanic child abuse, aerobics, Power Rangers — whence these crazes? Why does the primary-election system of the United States work entirely on the proposition that people will vote for whoever seems to be winning, as judged by the tiny state of New Hampshire? Why are people such ⁵⁾ sheep?

There are at least ⁶⁾ five explanations that have been proposed over the years, none of which is very convincing. First, those who do not follow the fashion are punished in some way — which is simply not true. Second, there is an immediate reward for following the fashion, as there is for driving on the correct side of the road. Again, usually false. Third, people simply irrationally prefer to do what others do, as herrings prefer to stay in the shoal. Well, perhaps, but this does not answer the question. Fourth, everybody comes independently to the same conclusion, or fifth, the first people to decide tell the others what to think. None of these explanations begins to make sense for most conformity.

In place of these hypotheses, Hirshleifer and his colleagues propose what they call an informational cascade. Each person who takes a decision — what skirt length to buy, what film to go and see, for instance — can take into account two different sources of information. One is their own independent judgment; the second is what other people have chosen. If others are unanimous in their choice, then the person may ignore his or her own opinion in favor of the herd's. This is not a weak or foolish thing to do. After all, 7) other people's [①] [②] [③] [④] [⑤] [⑥] [⑦]. Why trust your own fallible reasoning powers when you can take the temperature of thousands of people's views? A million customers cannot be wrong about a movie, however crummy the plot sounds.

Moreover, there are some things, such as clothes fashion, where the definition of the right choice is itself the choice that others are making. In choosing a dress, a woman does not just ask, 'Is it nice?' She also asks, 'Is it trendy?' There is an intriguing parallel to our faddishness among certain animals. In the sage grouse, a bird of the American high plains, the males gather in large flocks called leks to compete for the chance to inseminate the females. They dance and strut, bouncing their inflatable chests about with abandon. One or two males, usually the ones holding court near the center of the lek, are by far the most successful. Ten percent of the males can perform ninety percent of the matings. One of the reasons this is so is that the females are great copiers of each other. A male is attractive to females merely because he has other females already surrounding him, as 8) experiments with dummy females easily demonstrate. This faddishness on the part of the females means that the choice of male can be rather arbitrary, but it is none the less vital that they follow the fashion. Any female that breaks ranks and picks a lonely male will, in all probability, have sons who inherit their father's inability to attract a crowd of females. Therefore, popularity in the mating game is its own reward.

(Matt Ridley "The Origins of Virtue" より)

問1 1) accomplices とほぼ同じ意味の語は次のどれか。解答は [19] の解答欄にマークしなさい。

1. associates
2. companies
3. leaders
4. students
5. subjects

問2 2) Which の指す語句の最も適切な組み合わせは次のどれか。解答は [20] の解答欄にマークしなさい。

1. shared opinions – seven other people
2. the line the subject chose – different lines
3. his senses – twelve out of eighteen subjects
4. the evidence of his senses – shared opinions
5. the line the subject chose – the line seven others chose

問3 3) They not only conformed, they genuinely changed their beliefs. と最も意味の近い文は次のどれか。解答は [21] の解答欄にマークしなさい。

1. They changed their beliefs because they sincerely agreed.
2. They thought so originally, and were not influenced by other opinions.
3. They didn't change their beliefs because they were affected by other opinions.
4. They changed their beliefs only because they were forced to do so by other people.
5. They changed their beliefs not only because they were affected by other opinions, but because they sincerely agreed.

問4 4) They take conformity as read の意味は次のどれか。解答は [22] の解答欄にマークしなさい。

1. 彼らは快適に読みとおした
2. 彼らはその時々流行に従った
3. 彼らは書かれているとおりに従った
4. 彼らはそれを周囲への同調と受けとった
5. 彼らはそこから形式化というものを読み取った

問5 5) sheep の意味は次のどれか。解答は [23] の解答欄にマークしなさい。

1. a crazy person
2. an obedient person
3. an unthinking person
4. a farm animal with thick wool
5. a person deceiving other people

問6 6) five explanations について, first から fifth までの説明を要約した表現として, それぞれに最もふさわしいものは次のどれか。解答は first は [24], second は [25], third は [26], fourth は [27], fifth は [28] の解答欄にそれぞれマークしなさい。

1. benefit
2. coincidence
3. crime
4. following initiative-takers
5. leader
6. negative reinforcement
7. school

問7 下線部7) の ①～⑦ に以下の選択肢の語を入れて意味の通る文にしたとき, ①, ②, ⑦に入る語の番号を答えなさい。解答は ①は [29], ②は [30], ⑦は [31] の解答欄にマークしなさい。

1. a
2. behavior
3. information
4. is
5. of
6. source
7. useful

other people's [①] [②] [③] [④] [⑤] [⑥] [⑦] .

問8 8) experiments は具体的にどんな状況を示すことになるか。次から選びなさい。解答は [32] の解答欄にマークしなさい。

1. females crowd around dummy females in order to attract a male
2. flocking females are more attractive to males than dummy females
3. a male surrounded by dummy females is unattractive to other females
4. females will flock together around a male who is surrounded by dummy females
5. dummy females surrounding a male prevent other females from approaching him

〔Ⅲ〕以下の英文を読み、下の間に答えなさい。

Chimpanzees are skillful tool users, and use sticks to harvest termites, leaves as sponges, and stones to crack nuts. But – so far, at any rate – no chimpanzee in the wild has ever been seen to manufacture a stone tool. Humans began producing sharp-edged tools 2.5 million years ago by hitting two stones together, thus beginning a trail of technological activity that highlights human prehistory.

The earliest tools were small flakes, made by striking one stone – usually a lava cobble – with another. The flakes measured about an inch long and were surprisingly sharp. [1], they were put to a variety of uses. We know this because Lawrence Keeley, of the University of Illinois, and Nicholas Toth, of Indiana University, microscopically analyzed a dozen such flakes from a 1.5-million-year-old campsite east of *Lake Turkana, looking for signs of use. They found different kinds of scratches on the flakes – marks indicating that some had been used to cut meat, some to cut wood, and others to cut soft plant material, like grass. When we find a scattering of stone flakes at such an archeological site, we have to be creative to imagine the complexity of life that took place there, because the relics themselves are (2): gone is the meat, the wood, and the grass. We can imagine a simple riverbank campsite, where a human family group butchered meat in the shade of a structure made from small trees and also beneath a roof made of reeds, even though all we see today are the stone flakes.

The earliest stone-tool assemblages that have been found are 2.5 million years old; they include, besides flakes, larger implements, such as choppers and scrapers. In most cases, these items, too, were produced by the removal of several flakes from a lava cobble. Mary Leakey spent many years at *Olduvai Gorge studying this earliest of technologies – which is known as the Oldowan industry, after Olduvai Gorge – and in so doing established early African archeology.

As a result of his experimental toolmaking, Nicholas Toth suspects that the earliest toolmakers did not have the specific shapes of the individual tools (3) – a mental template, if you like – when they were making them. More likely, the various shapes were determined by the original shape of the raw material. The Oldowan industry – which was the only form of technology practiced until about 1.4 million years ago – was essentially (4) in nature.

An interesting question arises about the cognitive skills implied by the production of these artifacts. Were the earliest toolmakers employing mental abilities ⁵⁾ comparable to those of apes, but in a different way? Or did it require them to be of higher intelligence?

The brain of the toolmakers was some 50 percent bigger than that of apes, so the latter conclusion seems intuitively obvious. Nevertheless, Thomas Wynn, an archeologist at the University of Colorado, and William McGrew, a primatologist at the University of Stirling, Scotland, disagree. They analyzed certain manipulative skills displayed by apes, and in a paper they published in 1989, called 'An Ape's View of the Oldowan,' concluded: 'All the spatial concepts for Oldowan tools can be found in the minds of apes. Indeed, the spatial competence described above is probably true of all great apes and does not make Oldowan tool-makers unique.'

I find this statement surprising, not least because I have seen people try to make 'Stone Age' tools by bashing two rocks together, with little success. That's not how it was done. Nicholas Toth has spent many years perfecting techniques for making stone tools, and he has a good appreciation of the mechanics of flaking stone. To work efficiently, the stone knapper has to choose a rock of the correct shape, bearing the correct angle at which to strike; and the striking motion itself requires great practice in order to deliver the appropriate amount of force in the right place. 'It seems clear that early tool-making protohumans had a good intuitive sense of the fundamentals of working stone,' Toth wrote in a paper in 1985. 'There's no question that the earliest toolmakers possessed a mental capacity beyond that of apes,' he recently told me. 'Toolmaking requires a coordination of significant motor and cognitive skills.'

An experiment under way at the Language Research Center, in Atlanta, Georgia, is putting this question to the test. For more than a decade, Sue Savage-Rumbaugh, a psychologist, has been working with a pygmy chimpanzee on developing communication skills. Toth recently began a collaboration with her, to try to teach the chimp, named Kanzi, how to make stone flakes. Kanzi has undoubtedly displayed innovative thinking to produce sharp flakes, but so far he has not reproduced the systematic flaking technique used by the earliest toolmakers. I suspect this means that Wynn and McGrew are wrong and that the earliest toolmakers were using cognitive skills beyond those present in apes.

(Richard Leakey "The Origin of Humankind" より)

注 *Lake Turkana : ケニア北西部からエチオピア国境にかけて広がる細長い湖。

*Olduvai Gorge : オルドバイ峡谷。タンザニア北部、アフリカ大地溝帯中のセレンゲティ平原東部の峡谷。

問1 [1] に入る最も適切なものを下の選択肢より選びなさい。解答は [33] の解答欄にマークしなさい。

1. As fragile as they were
2. However they appeared
3. Whatever shapes they took
4. Even though they were worthless
5. Although they were simple in appearance

問2 (2) に入る最も適切な語を選びなさい。解答は [34] の解答欄にマークしなさい。

1. ample
2. dense
3. infrequent
4. present
5. sparse

問3 (3) に入る最も適切な語(句)を選びなさい。解答は [35] の解答欄にマークしなさい。

1. affixed
2. ahead
3. in mind
4. originally
5. to plan

問4 (4) に入る最も適切な語を選びなさい。解答は [36] の解答欄にマークしなさい。

1. changeable
2. intentional
3. opportunistic
4. systematic
5. total

問5 5) comparable と置き換えてもほぼ同じ意味になる語を選びなさい。解答は [37] の解答欄にマークしなさい。

1. equal
2. like
3. matching
4. related
5. superior

問6 以下の①～⑤記述は次の1～4のうち誰の考えていることか。解答は、①は [38]、②は [39]、③は [40]、④は [41]、⑤は [42] の解答欄にそれぞれマークしなさい。

1. Toth
2. Wynn & McGrew
3. Savage-Rumbaugh
4. 文中の誰でもない

- ① Training is required to create stone tools.
- ② Certain species (perhaps all species) of apes have the ability to express themselves.
- ③ Apes have the mental capacity to create tools similar to those made by the Oldowan.
- ④ The chimp named Kanzi has created an innovative system of producing sharp stone tools.
- ⑤ The most important condition to make sharp stone flakes is choosing a rock of the correct shape.