

はしがき

2019年12月末に中国の武漢市で発生した新型コロナ肺炎の感染はその後世界中に拡大しました。コロナ禍は、各国の景気後退と市民の日常生活に大きな不自由をもたらし、世界各国で進んでいたグローバル化志向も、停滞を余儀なくされたようです。

しかし、コロナ禍で人や物の国境を越えた移動が制限されても、ITはAIのとどまることを知らない進歩にも伴い、産業の現場だけでなく、好むと好まざるにかかわらず私たちの生活にもますます入り込んできています。科学の進歩とともに社会は、必ずしもプラスの面だけではないかもしれませんが、変わらざるを得ないのが現実です。それは今後の世界がコロナとの共生社会になるかどうかを問わず必然的に加速していくことでしょう。

本書はITによる技術の革新が与える社会への影響、農業や漁業の変化、学習方法の変化、また人間生活に与える負の一面などのトピック、加えて大洋に浮遊するプラスチックの問題や化石燃料からのエネルギー転換問題など、現代科学がもたらした負の遺産についての問題なども含め、きょうの世界を知り明日の社会を考える15のトピックを集めました。

そして、ここに収めた15のトピックはバラエティに富んでいるので、理系文系を問わずにどのクラスでも興味を持って読んで貰えることと確信しています。

加えて、本書には英文それ自体がきちんと読めているかどうかをチェックする設問が本文の随所に設けられています。また、文法問題とリスニング問題も各章ごとにつけて総合的な英語力がつくように配慮してあります。さらに、学生のみなさんが物事を自分の頭で考え、自分の意見を自分の言葉で表すことの一助になるように各章末にディスカッションや自習用の設問を付けてあります。

本書が学生の皆さんの英語力の向上とともに社会の現実と進化をよく知りよく考える一助となってくれることを願っています。

2021年11月

James M. Vardaman

Contents

| | | |
|------------|--|----|
| Chapter 1 | Universal Basic Income..... | 1 |
| Chapter 2 | Farms Without Land..... | 7 |
| Chapter 3 | Facial Recognition..... | 13 |
| Chapter 4 | Automated Transportation..... | 19 |
| Chapter 5 | Machine Learning..... | 25 |
| Chapter 6 | Where the Fish Grow..... | 31 |
| Chapter 7 | Shaping the Future Factory: From Shoes to Aircraft to Body Parts..... | 37 |
| Chapter 8 | Monitor Addiction..... | 43 |
| Chapter 9 | Endless Education: Learning for a Lifetime..... | 49 |
| Chapter 10 | Drones that Patrol, Deliver, and Teach..... | 55 |
| Chapter 11 | Energy Transition..... | 61 |
| Chapter 12 | Artificial Intelligence: Decision Making by Humans and the Competition..... | 67 |
| Chapter 13 | Oceans of Plastic..... | 73 |
| Chapter 14 | Active Participation..... | 79 |
| Chapter 15 | Life during a Pandemic..... | 85 |

CHAPTER 1

Universal Basic Income



完璧な世界があるとすれば、そこでは職業は自由に選択でき、そこそこの収入が得られて快適な生活が過ごせることだろう。自分の選ぶ道に進むために必要な教育や訓練も受けられるし、将来についても見通しを立てやすい。

しかし、現実には甘くない。会社の浮沈に憂き目を見るかもしれないし、技術革新の波のあおりを受けて、家族ともども経済的苦境に陥ることもあるだろう。

そんな時に必要なのが政府による支援だ。世界ではどんな考え方のもとで、どんなことが行われているのだろうか……。

Universal Basic Income



In a perfect world, people would be able to find a job that they enjoy and be paid a wage that allows them to live comfortably. They would have financial support to get a good education and training for that job. They could be assured that their job would continue for the foreseeable future. Our world, however, is not perfect. Companies can close or move elsewhere. Skills that were once sufficient grow outdated. To support a family and avoid poverty during difficult times, it becomes necessary to get help from the government in the form of welfare assistance. But some people are now promoting another alternative: Universal Basic Income.

The idea behind Universal Basic Income (UBI) is to eliminate poverty, immediately. By providing a financial cushion to those who are temporarily out of work, those who are working only part-time, those who are going to school, or those being retrained for new jobs, a monthly UBI payment would be a great help.

●NOTES●

4 **for the foreseeable future** 「ここ当分の間は」 / 9 **Universal Basic Income (UBI)** 「ベーシックインカム」 政府が全ての国民に対し所得保障として一定の現金を定期的に支給する制度。 / 10 **are temporarily out of work** 「一時的に失業中の」

Comprehension Check

1. Which of the following statements is true?
 - a. The skills we have will always be useful.
 - b. Sometimes the government has to help people avoid poverty.
 - c. Everyone can get a good education.
2. Who would Universal Basic Income be given to?
 - a. People who are not working full time.
 - b. Families with several children.
 - c. Children living away from their parents.



It is only natural to wonder whether recipients would simply stop working. In the 1970s Manitoba ran an actual experiment with UBI in a small town in that province in Canada. The University of Manitoba crunched the numbers and found out life in the small town of Dauphin improved considerably. More teenagers stayed in school.

Hospitalization rates decreased. Work rates remained basically stable. The program worked quite well. 5

Economists and policy strategists are looking at the Dauphin experiment again. With employers relocating, jobs moving offshore, traditional blue-collar jobs decreasing, automation expanding, and education costs rising, the idea of a basic income guarantee is increasingly seen as a means of preventing people from falling below the poverty line. To leftists, it is seen as a way of combatting the income gap and freeing workers from the burden of taking dead-end jobs. To conservatives, it seems like a better alternative to social-welfare and anti-poverty programs. It would be simple to administer—reducing government bureaucracy—and it would be provided to everyone. 10 15

●NOTES●

2 **Manitoba** 「マニトバ州」カナダ中部にある州。／3 **crunched the numbers** 「(答えを見つけるために) データを大量に処理した」／4 **Dauphin** 「ドーフィン」マニトバ州にある町。1974–79年にベーシックインカム導入に向けた社会実験を実施した。2011年にその成果をまとめた報告書がマニトバ大学から発表された。／5 **hospitalization rates** 「入院加療率」／11 **the poverty line** 「貧困ライン」最低限度の生活を送るのに必要な所得水準。／12 **dead-end jobs** 「将来性のない仕事」／14 **administer** 「(行政的に) 処理する」／14 **government bureaucracy** 「政府官僚」

✽*Comprehension Check*✽

3. What did the experiment in Manitoba find out?
 - a. Life in Dauphin worked rather well.
 - b. Local jobs decreased.
 - c. More people went to the hospitals.
4. Which of the following is NOT true about Universal Basic Income?
 - a. Leftists and conservatives find it attractive.
 - b. Automation is one cause of an increase in poverty.
 - c. The program would be available only to students and blue-collar workers.



Workers could take short breaks to study, upgrade their skills, or even take care of children or elderly relatives. Single parents would be able to support their families with part-time work, rather than have to choose between full-time jobs and being at home with their young children. Most importantly, recipients would not have to worry about covering monthly bills. It would give them the basic security of knowing 5

that if they work, they will not live in poverty.

In January 2017 Finland began paying a random sample of 2,000 unemployed people aged 25 to 58 a monthly 560 Euros. The recipients were under no obligation to seek or accept employment during the two-year trial. Anyone who took a job would continue to receive the same amount. In the growing “gig economy,” it offered 10 financial security to those whose incomes are variable.

While some worry that the UBI scheme simply gives money to citizens for nothing, others compare it to investing in infrastructure. It creates a “new road” that allows people to be more productive. It provides freedom and flexibility to do what one wants, even if it doesn’t pay particularly well. It provides a safety net for those 15 who want to change jobs. A small percent of recipients may choose to do nothing at all, but the trial in Finland may provide lessons for the future of welfare around the globe.

●NOTES●

7 a random sample 「無作為に抽出された標本（母集団）」／9 during the two-year trial 「2年の試験期間中」／10 gig economy 「ギグエコノミー」 インターネットを通じて単発や短期間の仕事を請け負う働き方やそれによって成り立つ経済形態をいう。／15 a safety net 「安全保証、頼みの綱」

Comprehension Check

5. What happened in the Finland experiment?
 - a. Recipients paid back the money after two years.
 - b. People could receive the money and take a job too.
 - c. The young recipients went back to school.

✽ Structure Practice ✽

A. Choose the one underlined word or phrase that should be corrected or rewritten. Then change it so the sentence is correct.

- With a university 1degree, many people would be 2insured that they would have a 3secure job that would last a 4lifetime. []
- Without government 1support, it is difficult to 2guarantee that families with only 3part-time jobs and a family to take care of can 4prevent falling into poverty. []

B. Choose the word or phrase that best completes the sentence.

- When we refer to jobs moving offshore we mean that . . .
 - employees go abroad.
 - workers in other countries take the job.
 - products are sold overseas.
 - jobs are done by machines.
- Dead-end jobs do not . . . to further developments of skills.
 - evolve
 - guide
 - lead
 - move
- If you are . . . new ideas and up-to-date information, online learning is certainly one good option.
 - attracting
 - looking
 - seeking
 - upgrading

✽ Listening Challenge ✽

 **4 Listen and fill in the missing words.**

- There was a time when it [] studying hard and getting a university education because that would [] to find a good job after graduation and [] the same company until retirement.

2. The governments of various countries are [] some form of basic income, whether it be provided [], even people with regular jobs, or [] without full-time employment.
3. The Manitoba experiment [suggests that] there are definite advantages to UBI [] work stability, health, and [] schools.
4. When companies relocate, local employees [] to either find new jobs in the same town or [] another place where there are more jobs to [].
5. I'm trying to [] my skills by taking online courses and [] special training courses [] and during my vacations.

Going Further (for discussion or research)

1. Would a Basic Income be a good idea for Japan?
2. As a fundamental idea, should everyone get such an income, even if they have a full-time job?

CHAPTER 2

Farms without Land



農業に新しい世代の若者たちが革新をもたらしている。なんと、耕作地や、トラクターなどの機器を必要としないどころか、土壌、日光にも頼らないというものだ。

日光を必要としないキノコ作りや、水栽培による小規模な植物育成などは従来から行われてきた。しかし画期的な発想の転換をもたらしたのはLEDの発明だ。建物の中で比較的安価に、ハイテクを駆使して「擬似」自然環境を作り出せるようになったからだ。

ニューヨークなどの大都市のど真ん中に高層ビルの農場を作ろうというアイデアもあるようだ。たしかに気候変動や害虫、雑草も管理可能で、究極の地産地消かもだが……。

Farms without Land



A new generation of farmers is breaking with tradition. They have no fields, no tractors or harvesters, and no barn. In fact, they have no soil and some don't even have sunlight.

In the cloudy city of Seattle, Dan Albert grows his crops in his farm which is located in his two-car garage. He produces tiny green plants called microgreens, which include radishes and arugula, popular ingredients in salads. Instead of fields covered with soil, he grows them in vertically stacked trays that slowly rotate. Instead of sunlight, he depends on LED lights. In the limited space within his garage, he grows them with hydroponics, a system that allows the plant's roots to sit in nutrient-rich water, instead of in soil. Within two weeks his crops go from seed to harvest to restaurants, farmers' markets, and local groceries. His microgreens are competitive in price with major farms and they are fresh.

The shift away from soil-based farming is not limited to spare garages and bedrooms. The shift is not limited to ground level either. New farmers are making use of tall, multi-floor former factories and empty warehouses, making "vertical farming" a new way to produce food.

●NOTES●

6 arugula 「ルッコラ」 / 7 virtually stacked trays 「垂直に積み重ねられたトレイ」 / 9 with hydroponics 「水耕栽培で」 / 13 soil-based farming 「土壌ベースの農業」 / 15 vertical farming 「垂直農法」

Comprehension Check

1. According to the article, traditional farming has depended on . . .
 - a. fields, sunlight, and machinery.
 - b. growing many crops in the same farm.
 - c. rapid transportation of large crops to markets.
2. Dan Albert's method does NOT use . . .
 - a. seeds or soil.
 - b. water or farm land.
 - c. soil or sunlight.



6

Admittedly, these larger-scale enterprises require more equipment, water, and electricity for the LEDs that mimic sunlight. Control software, however, can ensure that the rotating racks of plants get the same amount of light, and the pumps distribute an even amount of nutrients. Sensors discover which crops flourish with different wavelengths of light and adjust the lighting accordingly. Since these “farms” are indoors, the systems can be run on off-peak energy, for example, between 7:00 p.m. and 7:00 a.m., when electricity rates are lower.

In Singapore, which has a very low food self-sufficiency rate and a burgeoning population, a public-private enterprise is taking hydroponics seriously. Electricity for LEDs and tray rotation motors can be expensive in large-scale operations. The Sky Greens vertical farm, however, takes advantage of Singapore’s sunny weather. The four-story glass-sided farm requires no artificial lighting at all. Racks of vegetables rotate up to the sunny top of the building on a power-efficient elevator, giving each rack a dose of light.

●NOTES●

3 the rotating racks 「回転するラック」／5 wavelengths 「波長」／6 can be run 「作動できる」／8 food self-sufficiency rate 「食料自給率」／8 burgeoning 「増大する」／13 power efficient 「電力効率の良い、省電力」／14 a dose of 「一定量の」

Comprehension Check

3. “Vertical farming” can be controlled by software that . . .
 - a. guarantees that all plants get the same nutrient-rich water.
 - b. eliminates insects and dryness.
 - c. uses expensive electricity.

4. Which statement is true of the Sky Green vertical farm?
 - a. Plants are placed in racks that do not move.
 - b. Farmers use an elevator to reach the top trays.
 - c. It does not depend on electricity to provide light.



7

As a result of considerable success with these nine-meter tall towers in Singapore, one ecologist has imagined an even greater vertical farm. His idea is to build a 21-story transparent skyscraper in the heart of a major city such as New York. His plan would

grow the produce in the middle of the market where it would be consumed. With a very small footprint on the ground level, a large amount of food could be grown 5 inside the community that would consume it.

High-tech agribusiness has several important impacts. One is the reduced need for pesticides and herbicides. It is much easier to prevent damage to crops inside a building than in an open field. Second is the savings in fuel required to transport 10 harvested crops to markets if the vertical farm is in the city. Third is the protection of food supplies even when extreme weather strikes. A final advantage is that software can handle much of the day-to-day tending of the crops. The farmer can check on several farms remotely, adjusting water, tray rotation speed, and mechanical problems with a smartphone.

●NOTES●

5 **footprint** 「敷地面積」 / 8 **pesticides and herbicides** 「殺虫剤と除草剤」 -cide 「…を殺す薬剤」 / 11
extreme weather 「異常気象」 / 12 **day-to-day** 「毎日の」

Comprehension Check

5. Which statement is true of high-tech indoor farming?
 - a. It does not require any human activity.
 - b. It avoids weather damage caused by growing crops in open fields.
 - c. It does not require any light.

3. The [] a farm is to the market where its [], the fresher the product and the cheaper [].
4. Tractors and [] can be expensive to purchase and [], so some farmers cooperate [] in buying and sharing them.
5. Farming is a [] business, which is [] by weather, markets, and [] variables.

Going Further (for discussion or research)

1. Would vertical farms be practical in urban areas in Japan?
2. What edible plants could you grow at home?
3. How do you view the future of farming in Japan?