

I 次の文章を読み、設問(1)~(3)に答えなさい。

(50点)

In the final days of the twentieth century, a pair of aerobiologists gave their field a harsh report card. Writing in the December 1999 issue of the journal *Aerobiologia*, Paul Comtois and Scott Isard bemoaned “the low visibility of aerobiology\* as a complete science by itself.”

Aerobiologists had only themselves to blame. Their field was now over sixty years old, and yet it remained scattered and disorganized. Aerobiologists had gotten very good at collecting this kind of pollen or that kind of fungal spore\*. But in 1999, Comtois and Isard complained, they were still not grappling seriously with deep questions about the planetwide movement of life through the atmosphere. They were stuck, the scientists said, on a “stagnant plateau.”

But Comtois and Isard believed it was possible to kick-start aerobiology again. “We have the tools to forecast the flows of biota over the entire Earth,” they wrote. It was just a matter of using those tools. If aerobiologists learned how to harness the new satellites entering orbit or the computer networks getting wired across the planet, “aerobiology will finally be coming of age in this next century.”

Comtois and Isard declared it was high time for the new age to begin: “We believe that it is important to refocus aerobiology research NOW.”

(a) Aerobiology did indeed get refocused at the start of the twenty-first century, and it started growing up at last. For one thing, aerobiologists got braver. They launched more ambitious expeditions, and they learned how to collaborate in bigger teams to merge their data from across wider stretches of the sky. And they seized new kinds of technology and adapted them for the air.

When Fred Meier gathered organisms in the stratosphere\* in the 1930s, he

didn't have many ways to figure out what he had caught. He could try to identify them by shape under a microscope. If he was lucky, he could figure out the nutrients they needed to grow in a dish. Generations of aerobiologists worked under the same constraints. But in the 1990s, geneticists pioneered a new way to identify living things. They created tools to tear open cells, pull out their genes, and read their sequences.

Now it became possible to recognize a baobab or a green mamba by its unique genetic signature. It also became possible to scoop up a spoon of soil and take a complete census of all the life-forms it contained. Scientists might find the DNA of animals like ants or nematodes or of plants like dandelions or sphagnum moss. They also identified spores of fungi, amoebae, bacteria, and viruses. DNA revealed that the diversity of microbes was overwhelming: that <sup>(b)</sup>spoon of soil might contain thousands of species, most new to science. Looking for microbes with nothing but microscopes and dishes full of food had left the vast majority of species unseen. Now their genes could testify to their existence.

Before long, some scientists started using DNA as a way to track air-borne life too. In the 1990s, a team of scientists from the Australian National University climbed Mount Melbourne, a nine-thousand-foot volcano in Antarctica. As they reached the peak, the snow and ice there was melted away thanks to the subterranean heat. The warm, wet ground served as a refuge where patches of moss could grow. The researchers clipped a few shoots and brought them back to the university. On a separate expedition, they climbed Mount Erebus, more than two hundred miles to the south, and found more patches of moss. The scientists then examined bits of DNA from the moss from the two mountains. In 2001, they reported that the plants were close cousins. It's likely that a single moss plant, perhaps from as far away as New Zealand, released a cloud of spores. Most died on the unforgiving Antarctic

landscape. But the ones that landed on the two volcanoes found lucky warm spots where they could grow.

Soon scientists figured out how to read the DNA from microbes snatched from the air itself. In 2000, a team of scientists in Salt Lake City, Utah, pumped 370,000 gallons of air through a modern version of an aeroscope. When they pulled the DNA out of the cells trapped in the device, they identified more than three hundred distinct genetic sequences, each possibly coming from a different species of bacteria. The air, it turned out, was a zoo.

\* aerobiology : 大気生物学

\* spore : 孢子

\* stratosphere : 成層圏

- (1) 下線部(a)を和訳しなさい。
- (2) 下線部(b)を和訳しなさい。
- (3) 下線部(c)はどのような意味か、パラグラフの内容に即して日本語で具体的に説明しなさい。

II 次の文章を読み、設問(1)~(3)に答えなさい。

(50 点)

The influence of Mesopotamia on the modern world is pervasive, but often invisible to us. This civilisation that flourished four thousand years before our own has sown the seeds of many of our modern institutions and beliefs. In that time the kernels\* have grown into something often quite unrecognisable from the original germ, but nevertheless owe their existence to it. Yet the traces are clearly there if only we can read them. <sup>(a)</sup> Just as the Mesopotamian gods placed signs in the natural world as messages to be decoded, so the Mesopotamians have left their signs upon our culture.

The Mesopotamian kings buried cylinder accounts\* of their deeds in the ground, leaving them for future rulers to read. They knew that their words would stand the test of time, even if they were buried for many centuries before being unearthed again. It would be easy to assume that they would have been surprised at just how well their inscriptions\* have been preserved — that it would have surpassed their wildest dreams to know that we are still reading them in the third millennium AD. But to do so would be a fallacy of modern thinking. <sup>(b)</sup> In the sixth century BC the Babylonian king Nabonidus excavated\* the inscriptions of several already ancient figures, including Naram-Sin of Akkad, who ruled more than 1,600 years before him. That is an incredibly long time span, and during that millennium-and-a-half cuneiform\* had always been the default — perhaps Nabonidus too would have expected his own cylinders to last another 1,600 years or more. In fact, Nabonidus probably had an even longer perspective since the Babylonian kings saw themselves as part of a line of ancient rulers stretching back hundreds of thousands of years.

That we can still read their words today is of course all thanks to the incredible durability of cuneiform tablets, a technology so simple yet with profound implications, as it ensured the survival of the world's very first written records and literature. The achievements of the twenty-first century are far more vulnerable. In response to this, clay tablets have been resurrected as

the ultimate medium of data storage. In a salt mine in Austria, the Memory of Mankind Project is depositing one thousand of the most important books from our era to keep them safe in case of a global technological failure. They are printed on microfilm tablets made of ceramic, the only material deemed durable enough to survive the test of time. This is the ultimate time capsule, and like those left by the Mesopotamian kings, is addressed to a future civilisation at least as advanced as we are, giving them a snapshot of our era. The project was directly inspired by cuneiform and the astonishing longevity of its writing materials but is enhanced by modern technology. No fire can turn these tablets to glass, as they are made to withstand temperatures of up to 1,500 degrees, and can resist water damage and even acid. We have come full circle, from writing on clay tablets at the very beginning of history to returning to them now to ensure the survival of the information age. This is one of the most fundamental lessons of all that we can learn from Mesopotamia: that the way we record knowledge matters and can have a real impact on the preservation of our culture. The legacy of Mesopotamia will be with us for millennia more to come. We can only hope our own civilisation will survive as well.

\*kernel : 穀粒

\*cylinder accounts : 円筒形碑文

\*inscription : 碑文

\*excavate : 発掘する

\*cuneiform : 楔<sup>くさび</sup>形文字

- (1) 下線部(a)を和訳しなさい。
- (2) 下線部(b)はどういう意味か、パラグラフの内容に即して日本語で具体的に説明しなさい。
- (3) 下線部(c)を, returning to them の内容を補足しつつ和訳しなさい。

Ⅲ 次の文章を英訳しなさい。

(25 点)

進むべき道を決めるには、事前に入念に検討し、最も満足のいく選択をしたいものだ。ただ、その道が本当に当人に実りをもたらしてくれるかどうかを知るには、ある程度の時間をかけて実際に経験するほかない。ここに避けがたい試練がある。岐路に立った時、その選択の先には想像もつかない世界が待つに違いないと腹をくくることも時には必要だろう。

**IV** In English, write a paragraph explaining one thing that could be done to make the world a better place to live in. Begin with a statement summarizing your main argument, followed by supporting points, and conclude with a final sentence. (25 点)

1. 語数は 80 語以上 100 語以内とすること。
2. 解答欄の各下線部分の上に単語 1 語を記入すること。カンマ(,)等の記号は、その直前の語と同じ下線に含めることとし、1 語と数えない。短縮形(例: don't)は 1 語と数える。

問題は、このページで終わりである。