The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

REGENTS EXAMINATION

IN

ENGLISH LANGUAGE ARTS

Monday, January 22, 2018 — 9:15 a.m. to 12:15 p.m., only

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

A separate answer sheet has been provided for you. Follow the instructions for completing the student information on your answer sheet. You must also fill in the heading on each page of your essay booklet that has a space for it, and write your name at the top of each sheet of scrap paper.

The examination has three parts. For Part 1, you are to read the texts and answer all 24 multiple-choice questions. For Part 2, you are to read the texts and write one source-based argument. For Part 3, you are to read the text and write a text-analysis response. The source-based argument and text-analysis response should be written in pen. Keep in mind that the language and perspectives in a text may reflect the historical and/or cultural context of the time or place in which it was written.

When you have completed the examination, you must sign the statement printed at the bottom of the front of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part 1

Directions (1–24): Closely read each of the three passages below. After each passage, there are several multiple-choice questions. Select the best suggested answer to each question and record your answer on the separate answer sheet provided for you. You may use the margins to take notes as you read.

Reading Comprehension Passage A

It had been noisy and crowded at the Milligan's and Mrs. Bishop had eaten too many little sandwiches and too many iced cakes, so that now, out in the street, the air felt good to her, even if it was damp and cold. At the entrance of the apartment house, she took out her change purse and looked through it and found that by counting the pennies, too, she had just eighty-seven cents, which wasn't enough for a taxi from Tenth Street to Seventy-Third. It was horrid never having enough money in your purse, she thought. Playing bridge,[1] when she lost, she often had to give I.O.U.'s and it was faintly embarrassing, although she always managed to make them good. She resented Lila Hardy who could say, "Can anyone change a ten?" and who could take ten dollars from her small, smart bag while the other women scurried about for change.

She decided it was too late to take a bus and that she might as well walk over to the subway, although the air down there would probably make her head ache. It was drizzling a little and the sidewalks were wet. And as she stood on the corner waiting for the traffic lights to change, she felt horribly sorry for herself. She remembered as a young girl, she had always assumed she would have lots of money when she was older. She had planned what to do with it — what clothes to buy and what upholstery she would have in her car. …

The air in the subway was worse than usual and she stood on the local side waiting for a train. People who took the expresses seemed to push so and she felt tired and wanted to sit down. When the train came, she took a seat near the door and, although inwardly she was seething with rebellion, her face took on the vacuous[2] look of other faces in the subway. At Eighteenth Street, a great many people got on and she found her vision blocked by a man who had come in and was hanging to the strap in front of her. He was tall and thin and his overcoat which hung loosely on him and swayed with the motion of the train smelled unpleasantly of damp wool. The buttons of the overcoat were of imitation leather and the button directly in front of Mrs. Bishop's eyes evidently had come off and been sewed back on again with black thread, which didn't match the coat at all.

It was what is known as a swagger coat[3] but there was nothing very swagger about it now. The sleeve that she could see was almost threadbare around the cuff and a small shred from the lining hung down over the man's hand. She found herself looking intently at his hand. It was long and pallid[4] and not too clean. The nails were very short as though they had been bitten and there was a discolored callous on his second finger where he probably held his pencil. Mrs. Bishop, who prided herself on her powers of observation, put him in the white collar class. He most likely, she thought, was the father of a large family and had a hard time sending them all through school. He undoubtedly never spent money on himself. That would account for the shabbiness of his overcoat. And he was probably horribly afraid of losing his job. His house was always noisy and smelled of cooking. Mrs. Bishop couldn't decide whether to make his wife a fat slattern[5] or to have her an

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[1]bridge — a card game

[2]vacuous — empty

[3]swagger coat — a popular coat style in the 1930s

[4]pallid — pale

[5]slattern — sloppy woman

invalid. Either would be quite consistent.

She grew warm with sympathy for the man. Every now and then he gave a slight cough, and that increased her interest and her sadness. It was a soft, pleasant sadness and made her feel resigned to life. She decided that she would smile at him when she got off. It would be the sort of smile that couldn't help but make him feel better, as it would be very obvious that she understood and was sorry.

But by the time the train reached Seventy-Second Street, the closeness of the air and the confusion of her own worries had made her feelings less poignant,[6] so that her smile, when she gave it, lacked something. The man looked away embarrassed.

II

Her apartment was too hot and the smell of broiling chops sickened her after the enormous tea she had eaten. She could see Maude, her maid, setting the table in the dining-room for dinner. Mrs. Bishop had bought smart little uniforms for her, but there was nothing smart about Maude and the uniforms never looked right. …

For a minute she stood in the doorway trying to control herself and then she walked over to a window and opened it roughly. "Goodness," she said. "Can't we ever have any air in here?"

Robert gave a slight start and sat up. "Hello, Mollie," he said. "You home?"

"Yes, I'm home," she answered. "I came home in the subway."

Her voice was reproachful.[7] She sat down in the chair facing him and spoke more quietly so that Maude couldn't hear what she was saying. "Really, Robert," she said, "it was dreadful. I came out from the tea in all that drizzle and couldn't even take a taxi home. I had just exactly eighty-seven cents. Just eighty-seven cents!"

"Say," he said. "That's a shame. Here." He reached in his pocket and took out a small roll of crumpled bills. "Here," he repeated. And handed her one. She saw that it was five dollars.

Mrs. Bishop shook her head. "No, Robert," she told him. "That isn't the point. The point is that I've really got to have some sort of allowance. It isn't fair to me. I never have any money! Never! It's got so it's positively embarrassing!"

Mr. Bishop fingered the five dollar bill thoughtfully. "I see," he said. "You want an allowance. What's the matter? Don't I give you money every time you ask for it?"

"Well, yes," Mrs. Bishop admitted. "But it isn't like my own. An allowance would be more like my own."…

Mr. Bishop sat turning the five dollar bill over and over in his hand. "About how much do you think you should have?" he asked.

"Fifty dollars a month," she told him. And her voice was harsh and strained. "That's the very least I can get along on. Why, Lila Hardy would laugh at fifty dollars a month."

"Fifty dollars a month," Mr. Bishop repeated. He coughed a little, nervously, and ran his fingers through his hair. "I've had a lot of things to attend to this month. But, well, maybe if you would be willing to wait until the first of next month, I might manage."

"Oh, next month will be perfectly all right," she said, feeling it wiser not to press her victory. "But don't forget all about it. Because I shan't."

As she walked toward the closet to put away her wraps, she caught sight of Robert's overcoat on the chair near the door. He had tossed it carelessly across the back of the chair

[6]poignant — deeply felt

[7]reproachful — critical

as he came in. One sleeve was hanging down and the vibration of her feet on the floor had made it swing gently back and forth. She saw that the cuff was badly worn and a bit of the lining showed. It looked dreadfully like the sleeve of the overcoat she had seen in the subway. And, suddenly, looking at it, she had a horrible sinking feeling, as though she were falling in a dream.

—Sally Benson
excerpted from "The Overcoat"
The American Mercury, July, 1941

1 The first paragraph creates a sense of

(1) submission
(2) urgency
(3) frustration
(4) hopelessness

2 The use of the word "although" in line 12 signals Mrs. Bishop's

(1) disapproval
(2) enthusiasm
(3) nervousness
(4) resilience

3 The "soft, pleasant sadness" (line 40) Mrs. Bishop experiences while listening to the man cough indicates that she is

(1) discouraged by the illnesses spread on the subway
(2) inclined to help those in need
(3) pressured to act graciously in uncomfortable situations
(4) reassured by those who are less fortunate than she

4 Lines 44 through 46 convey Mrs. Bishop's

(1) confidence
(2) insincerity
(3) optimism
(4) hostility

5 Mrs. Bishop's thoughts in lines 6 through 8 contrast with her statements in lines 64 and 65, revealing that she

(1) exaggerates her feelings to manipulate her husband
(2) hoards her money to cheat her friends
(3) demonstrates her neediness to agitate her husband
(4) flaunts her wealth to impress her friends

6 The details in lines 74 through 76 suggest that Mr. Bishop is

(1) puzzled
(2) uneasy
(3) suspicious
(4) selfish

7 The figurative language in lines 84 and 85 reveals that Mrs. Bishop is

(1) confused about her values
(2) relieved of her discontent
(3) forced to face reality
(4) pleased to learn the truth

8 In which lines is the central idea of the passage most clearly revealed?

(1) "there was a discolored callous on his second finger where he probably held his pencil" (lines 31 and 32)
(2) "but there was nothing smart about Maude and the uniforms never looked right" (lines 49 and 50)
(3) "He reached in his pocket and took out a small roll of crumpled bills" (lines 60 and 61)
(4) "It looked dreadfully like the sleeve of the overcoat she had seen in the subway" (line 83)

9 The primary conflict in the passage is Mrs. Bishop's

(1) perception of herself
(2) relationship with Maude
(3) reluctance to help others
(4) friendship with Lila Hardy

Reading Comprehension Passage B

Storm Warnings

The glass[1] has been falling all the afternoon,
And knowing better than the instrument
What winds are walking overhead, what zone
Of gray unrest is moving across the land,
I leave the book upon a pillowed chair
And walk from window to closed window, watching
The stiff boughs strain against the blotted sky

And think again, as often when the air
Moves inward toward a silent core of waiting,
How with a single purpose time has traveled
Through currents of unguessed fatality
Into this polar realm, this present island.
Weather abroad and weather in the heart
Alike come on regardless of prediction.

Between foreseeing and averting change
Lies all the mastery of elements
Which clocks and weather-glasses cannot alter.
Time in the hand is not control of time,
Nor shattered fragments of an instrument
The breaking of a cordon[2] of events.
The wind will rise: we can only close the shutters.

I draw the curtains as the sky goes black
And set a match to candles sheathed in glass
Against the keyhole draught,[3] the insistent whine
Of weather through the unsealed aperture.[4]
This is our sole defense against the season;
These are the things that we have learned to do
Who live in zones of much inquietude.[5]

—Adrienne Cecile Rich
"Storm Warnings"
Harper's Magazine, April 1951

[1]glass — barometer
[2]cordon — string
[3]draught — draft
[4]aperture — an opening
[5]inquietude — a disturbance

10 The figurative language used in lines 9 through 11 suggests the

(1) anticipation of life's challenges
(2) questioning of life's meaning
(3) appreciation of patience
(4) importance of solitude

11 The purpose of the repetition of "weather" in line 13 is to imply

(1) an uncommon occurrence
(2) a personal connection
(3) a beneficial circumstance
(4) an unexplained phenomenon

12 The statement, "The wind will rise: we can only close the shutters" (line 21) most likely means we

(1) can overcome problems by denying them
(2) cannot predict our emotions but we can learn to ignore them
(3) can control events by understanding them
(4) cannot prevent our distress but we can choose how to deal with it

13 Lines 27 and 28 convey a sense of

(1) disinterest
(2) acceptance
(3) urgency
(4) terror

14 The poem suggests that the narrator views storms as

(1) having unpredictable results
(2) being frightening experiences
(3) being familiar events
(4) having destructive powers

Reading Comprehension Passage C

Wherever humans have gone in the world, they have carried with them two things, language and fire. As they traveled through tropical forests they hoarded the precious embers of old fires and sheltered them from downpours. When they settled the barren Arctic, they took with them the memory of fire, and recreated it in stoneware vessels filled with animal fat. [Charles] Darwin[1] himself considered these the two most significant achievements of humanity. It is, of course, impossible to imagine a human society that does not have language, but—given the right climate and an adequacy of raw wild food—could there be a primitive tribe that survives without cooking? In fact, no such people have ever been found. Nor will they be, according to a provocative[2] theory by Harvard biologist Richard Wrangham, who believes that fire is needed to fuel the organ that makes possible all the other products of culture, language included: the human brain.

Every animal on earth is constrained by its energy budget; the calories obtained from food will stretch only so far. And for most human beings, most of the time, these calories are burned not at the gym, but invisibly, in powering the heart, the digestive system and especially the brain, in the silent work of moving molecules around within and among its 100 billion cells. A human body at rest devotes roughly one-fifth of its energy to the brain, regardless of whether it is thinking anything useful, or even thinking at all. Thus, the unprecedented increase in brain size that hominids[3] embarked on around 1.8 million years ago had to be paid for with added calories either taken in or diverted from some other function in the body. Many anthropologists think the key breakthrough was adding meat to the diet. But Wrangham and his Harvard colleague Rachel Carmody think that's only a part of what was going on in evolution at the time. What matters, they say, is not just how many calories you can put into your mouth, but what happens to the food once it gets there. How much useful energy does it provide, after subtracting the calories spent in chewing, swallowing and digesting? The real breakthrough, they argue, was cooking. …

Food is a subject on which most people have strong opinions, and Wrangham mostly excuses himself from the moral, political and aesthetic debates it provokes. Impeccably lean himself, he acknowledges blandly that some people will gain weight on the same diet that leaves others thin. "Life can be unfair," he writes in his 2010 book *Catching Fire*, and his shrug is almost palpable[4] on the page. He takes no position on the philosophical arguments for and against a raw-food diet, except to point out that it can be quite dangerous for young children. For healthy adults, it's "a terrific way to lose weight."

Which is, in a way, his point: Human beings evolved to eat cooked food. It is literally possible to starve to death even while filling one's stomach with raw food. In the wild, people typically survive only a few months without cooking, even if they can obtain meat. Wrangham cites evidence that urban raw-foodists, despite year-round access to bananas, nuts and other high-quality agricultural products, as well as juicers, blenders and dehydrators, are often underweight. Of course, they may consider this desirable, but Wrangham considers it alarming that in one study half the women were malnourished to the point they stopped menstruating. They presumably are eating all they want, and may even be consuming what appears to be an adequate number of calories, based on standard USDA [United States Department of Agriculture] tables. There is growing evidence that these overstate, sometimes to a considerable degree, the energy that the body extracts from whole raw foods. Carmody explains that only a fraction of the calories in raw starch and protein are absorbed by the body directly via the small intestine. The remainder passes into

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[1]Charles Darwin — English naturalist who developed a scientific theory of evolution

[2]provocative — thought–provoking

[3]hominids — taxonomic title for family of great apes and humans

[4]palpable — touchable

the large bowel, where it is broken down by that organ's ravenous population of microbes, which consume the lion's share for themselves. Cooked food, by contrast, is mostly digested by the time it enters the colon; for the same amount of calories ingested, the body gets roughly 30 percent more energy from cooked oat, wheat or potato starch as compared to raw, and as much as 78 percent from the protein in an egg. In Carmody's experiments, animals given cooked food gain more weight than animals fed the same amount of raw food. And once they've been fed on cooked food, mice, at least, seemed to prefer it.

In essence, cooking—including not only heat but also mechanical processes such as chopping and grinding—outsources some of the body's work of digestion so that more energy is extracted from food and less expended in processing it. Cooking breaks down collagen, the connective tissue in meat, and softens the cell walls of plants to release their stores of starch and fat. The calories to fuel the bigger brains of successive species of hominids came at the expense of the energy-intensive tissue in the gut, which was shrinking at the same time—you can actually see how the barrel-shaped trunk of the apes morphed into the comparatively narrow-waisted *Homo sapiens*. Cooking freed up time, as well; the great apes spend four to seven hours a day just chewing, not an activity that prioritizes the intellect.

The trade-off between the gut and the brain is the key insight of the "expensive tissue hypothesis," proposed by Leslie Aiello and Peter Wheeler in 1995. Wrangham credits this with inspiring his own thinking—except that Aiello and Wheeler identified meat-eating as the driver of human evolution, while Wrangham emphasizes cooking. "What could be more human," he asks, "than the use of fire?" …

In Wrangham's view, fire did much more than put a nice brown crust on a haunch of antelope. Fire detoxifies some foods that are poisonous when eaten raw, and it kills parasites and bacteria. Again, this comes down to the energy budget. Animals eat raw food without getting sick because their digestive and immune systems have evolved the appropriate defenses. Presumably the ancestors of *Homo erectus*—say, *Australopithecus*—did as well. But anything the body does, even on a molecular level, takes energy; by getting the same results from burning wood, human beings can put those calories to better use in their brains. Fire, by keeping people warm at night, made fur unnecessary, and without fur hominids could run farther and faster after prey without overheating. Fire brought hominids out of the trees; by frightening away nocturnal predators, it enabled *Homo erectus* to sleep safely on the ground, which was part of the process by which bipedalism[5] (and perhaps mind-expanding dreaming) evolved. By bringing people together at one place and time to eat, fire laid the groundwork for pair bonding and, indeed, for human society. …

—Jerry Adler
excerpted and adapted from "The Mind on Fire"
Smithsonian.com, June, 2013

[5]bipedalism — using two feet for locomotion

15 When the author cites Darwin in lines 5 and 6, he most likely does so to

(1) stress the equal importance of language and fire
(2) show scientific theories change over time
(3) suggest migration played a role in evolution
(4) lend credibility to the discussion

16 Lines 9 through 11 serve to

(1) present an argument
(2) explain an image
(3) resolve a controversy
(4) dismiss a counterclaim

17 The phrase "energy budget" (line 12) serves to emphasize a

(1) reduction of conservation efforts
(2) scarcity of combustible material
(3) limited amount of body fuel
(4) restricted knowledge of resources

18 The physical structure of hominids was altered (lines 17 through 25) as a result of their increased

(1) meat consumption and changes in food preparation
(2) diet variety and changes in food preservation
(3) demands for physical exertion
(4) opportunities for problem solving

19 In the context of lines 26 through 32, Wrangham's quote "a terrific way to lose weight" is most likely meant to be

(1) poetic
(2) hostile
(3) ironic
(4) theoretical

20 According to lines 40 through 44, the "standard USDA tables" may "overstate" caloric intake because they do not account for

(1) how the body converts food into calories
(2) the importance of calories from protein
(3) the way calories are measured
(4) how the body adjusts to excessive calories

21 The use of the word "ravenous" (line 46) suggests that microbes in the large bowel are

(1) deadly
(2) aggressive
(3) healthy
(4) energizing

22 According to lines 53 through 55, a key benefit of cooking food is that it

(1) completes the body's need for collagen
(2) prevents the body from absorbing fat
(3) aids the body in fighting disease
(4) assists the body in digesting food

23 Which statement best contributes to the development of a central idea in the text?

(1) " 'Life can be unfair … palpable on the page' " (lines 29 and 30)
(2) "It is literally possible … with raw food" (lines 33 and 34)
(3) "And once they've been fed … prefer it" (line 52)
(4) "Animals eat raw food … evolved the appropriate defenses" (lines 70 through 72)

24 The tone of the passage can best be described as

(1) critical
(2) informative
(3) doubtful
(4) hopeful

Part 2

Argument

Directions: Closely read each of the ***four*** texts provided on pages 11 through 17 and write a source-based argument on the topic below. You may use the margins to take notes as you read and scrap paper to plan your response. Write your argument beginning on page 1 of your essay booklet.

Topic: Could algae be the solution to our energy problems?

Your Task: Carefully read each of the ***four*** texts provided. Then, using evidence from at least ***three*** of the texts, write a well-developed argument regarding whether or not algae could be the solution to our energy problems. Clearly establish your claim, distinguish your claim from alternate or opposing claims, and use specific, relevant, and sufficient evidence from at least ***three*** of the texts to develop your argument. Do *not* simply summarize each text.

Guidelines:

Be sure to:

- Establish your claim regarding whether or not algae could be the solution to our energy problems
- Distinguish your claim from alternate or opposing claims
- Use specific, relevant, and sufficient evidence from at least ***three*** of the texts to develop your argument
- Identify each source that you reference by text number and line number(s) or graphic (for example: Text 1, line 4 or Text 2, graphic)
- Organize your ideas in a cohesive and coherent manner
- Maintain a formal style of writing
- Follow the conventions of standard written English

Texts:

Text 1 – Biofuel from Algae Part One: The Pros and Cons of Pond Scum
Text 2 – Algae's Potential as a Transportation Biofuel
Text 3 – Green Oil: Scientists Turn Algae Into Petroleum In 30 Minutes
Text 4 – Green Crude: The Quest to Unlock Algae's Energy Potential

Text 1

Biofuel from Algae Part One: The Pros and Cons of Pond Scum

…As we approach a point of peak oil — the point at which fossil fuels become scarcer and more expensive (and some argue that we've already passed that point) — the interest in biodiesel has been revived. Producing fuel from food products, however, has been morally controversial from the beginning. As the planet's population and demand for food grows, it becomes more unconscionable[1] for the wealthier nations to waste food products like corn, soy, sugar cane, and rapeseed, as well as food cultivation space, on filling their gas tanks.

To mitigate[2] wasted food and wasted land, in recent decades, there has been rising interest in cultivating biofuel from algae. To pursue a better promise of low-cost, scalable,[3] green and clean biodiesel, research organizations in institutions both private and public have sunk a lot of time and money into algae research in an effort to advance a technology that could produce transportation fuel on a large scale.

It simply makes sense: as anyone who has ever had a fish tank knows, algae is ridiculously easy to grow. There are many kinds of algae: complicated, multicellular forms (think seaweed) as well as simple, single-celled forms (think pond scum). It's hardly a fussy plant, and producing large quantities of it doesn't exactly require a green thumb. What's so compelling about algae is that it contains a high amount of fatty molecules that are similar to vegetable oils, and these fats can be rather easily converted to a biofuel that can act as a drop-in replacement for petroleum-based gas, diesel and jet fuel.

The Pros of Algae-based Biofuel

One of algae's major attractions is that unlike corn for ethanol or soybeans for biodiesel, algae can be grown in places unsuitable for food cultivation, which takes away the wasted space drawback by making use of non-arable,[4] nutrient-poor land that won't support conventional agriculture.

Algae can be grown in ponds, tubes or even large bags provided it gets the right combination of vitamins, minerals and sunlight. It doesn't require soil or even fresh water to grow, and when cultivated in large quantities, algae can produce more energy per acre than any land crop, making it the most energy efficient plant for biodiesel production: far more efficient than corn, sugar cane, or soy. And unlike row crops, which are dependent on growing seasons, algae can be grown at any time of year, since ideal growing conditions can be easily simulated. In addition, it requires no fresh water for irrigation and no application of petroleum-based fertilizers. Algae can thrive in desert ponds using high-saline water from aquifers that can't be used for traditional crops. Many species of algae can even grow in wastewater from treatment plants and water that contains nitrates, phosphates, and other pollutants. In fact, algae ponds and cultivation facilities are often located as close as possible to wastewater or pollution sources, since algae thrives on both carbon and bacteria. …

The Cons of Algae-based Biofuel

While algae-based biofuel may use far less land and have a higher energy yield than other biodiesel crops, its production also requires more energy and water (albeit not necessarily fresh water) than plant sources such as corn. It also has higher greenhouse gas emissions.

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[1]unconscionable — unethical

[2]mitigate — make less severe

[3]scalable — capable of being easily expanded on demand

[4]non-arable — not suitable for growing crops

The reason is that the production of the final product is more complex and therefore more energy intensive. While many kinds of algae are easy to cultivate, the species of the plant that contain the most fats are most suitable for biodiesel, and these specialized lipid-producers are a bit fussier than ordinary algae. …

The cultivation of algae (like the cultivation of most other plants) requires large amounts of phosphorus as a fertilizer, and while it's not an oft-discussed topic, the world is currently on the brink of a peak of availability of Earth's finite phosphate resources. "Peak phosphorus," as it's called, is the point in time at which the maximum global phosphorus production rate is reached. According to some researchers, Earth's phosphorus reserves are expected to be completely depleted in 50 to 100 years, and peak phosphorus will be reached by the year 2030. (This is a fairly scary prospect for global agriculture, not just for algae production). To succeed, large scale algae production will need to reduce its use of phosphorus and find ways of reusing what it does require. The need for phosphorus in cultivation has been called by Forbes [magazine] "The Achilles Heel" of algae biofuel. …

—Tracey Schelmetic
excerpted and adapted from "Biofuel from Algae Part One:
The Pros and Cons of Pond Scum"
news.thomasnet.com, February 19, 2013

Text 2

Algae's Potential as a Transportation Biofuel

…Algae can be converted into various types of energy for transportation, including biodiesel, jet fuel, electric power, and ethanol. The potential advantages of algae-based biofuel over other biofuel pathways include higher biomass[1] yields per acre of cultivation, little to no competition for arable[2] land, use of a wide variety of water sources, the opportunity to use carbon dioxide [CO_2] from stationary sources,[3] and the potential to produce "drop-in" ready-to-use fuels. Potential drawbacks include the anticipated cost of production, the amount of resources (e.g., water and land) required to produce the biofuel, and the lack of commercial-scale production facilities. Algae-based biofuel research and development are in their infancy, although work has been conducted in this area for decades. At present, published research efforts offer policymakers little guidance on what algae types or conversion methods could be the front-runner for commercial production, or on when and for which biofuel. …

Potential Challenges

The primary challenge for ABB [Agriculture-Based Biofuels] is that it has not yet been demonstrated to be economical at commercial scale. If economic production can be achieved, the potential impact on the national transportation fuel network would need to be assessed. Also, as mentioned above, algae cultivation requires significant amounts of CO_2, and there are questions about where this CO_2 would come from. While the CO_2 could come from existing stationary sources, it may be incorrect to assume that all algae processing facilities would be located near existing sources of CO_2 or that enough CO_2 from existing sources would be available to meet demand for commercial levels of ABB production. It is likely that siting and permitting of these facilities would require involvement of local, state, and federal government agencies. It is unclear how use of CO_2 from a power plant for the production of algae would be treated under the Clean Air Act.

There may be supply and demand concerns for ABB. The use of some feedstocks for biofuels has been controversial, as some report that rising demand for biofuels shifts biomass feedstocks and arable land away from use for other purposes (e.g., food). Some assert that significant quantities of resources (e.g., land, water, and CO_2) exist to support algae-based biodiesel production; however, it is not clear if existing resources can support biodiesel *and* bio-jet fuel, bioethanol, and more from algal feedstock. The National Research Council (NRC) reports that the quantity of water necessary for algae cultivation is a concern of high importance, among others, that has to be addressed for sustainable development of ABB. In general, biofuels derived from open-pond algae production consume more water for feedstock production and fuel processing than petroleum-derived fuels, although the water quality may not be comparable, since some algae is able to use waste- or brackish[4] water. One reported possible technique to drastically curb water use is to site ABB facilities at optimized locations—locations where land with the lowest water use per liter of biofuel produced is available—but algae would still use significantly more water than petroleum. Another technique is to use water unsuitable for other purposes. Algae requires both water

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[1]biomass — organic matter used as a fuel

[2]arable — suitable for growing crops

[3]stationary sources — a source that emits a certain amount of a pollutant as defined by the U.S. Environmental Protection Agency

[4]brackish — salty

and nutrients (e.g., phosphorus) to grow, which may inadvertently[5] put it in competition with other areas of agriculture, depending on water sources and land types selected for algae cultivation should ABB be produced at a large scale. Also, large-scale ABB production may involve the use of genetically modified algae, which some may oppose because of concerns that genetically modified algae may escape into the environment and become invasive, as algae that are non-native to that location. …

—Kelsi Bracmort
excerpted and adapted from "Algae's Potential as a Transportation Biofuel"
Congressional Research Service 7-5700
www.crs.gov, January 30, 2014

[5]inadvertently — accidentally

Text 3

Green Oil: Scientists Turn Algae Into Petroleum In 30 Minutes

Scientists at the Pacific Northwest National Laboratory [PNNL] are claiming success in perfecting a method that can transform a pea-soupy solution of algae into crude oil by pressure cooking it for about 30 minutes. The process, called hydrothermal liquefaction, also works on other streams of organic matter, such as municipal sewage. And the crude oil created is lightweight and low in sulfur and can be "dropped in" to refineries that process fossil crudes.[1]

"It's a bit like using a pressure cooker, only the pressures and temperatures we use are much higher," said researcher Douglas Elliott in a statement. "In a sense, we are duplicating the process in the Earth that converted algae into oil over the course of millions of years. We're just doing it much, much faster."

It only makes sense that scientists should be able to figure out how to turn algae into crude oil. After all, most of the oil that we drill out of the ground was formed by algae and other sea-borne flora[2] that piled up at the bottom of the ocean over millenia, then got compacted and heated over eons and transformed into petroleum.

But figuring out how to do it economically is a challenge. A half-century ago researchers were growing algae on the roof of M.I.T. More recently, ExxonMobil raised the hopes of the algae-to-oil crowd in 2009 when it forged a research venture with Craig Venter's Synthetic Genomics. If Venter (who was first to decode the human genome) could find or engineer an algae strain adept at naturally creating oils, Exxon would fund development to the tune of $600 million. Unfortunately Venter called off the quest a few years later. Algaes just weren't oily enough to be commercially viable sources of crude. …

Given 100 pounds of algae feedstock, the system will yield 53 pounds of "bio-oil" according to the PNNL studies. The oil is chemically very similar to light, sweet crude, with a complex mixture of light and heavy compounds, aromatics, phenolics, heterocyclics and alkanes in the C_{15} to C_{22} range.

Not all the organic matter gets turned into oil. It also yields a stream of carbon dioxide, hydrogen and oxygen, which can readily be turned into a stream of synthetic natural gas and burned to generate heat or electricity.

Also left over is water rich in the plant nutrients (nitrogen, phosphorous and potassium) previously present in the algae. This water can be sold back to the algae ponds as fertilizer.

"Not having to dry the algae is a big win in this process; that cuts the cost a great deal," said Elliott in a statement. "Then there are bonuses, like being able to extract usable gas from the water and then recycle the remaining water and nutrients to help grow more algae, which further reduces costs."

The researchers figure that at current algae prices of several hundred dollars a ton they could make algae-based fuel for the gasoline equivalent of less than $5 per gallon.

And algae's only the most viable oil source. The same tricks can oil-ify all sorts of other organic wastes such as manure, municipal sewage, vegetable compost, even fish heads. Indeed, if the technology can be successfully scaled up to commercial size, says [Genifuel CEO, Jim] Oyler, our stinky streams of human waste alone could provide the feedstock to meet 10% of our worldwide petroleum demand. …

[1]fossil crudes — unrefined oil and natural gases

[2]flora — plants

The key will be in figuring out how to make massive quantities of algae cheap. Because then, explains Oyler, the rest will support itself: excluding the energy used in growing the algae (a huge caveat[3]), the hydrothermal extraction process developed at PNNL can create about 9 units of energy for every unit used.

No doubt algae cultivation will improve. Until then the big hope for this technology now may be to pair it with a feedstock that cities otherwise have to pay to get rid of — like sewage. Oyler envisions a distributed system of hydrothermal liquefaction systems set up at regional sewage plants and a fleet of trucks that come to load up on crude oil once a week.

—Christopher Helman
excerpted and adapted from "Green Oil: Scientists Turn Algae Into Petroleum In 30 Minutes"
www.forbes.com, December 23, 2013

[3]caveat — a warning

Text 4

Green Crude: The Quest to Unlock Algae's Energy Potential

…Although scientists and entrepreneurs have been trying to unlock the energy potential of algae for more than three decades, they don't yet agree on how to go about it. Some companies grow algae in ponds, others grow them in clear plastic containers, and others keep their algae away from sunlight, feeding them sugars instead. To improve the productivity of the algae, some scientists use conventional breeding and others turn to genetic engineering. "Algae is the most promising source of renewable transportation fuel that we have today," says Steve Kay, a distinguished professor of biology at the University of California, San Diego, and co-founder of the San Diego Center for Algae Biotechnology, a partnership of research institutions, business, and government.

And yet there's plenty of reason for skepticism about algae. Scientists and entrepreneurs have been trying for decades to unlock algae's energy potential, with mixed results. After the 1970s oil shocks, the U.S. government created an algae research program that analyzed more than 3,000 strains of the tiny organisms; the program was shut down in 1996, after the Department of Energy concluded that algal biofuels would cost too much money to compete with fossil fuels. A decade later, after President George W. Bush declared that the U.S. is "addicted to oil," government research into algae was restarted, and venture capital flowed into dozens of algae startups. Oil companies ExxonMobil and Chevron placed bets, too.

But algae companies haven't made much oil yet: Sapphire's annual production target of 1.5 million gallons for 2014 compares to U.S. *daily* oil consumption of 18.8 million *barrels*. Even algae's most enthusiastic advocates say that commercialization of algal biofuels, on a scale that that would matter to the environment or the energy industry, is at least five to 10 years away.

High costs remain the big obstacle to commercial production. The algae business has suffered from "fantastic promotions, bizarre cultivation systems, and absurd productivity projections," says John Benemann, an industry consultant and Ph.D. biochemist who has spent more than 30 years working on algae. Even if the capital costs and operating costs of algae farms are low, and the productivity of the algae is improved, Benemann says that "algae biofuels cannot compete with fossil energy based on simple economics… The real issue is that an oil field will deplete eventually, while an algae pond would be sustainable indefinitely." In a thorough 2010 technology assessment, researchers at the Lawrence Berkeley National Laboratory estimated that producing oil from algae grown in ponds at scale would cost between $240 and $332 a barrel, far higher than current petroleum prices.

Perhaps more worrisome, government scientists say the environmental benefits of algae remain unproven. Writing in *American Scientist*, Philip T. Pienkos, Lieve Laurens and Andy Aden, all of the National Renewable Energy Laboratory, say that the few life-cycle assessments of algae done so far have shown "unpromising energy returns and weak greenhouse gas benefits." By phone, Pienkos acknowledged that, in theory, algae should produce low-carbon fuels because the CO_2 emitted when the fuels are burned is absorbed from the air when algae grow. But, he says, calculating the true sustainability benefits of algae requires doing a detailed study of inputs and outputs and "that will be difficult until big algae farms are built." …

—Marc Gunther
excerpted from "Green Crude: The Quest to Unlock Algae's Energy Potential"
e360.yale.edu, October 15, 2012

Part 3

Text-Analysis Response

Your Task: Closely read the text provided on pages 19 and 20 and write a well-developed, text-based response of two to three paragraphs. In your response, identify a central idea in the text and analyze how the author's use of ***one*** writing strategy (literary element or literary technique or rhetorical device) develops this central idea. Use strong and thorough evidence from the text to support your analysis. Do *not* simply summarize the text. You may use the margins to take notes as you read and scrap paper to plan your response. Write your response in the spaces provided on pages 7 through 9 of your essay booklet.

Guidelines:

Be sure to:

- Identify a central idea in the text
- Analyze how the author's use of ***one*** writing strategy (literary element or literary technique or rhetorical device) develops this central idea. Examples include: characterization, conflict, denotation/connotation, metaphor, simile, irony, language use, point-of-view, setting, structure, symbolism, theme, tone, etc.
- Use strong and thorough evidence from the text to support your analysis
- Organize your ideas in a cohesive and coherent manner
- Maintain a formal style of writing
- Follow the conventions of standard written English

Text

…George Willard, the Ohio village boy, was fast growing into manhood and new thoughts had been coming into his mind. All that day, amid the jam of people at the Fair, he had gone about feeling lonely. He was about to leave Winesburg to go away to some city where he hoped to get work on a city newspaper and he felt grown up. The mood that had taken possession of him was a thing known to men and unknown to boys. He felt old and a little tired. Memories awoke in him. To his mind his new sense of maturity set him apart, made of him a half-tragic figure. He wanted someone to understand the feeling that had taken possession of him after his mother's death.

There is a time in the life of every boy when he for the first time takes the backward view of life. Perhaps that is the moment when he crosses the line into manhood. The boy is walking through the street of his town. He is thinking of the future and of the figure he will cut in the world. Ambitions and regrets awake within him. Suddenly something happens; he stops under a tree and waits as for a voice calling his name. Ghosts of old things creep into his consciousness; the voices outside of himself whisper a message concerning the limitations of life. From being quite sure of himself and his future he becomes not at all sure. If he be an imaginative boy a door is torn open and for the first time he looks out upon the world, seeing, as though they marched in procession before him, the countless figures of men who before his time have come out of nothingness into the world, lived their lives and again disappeared into nothingness. The sadness of sophistication has come to the boy. With a little gasp he sees himself as merely a leaf blown by the wind through the streets of his village. He knows that in spite of all the stout talk of his fellows he must live and die in uncertainty, a thing blown by the winds, a thing destined like corn to wilt in the sun. He shivers and looks eagerly about. The eighteen years he has lived seem but a moment, a breathing space in the long march of humanity. Already he hears death calling. With all his heart he wants to come close to some other human, touch someone with his hands, be touched by the hand of another. If he prefers that the other be a woman, that is because he believes that a woman will be gentle, that she will understand. He wants, most of all, understanding.

When the moment of sophistication came to George Willard his mind turned to Helen White, the Winesburg banker's daughter. Always he had been conscious of the girl growing into womanhood as he grew into manhood. Once on a summer night when he was eighteen, he had walked with her on a country road and in her presence had given way to an impulse to boast, to make himself appear big and significant in her eyes. Now he wanted to see her for another purpose. He wanted to tell her of the new impulses that had come to him. He had tried to make her think of him as a man when he knew nothing of manhood and now he wanted to be with her and to try to make her feel the change he believed had taken place in his nature.

As for Helen White, she also had come to a period of change. What George felt, she in her young woman's way felt also. She was no longer a girl and hungered to reach into the grace and beauty of womanhood. She had come home from Cleveland, where she was attending college, to spend a day at the Fair. She also had begun to have memories. During the day she sat in the grandstand with a young man, one of the instructors from the college, who was a guest of her mother's. The young man was of a pedantic[1] turn of mind and

[1]pedantic — given to showing off knowledge

she felt at once he would not do for her purpose. At the Fair she was glad to be seen in his company as he was well dressed and a stranger. She knew that the fact of his presence would create an impression. During the day she was happy, but when night came on she began to grow restless. She wanted to drive the instructor away, to get out of his presence. While they sat together in the grand-stand and while the eyes of former schoolmates were upon them, she paid so much attention to her escort that he grew interested. "A scholar needs money. I should marry a woman with money," he mused.

Helen White was thinking of George Willard even as he wandered gloomily through the crowds thinking of her. She remembered the summer evening when they had walked together and wanted to walk with him again. She thought that the months she had spent in the city, the going to theatres and the seeing of great crowds wandering in lighted thoroughfares, had changed her profoundly. She wanted him to feel and be conscious of the change in her nature.

The summer evening together that had left its mark on the memory of both the young man and woman had, when looked at quite sensibly, been rather stupidly spent. They had walked out of town along a country road. Then they had stopped by a fence near a field of young corn and George had taken off his coat and let it hang on his arm. "Well, I've stayed here in Winesburg—yes—I've not yet gone away but I'm growing up," he had said. "I've been reading books and I've been thinking. I'm going to try to amount to something in life." …

—Sherwood Anderson
excerpted from "Sophistication"
Winesburg, Ohio, 1919
B.W. Huebsch

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