

Chicago Open 2020 2021: “We probably needed the extra year to finish it anyways.”

Editors: Will Alston, Brad McLain, Eric Mukherjee, and Jonathen Settle, with assistance from Ike Jose

Writers: Noah Chen, Ryan Humphrey, Kirk Jing, Joseph Krol, Caroline Mao, Jack Mehr, Matt Jackson, and Itamar Naveh-Benjamin

Logistics: Jacob O'Rourke

Packet by Chicago B: John Lawrence, Matthew Lehmann, Kai Smith, Alston Boyd

TOSSUPS

1. **In one ballad, this man is the first to attack Gamble Gold after he refused to give up half of the contents of his pack. According to legend, this man is buried in the graveyard at St. Michael’s Church in Hathersage on the Nailor family estate. After the Curtal Friar blew his whistle to summon a pack of dogs, this man shot 20 of them dead with his longbow. Along with Mutch the Miller's Son, this man killed a treacherous monk in order to break his master out of prison. William Stutely served as this man's “godfather” after he defeated that master in a (*) quarterstaff duel and threw him into the river. This is the only member of the Merry Men to accompany their leader when he was fatally bled by the Prioress. For 10 points, name this humorously-named giant man who is depicted as Robin Hood’s closest friend.**

ANSWER: Little John [or Petit John; or John Little; accept John Nailer; prompt on John]

<Legends, Brad McLain>

2. **To stop competitors from redirecting phone calls away from his example of these businesses, Alfred Strowger invented the first stepping switch for telephone exchange. The two oldest examples of these businesses in the U.S. are Bucktrout and Kirk & Nice, which both originated as cabinet manufacturers. In 1996, an author revised her muckraking exposé of how these businesses often charge consumers “pre-need,” which inspired an FTC rule granting consumers rights to “alternative containers.” That book, which attacks the methods these businesses use to create “beautiful (*) memory pictures,” was partly inspired by Evelyn Waugh’s *The Loved One* and is by Jessica Mitford. These businesses, exemplified by Service Corporation International, perform tasks which were traditionally done in the U.S. over a period of a couple days in family parlor rooms. For 10 points, name these businesses which employ morticians and undertakers.**

ANSWER: funeral homes [or funeral parlors; accept any answer referring to funerals or funerary services; accept undertaker or undertaking before “undertakers”; prompt on answers referring to burials; reject “cemeteries”]

(Mitford’s book is titled *The American Way of Death*.)

<American History, Will Alston>

3. **An epitaph by this poet describes a woman as *lectissimae dilectissimaeque* (“lek-TEE-see-my dee-lek-TEE-see-MYE-kway”), a pun meaning both “most choice” and “well-read.” In a letter written from Fleet Prison, this author implores Thomas Egerton to save him from his future father-in-law George in court. The speaker declares that “Wholly on heavenly things my mind is set” because a soul was “early into heaven ravishèd,” in a sonnet by this poet declaring that his deceased wife has (*) “paid her last debt / To nature.” The fallout from this author’s secret marriage may have prompted him to write his defense of suicide, *Biathanatos* (“bee-ah-THA-nah-tos”). One of his poems asks his wife Ann More to “endure not yet / a breach, but an expansion / Like gold to airy thinness beat,” and suggests the two should part as “virtuous men pass mildly away.” For 10 points, name this poet who declared “thy firmness makes my circle just” in his “A Valediction Forbidding Mourning.”**

ANSWER: John Donne

<Poetry, Will Alston>

4. *Description acceptable.* **In one assay that uses this chemical transformation, a control is used in which this**

transformation is done “maximally” in 6 molar urea, in order to determine the rate of this transformation’s reverse. This chemical transformation is conducted on a sample for a period of time, then quenched by decreasing the pH to 2.5 before the sample is digested and fed into an orbitrap M·S. Protein-ligand interactions and folding dynamics are studied by performing this chemical transformation on exposed backbone amides of a (*) protein. Extra peaks in certain forms of N·M·R can be eliminated in a “shake” in which this transformation occurs at labile (“LAY-bile”) bonds. This transformation increases, by up to 1.4-fold, the rate constant, in a common example of the kinetic isotope effect. For 10 points, name this transformation in which the lightest element is replaced by one of its heavier isotopes.

ANSWER: hydrogen-deuterium exchange [or HDX; accept deuteration or answers including adding deuterium or replacing hydrogen with deuterium]

<Chemistry, Eric Mukherjee>

5. *Description acceptable.* Klaus Hesse traced the spiritual hierarchy of one of this religion's sects to the worship of a group of 55 benevolent spirits who are opposed by a group of 45 evil spirits. That sect of this religion also worships a group of 77 “earth mothers” or *natigai*. When passing by stacked rock shrines, practitioners of this religion are expected to circle it three times before adding an alcoholic offering and a stone to the top of the pile. Practitioners of this religion engage in midnight summer solstice fire ceremonies known as Tergel and venerate shrines called (*) *ovoo*. Another sacred site to this religion is a tomb called the “Lord's Enclosure,” which is guarded by a group of Darkhad people. The two main sects of this religion are divided into Black and Yellow varieties, based on degree of influence from Tibetan Buddhism. The city of Ordos is a major site of worship in, for 10 points, what traditional religion that worships Genghis Khan?

ANSWER: Mongolian Shamanism [accept Siberian Shamanism or Buryat Shamanism; accept any answer indicating the traditional religion of the Mongols; accept Mongolian Tengrism but prompt on shamanism, Tengrism, or Tenergrism with “as practiced in what country?”]

<Theology / Practice, Brad McLain>

6. This character takes a swig of gasoline after being shot in the leg, which causes the wound to stop bleeding. When losing a game of chess, this character winks at the enemy king, causing it to leave the board. After a severed head insists it will never say “such drivel again,” this character successfully puts the head back on its owner. He is revealed to be a “slim youth” who is the “best jester the world has ever seen” while riding into the night with his friends in the final chapter, “Forgiveness and Eternal Refuge.” This character tosses a (*) deck of cards to a magician who swallows them, after which a séance audience finds wads of fake currency in their pockets. After protesting that “Dostoevsky is immortal,” this cavalry-moustached character sets fire to the Griboedov (“gree-BAH-yeh-doff”) House during his “last adventure” with Koroviev. In *The Master and Margarita*, Woland’s retinue includes, for 10 points, what were-cat named for the Leviathan’s earthly twin?

ANSWER: Behemoth [or Begemot; prompt on answers indicating the cat in *Master and Margarita*]

<Long Fiction, Will Alston>

7. After an earthquake on the feast day of Saint Andrew rocked this colony, the Dutch launched a raid whose failure was attributed to intercession of Our Lady of Naval. Creole caste members in this colony were usually called *insulares* (“een-soo-LAH-race”). Missions evangelizing to this colony led by Martín de Rada informed the illustrations of its native peoples found in the Boxer Codex. Graciano López Jaena (“hah-EY-nah”) was a leading member of this colony’s class of intelligentsia, the (*) *ilustrados*. A trio of Catholic priests collectively called GOMBURZA were martyred in this colony for supporting the Cavite Mutiny. Miguel López de Legazpi was the first governor of this colony, which was the usual destination of the silver-bearing galleons that sailed west from Lima and Acapulco. A 17th century monarch lends his name to, for 10 points, what former Spanish colony whose first capital was Cebu City before it was moved to Manila?

ANSWER: Spanish Philippines [or Filipinas or Pilipinas prompt on Spanish East Indies]

<CW / International Hist, Will Alston>

8. A rather subtle example of this pattern is the metaclass construct in Smalltalk-80, which, unsurprisingly, is the class of a class. An inner helper class is used in a popular implementation of this pattern attributed to Bill Pugh, who based his design on the initialization-on-demand holder idiom. A null check followed by a null check within a synchronized block is performed in one implementation of this pattern. Other thread-safe implementations of this pattern tend to rely on lazy initialization combined with a synchronized accessor method. Loggers and (*) thread pools are often implemented using this pattern. The central class of this creational pattern has a private constructor and a private member variable that is the same type as the class. Sometimes derisively called an anti-pattern, this pattern is a good alternative to using a class with only static members. For 10 points, name this design pattern used to ensure that a class only has one instance across an entire program.

ANSWER: singleton

<Other Science: Computer Science, Jonathen Settle>

9. Giovanni di Ser Giovanni Guidi commemorated one of these events with his depiction of the *Triumph of Fame*, done for the Medici and Tornabuoni families. A fresco by Piero della Francesca named for one of these events shows two angels pulling back a large curtain which surrounds the towering blue-clad figure at center. Jacopo Pontormo’s *Naming of John the Baptist* exemplifies a *tafferia* or bowl created to celebrate these events. Masaccio’s *Berlin Tondo* exemplifies a type of decorative wooden (*) tray or salver commemorating these events. Another painting depicting one of these events is based on Apelles’ lost depiction of the *Anadyomene* (“ana-die-AH-muh-nee”) scene and features a number of rose petals floating across the center, coming from a cloak that is being unfurled by the Hora of Spring. For 10 points, identify these events, a mythical example of which is shown in a painting in which Zephyr blows wind towards a goddess on a shell.

ANSWER: births [or parto, or parti, or parturition; accept birth trays; accept bearing children; prompt on pregnancy]

<Painting/Sculpture, John Lawrence/Will Alston>

10. The so-called “130/30” strategy is an example of approaches that “separate” this quantity from an underlying index, and thus make this quantity “portable.” When introduced, a widely used three-factor model explained about two-thirds of historic values of this quantity by adding “small minus big” and P/B ratio components. Rules-based approaches seek to maintain “passive” amounts of this quantity by avoiding the behavioral biases of active approaches. The equation for the characteristic line is given by this quantity, plus an error term representing idiosyncratic (*) exposure, plus a term proportional to systemic risk. This quantity, which is measured ex-post using Jensen’s measure, has a long-term expected value of zero for a publicly traded security according to both the CAPM and efficient market hypotheses. For 10 points, what above-market return on an investment, denoted by a Greek letter, names a popular investment website about “Seeking” it? ANSWER: alpha [accept portable alpha or passive alpha; accept SeekingAlpha; prompt on return on investment, or ROI, or excess return]

<Social Science: Economics, Will Alston>

11. A torus of fluid that is uniform in entropy and this quantity was shown to be unstable under non-axisymmetric perturbations by Papaloizou and Pringle. It’s not related to optics, but Rayleigh’s criterion states that this quantity must decrease with radius or else the epicyclic frequency will be real, creating a stable system. In the presence of a poloidal magnetic field, build up of tension in field lines between two fluid elements leads to the onset of turbulence and transport of this quantity. In Shakura and Sunyaev’s alpha model, this quantity is transported outward as a series of concentric shells undergo (*) Keplerian rotation. Differential rotation amplifies a weak magnetic field in magnetorotational instabilities that cause the transport of this quantity. In accretion discs, mass is transported inward while this quantity moves outward. For 10 points, name this quantity that prevents gravitational collapse perpendicular to the axis of rotation.

ANSWER: angular momentum [reject “momentum”]

<Other Science: Astronomy, Jonathen Settle>

12. A series of plates illustrating these objects for the King of Saxony earned the artist Alexander Sauerweid (“sour-vyde”) a commission from Tsar Alexander I. The Childers Reforms unsuccessfully tried to remove “tribal” variation among these objects, such as the ones that were the namesake of East Kent’s “Buffs.” A style of these objects was the best-known output of the town of Stroud in Gloucestershire (“GLOSS-ter-shur”) in the 18th century and derives its iconic appearance from the use of cheap madder lake. In Imperial Russia, dark (*) green examples of these objects were used by groups called “Preobrazhenskii” and “Semenovsky.” After the French Revolution, volunteers began using blue ones, rather than the white-grey ones of the Bourbons. The use of “facing colors” on these objects evolved from noblemen issuing distinct livery to their retainers. For 10 points, Prussian blue got its name from being used to dye what objects, one of which is the namesake of the Redcoats?

ANSWER: military uniforms [or soldier uniforms; accept any answer indicating uniforms for any kind of troops, or for officers etc; accept insignia; prompt on coats or hats by saying “we’re looking for the whole that the coat / hat is part of”; prompt on outfits or clothes; prompt on uniforms by asking “for what people?”]

<Euro History, Will Alston>

13. Searches for an immature version of this product called “99918” spiked during the COVID-19 pandemic. Seth Moulton, Sherrod Brown, and other legislators from their state teamed up in 2019 to target this product in a namesake bipartisan “Sanctions Act.” Before becoming much better known as the likely origin of COVID-19, Wuhan was notorious as a center for making this product, particularly varieties altered by Dharmachem to be allowed for sale. Though China banned this product in 2019, an investigation by NPR and the nonprofit C4ADS found that (*) precursors to it were still widely available on Alibaba. Brand medicines containing this drug, such as Duragesic and Actiq, are often administered via transdermal patch to cancer patients. In 2016, this drug surpassed heroin as the illegal drug which kills the most people in the U.S. through overdose. For 10 points, name this highly potent synthetic opioid that is up to 100 times stronger than morphine.

ANSWER: **fantanyl** [prompt on opiates; prompt on drugs before “drug”]

<Modern World, Will Alston>

14. A character in this story describes wetting his pants and staring into the blue sky at a flock of birds while being trapped in a dry well as a twelve-year-old. This story’s narrator elaborates on the phrase “I mean fights” by describing a sequence of events culminating in the statement “She got herself into it, and she'd solve it.” This story titles the last collection published by its author, which includes the stories “Elephant,” “Boxes,” and “Gazebo.” A character in this story describes the disintegration of his (*) marriage to Roxy and notes how even a great like Jack London “couldn’t handle the stuff either.” It ends with the narrator pondering how he might say “Hello, sugar” when telephoning his girlfriend. Chats with a man called J.P. comprise much of, for 10 points, what story set at Frank Martin’s “drying-out” facility for alcoholics, written by Raymond Carver?

ANSWER: “**Where I’m Calling From**”

<Short Fiction, John Lawrence>

15. *Description acceptable.* A massive collection of 19th century books on these systems compiled by Mary Ann O’Brian Malkin is housed at Penn State. Examples of these sorts of systems include one designed by Skippy Blair called the Universal Unit System and one created by and named for the originator of “spatial harmony” theory. The BESS (“bess”) method developed by Irgmard Bartenieff (“bar-TEN-ee-yeff”) is used to teach people that example of these systems, which uses three vertical lines to represent total (*) stillness. Louis XIV’s performance as the “Sun King” inspired the Beauchamp-Feuillet (“bow-SHAHMP feuh-YAY”) example of these systems. A core repertoire of 19th-century Russian works was captured using one of these systems created by Vladimir Stepanov. Benesh Notation and Labanotation are both examples of, for 10 points, what sorts of systems used to visually represent positions such as *en pointe*?

ANSWER: **ballet notation** [or **dance notation** or **choreology**; accept **notation** for **choreography**; accept **movement analysis**; accept any answer indicating a method to **transcribe** the **movements** of dancers; prompt on **notation** by asking “for what discipline?”]

<Other Arts: Ballet, John Lawrence/Matthew Lehmann>

16. In its closing sentence, this book alludes to *Waiting For Godot* by expressing the desire for a new St. Benedict to arise, who the author had earlier compared to Leon Trotsky. In a critique of Burkean conservatism, this book argues that traditions can only remain “vital” when they embody continuities of conflict. It opens with a thought experiment examining what the world would look like if modern science was dismantled and had to be rebuilt from surviving manuscripts. Another section of this book imagines the application of emotivist theories to (*) Polynesian society in the wake of the abolition of taboos, leading to the question “why should we not think of Nietzsche as the Kamehameha II of the European tradition?” This book critiques enlightenment morality using an earlier thinker’s concept of individual flourishing, or *eudaimonia*. For 10 points, name this book advocating for a return to Aristotelian ethics, the magnum opus of Alistair MacIntyre.
ANSWER: After Virtue: A Study in Moral Theory
<Philosophy, Brad McLain>

17. In *Loasaceae* (“Loh-uh-SAY-see-eh”), scales in the staminoidal complex can trigger this phenomenon. One form of this phenomenon occurs due to a significant decrease in the reflection coefficient in pulvinar cells, which heavily express an H⁺-A⁺T⁺P⁺ase. Acclimation and habituation have been extensively studied in *Rhododendron* (“ROW-duh-DEN-dron”) and *Mimosa pudica* (“mi-MO-suh PEW-dee-kuh”) because they exhibit this phenomenon. Types of this phenomenon that are controlled by the pulvinus involve changes in (*) turgor (“TURR-gurr”) pressure. Contact with glandular trichomes in genus *Drosera* (“dro-ZAY-ruh”) can trigger this phenomenon, while more dramatic examples of this phenomenon are caused by activation of “trigger hairs,” causing closure of a Venus Fly Trap. For 10 points, identify this type of plant movement that, unlike tropisms, involves non-directional responses to external stimuli.
ANSWER: nastic movement [accept thigmonasty, hyponasty, or nyctinasty; prompt on rapid plant movements]
<Biology, Kai Smith>

18. This word, which is not the name of a city, identifies an institution founded by tycoon Shang Xuanhai (“shang shwen-hye”) as China’s first modern university. The leader of an organization of this name was forced into internal exile in Henan by Prince Chun, but returned to seize power three years later amidst the chaos of the Wuchang Uprising. In the 19th century, trade in the region of this name was supervised by a powerful minister who was also the Viceroy of Zhili (“zhuh-lee”) and could thus give tax exemptions in treaty ports. The most prominent such minister, Li Hongzhang, sponsored two (*) forces of this name to acquire European advisors and ironclads as part of the Self-Strengthening Movement. Ex-officers in those forces of this name formed a warlord clique which was defeated in the Northern Expedition by Chiang Kai-Shek. For 10 points, what Chinese word meaning “Northern Ocean” names the army and the government led by Yuan Shikai?
ANSWER: Beiyang [accept Beiyang army, fleet, university, clique, etc; prompt on Dongbei or Northeast China; prompt on Northern Ocean before “Northern”]
<World History, Will Alston>

19. A movement of orchestral music set in this state begins with the upper instruments descending from E-flat in chromatically-inflected mostly stepwise fashion for one bar of 4/4 time and then one bar of 9/8 time. David Wallis Reeves’s most famous march is titled for the “Second Regiment” of this state’s National Guard. A location in this state titles a movement that depicts a child wandering into the woods and encountering a woman reminiscent of the Goddess Liberty. From 1893 until his death, Horatio Parker taught at a university in this state, where (*) Paul Hindemith taught from 1940 to 1953. A movement set in this state represents two different armies with the tunes “Hail, Columbia” and “British Grenadiers” and comes right before “The Housatonic at Stockbridge.” For 10 points, the second movement of Charles Ives’s *Three Places in New England* is set in Putnam’s Camp in Redding, a city in what U.S. state?
ANSWER: Connecticut
<Classical/Opera, John Lawrence>

20. A novel by this author presents five “agonies” of family members and closes with the section “Sixth Agony,” in which Death reappears riding a bicycle in the family’s backyard. In another novel by this author, an aging mother is shocked to find her youngest son, whom she calls “the brightest star,” in bed with another boy. In yet another work, this author confesses to publishing a book abroad after the government fails to produce two witnesses at a morality trial. That book by this author of *Old Rosa* describes being forced to work in the cane fields while imprisoned for ten years in a feces-ridden cell at (*) El Morro. This author of *Palace of the White Skunks* wrote a suicide note claiming his country would soon be free and “I already am,” before overdosing on drugs to end his suffering. This participant in the Mariel Boatlift finished the *Pentagonia* series while afflicted with AIDS. For 10 points, name this Cuban-American author of the memoir *Before Night Falls*.

ANSWER: Reinaldo Arenas

<Misc. Lit, Matthew Lehmann>

BONUSES

1. This event was first held in 1903 by *L'Auto*, which desperately needed to grow its revenues and fanbase after the Dreyfus Affair caused it to split with the newspaper *Le Vélo*. For 10 points each:

[10e] Name this athletic competition whose course has always ended on the Champs-Élysées since 1975, though it now frequently begins in foreign countries. Its winners include Jacques Anquetil (“on-kuh-TEAL”).

ANSWER: **Tour de France**

[10h] The inaugural Tour de France was won by this dude. His biking career ended shortly after, as he was caught cheating in the second Tour, stripped of his title, and beaten up by a mob of spectators.

ANSWER: Maurice **Garin**

[10m] This man phoned cyclist Gino Bartali to encourage him during the Tour de France, hours after he was shot in the neck during the 1948 Italian elections; Bartali then won, helping narrowly avert a civil war. This longtime leader of the Italian Communists was nicknamed “The Best,” or *Il Migliore*.

ANSWER: Palmiro **Togliatti**

<Euro History, Will Alston>

2. In the language R, Douglas Bates’ Matrix package on CRAN (“cran”) is used to load these matrices into objects of the class ‘dgCMatrix’ from files in the Harwell–Boeing exchange format. For 10 points:

[10e] Name these matrices that, since they have few non-zero elements, are stored in compressed data structures.

ANSWER: **sparse** matrices

[10m] Sparse matrices arise when solving differential equations with this method that models a wide range of complex physical phenomena. This method solves a system of equations obtained from the following equation: the stiffness matrix times a nodal displacement vector equals the nodal force vector.

ANSWER: **finite element** method [or **FEM**; or **finite element analysis**; or **FEA**; reject “finite difference method”]

[10h] The go-to algorithms for finding eigenpairs of sparse matrices belong to this class of methods first described by a Soviet naval engineer. For matrix A and vector x , this class of methods constrains the search space to a space spanned by the vectors x , A times x , A -squared times x , and so on, up to some finite power.

ANSWER: **Krylov** subspace methods

<Other Science: Applied/Data Science/Engineering, Jonathen Settle>

3. Vincent Van Gogh wrote that his landscape of a “green” example of these places depicted “The Poet’s Garden,” For 10 points each:

[10m] Name these places. A Van Gogh painting of a “red” example of these places shows the reflection of a blazing yellow sun on a canal at right and was the only painting he sold during his lifetime.

ANSWER: **vineyard**s [accept *The Green Vineyard*; DO NOT REVEAL THIS ANSWER OTHERWISE but accept *The Red Vineyards Near Arles*; prompt on **winery** or **wineries**; reject “farms”]

[10e] Van Gogh’s *Red Vineyard* depicts a location in this French town. Van Gogh’s *Yellow House* is also set in this town, where he lived for nine weeks with Paul Gauguin.

ANSWER: **Arles** [accept *The Yellow House at Arles*]

[10h] *The Red Vineyard* was purchased by an artist from this family who was portrayed in James Ensor’s *Russian Music* and whose own paintings include *The Shores of Brittany*. Another artist from this family named Eugène was portrayed by Van Gogh in *The Poet*.

ANSWER: **Boch** family [accept Anna **Boch** or Eugène **Boch**]

<Painting / Sculpture, John Lawrence>

4. This author's poem "Baneker" describes the title surveyor seeing a "domed city / rising from the morass and spreading / in a spiral of lights..." For 10 points each:

[10m] Name this poet. Five "movements" of poems celebrating the life of biracial violinist George Bridgetower comprise this poet's collection *Sonata Mulattica*.

ANSWER: Rita **Dove**

[10e] Rita Dove was the first African-American to be appointed to this post in the U.S. which is currently held by Joy Harjo as of 2021.

ANSWER: **Poet Laureate** of the United States

[10h] Rita Dove describes an object named for this figure in a poem describing how it is "one more exotic in a stream of foreign students." An archetypal image named for this figure titles the National Book Award-winning, debut poetry collection of Robin Coste-Lewis.

ANSWER: **Venus** [accept "**Venus** of Willdenfort" or *Voyage of the Sable Venus*; reject "Aphrodite"]

<Poetry, Will Alston>

5. According to one text, this thinker was able to explain to Huang Liao why the sky does not fall down or why the earth does not drop off. For 10 points each:

[10h] Name this philosopher who belonged to the "School of Names." All of his works are lost, but thankfully ten "theses" or paradoxes by him are preserved in another book.

ANSWER: **Hui Shi** ("hway shih") [or **Hui Zu** or **Master Hui** or **Hui Tzu**; prompt on **Hui**]

[10e] Hui Shi is an interlocutor in this work of Taoist philosophy. The so-called "inner seven chapters" of this work are thought to be the only ones actually written by its namesake philosopher.

ANSWER: **Zhuangzi** ("zhwang-zuh")

[10m] In a chapter called "Autumn Flood" from the *Zhuangzi*, Hui Shi and Master Zhuang discuss whether or not it is possible for Zhuang to know whether these animals are happy. In another passage, Master Zhuang enigmatically describes one of these animals named *Kun* who is able to transform into the massive *Peng*.

ANSWER: **fish** [or **fishies**; accept **minnows**]

<Philosophy, Ike Jose>

6. For 10 points each, answer the following about acoustic attenuation: how sound loses energy in viscous media.

[10e] This physicist derived a fundamental law for acoustic attenuation in Newtonian fluids. A law describing the drag on a sphere in a viscous fluid is one of many contributions this Anglo-Irish physicist made to fluid dynamics.

ANSWER: George Gabriel **Stokes**

[10h] Unlike many other fluid dynamics phenomena, acoustic attenuation notably depends on this type of viscosity, as captured in the modern version of Stokes law. Often denoted with a lowercase zeta, this type of viscosity appears in the compressible Navier–Stokes equations, but not their incompressible form.

ANSWER: **bulk** viscosity [or **volume** viscosity; or **second coefficient** of viscosity; or **dilatational** viscosity]

[10m] Acoustic attenuation and dispersion can be modeled by this general dispersion relation. In nonlinear optics, applying this relation connects the real and imaginary parts of a frequency-dependent dielectric function.

ANSWER: **Kramers–Kronig** relations

<Physics, Kai Smith>

7. The chronicler Gervase of Canterbury records that, on June 18, 1178, five monks saw one of these events which they observed as appearing like a “flaming torch.” For 10 points each:

[10m] Describe this sort of event. Islamic scholars are divided on whether Surat al-Qamar describes an actual example of this event from one of Muhammad’s miracles, or whether it will only occur on Judgment Day.

ANSWER: **splitting** the **moon** [or **lunar explosion**, or **cleaving** of the **moon**, or **sundering** of the **moon**; accept answers that indicate a **dividing** or **conflagration** or **explosion** on the Earth’s **Moon**; prompt on **asteroid** or **meteor** impact by asking “what sort of event did Gervase describe it as?”]

[10h] In 2010, NASA photos of one of these lunar features called Rima Ariadaeus were cited by Muslim theologians as evidence that the moon had been split. This German term refers to small, thin depressions on the moon’s surface.

ANSWER: **rilles** (rhymes with “grills”)

[10e] The astronomer Jack Hartung, who investigated Gervase’s moon splitting, worked at this university system’s school at Stony Brook. This system’s flagship university is at Binghamton (“BING-um-ton”).

ANSWER: **SUNY** system [or **State University of New York**; reject “New York State”]

<Other Academic, Will Alston>

8. The revolt of Sextus Pompey against this government was prompted by the fact that Pompey’s grant of tax rights to the Peloponnesus was worthless, as Marc Antony had already taxed the place to death. For 10 points each:

[10e] Name this government which Antony led along with Octavian and Marcus Lepidus.

ANSWER: **Second Triumvirate** [prompt on **Triumvirate**]

[10m] The Second Triumvirate funded itself by reviving this policy, in which lists of public enemies were published and Romans were allowed to murder them, thus letting the triumvirs confiscate the property of dead enemies.

ANSWER: **proscription** [or **proscriptio**]

[10h] Having failed to raise sufficient funds through confiscation, the triumvirs then proposed to tax Rome’s 1400 wealthiest ladies, prompting this woman to speak out. Her eloquent oration, which asked “Why should we pay taxes when we have no part in the honours...of statecraft?” convinced the triumvirs to partly repeal the tax.

ANSWER: **Hortensia**

<Ancient History, Will Alston>

9. A psychological syndrome is named for a poem by George Humphries in which a toad asks one of these animals a question which “raised her doubts to such a pitch / She fell exhausted in the ditch.” For 10 points each:

[10h] Name these animals. In *Naked Lunch*, Doc Benaway heads an organization that produces a drug called “black meat” from giant Brazilian examples of these animals.

ANSWER: **centipedes** [accept “The **Centipede**’s Dilemma”; prompt on **arthropods**; reject “insects”]

[10m] A centipede being crushed to death with a napkin is a recurring image in this Alain Robbe-Grillet novel, whose narrator suspects his wife A... is having an affair with the plantation owner Franck.

ANSWER: **Jealousy** [or *La **Jalousie***]

[10e] In this author’s novella *The Bridge of Dreams*, Tadasu wonders if his wife Sawako had anything to do with his stepmother Tsuneko dying of a centipede bite. This Japanese author also wrote the novel *Naomi*.

ANSWER: Jun’ichirō **Tanizaki**

<Misc. Lit, John Lawrence>

10. In this film, overtone singing accompanies a scene in which several men don walrus teeth to exorcise an evil shaman, who vanishes into thin air. For 10 points each:

[10h] Name this film in which Oki and his friends pursue a butt-naked man across a plain before he escapes by jumping across a crack in the ice. It is the only Canadian film to ever win the Camera d'Or at Cannes.

ANSWER: Atanarjuat: The Fast Runner

[10e] *Atanarjuat* was the first major film to have a cast entirely of this ethnicity and dialogue entirely in its language. A family of this ethnicity is depicted in Robert Flaherty's partly-staged documentary *Nanook of the North*.

ANSWER: Inuit [or Inuuk; prompt on Eskimos or First Peoples; reject "First Nations"]

[10m] The director of *Atanarjuat*, Zacharias Kunuk, also made an adaptation of this film centered on the hunter Kuanana. This film's protagonist often remarks "That'll be the day" to his companion Martin Pawley, played by a young Jeffrey Hunter.

ANSWER: *The Searchers* [or Maliglutit] (The original is by John Ford.)

<OArts, Will Alston>

11. In the *Politics*, Aristotle asks "who shall serve as herald" if there is nobody with the "lungs" of this character, to give an example of why an effective state must have a minimum number of people. For 10 points each:

[10h] Name this herald of the Greek forces during the Trojan War. In the *Iliad*, Hera likens herself to this character as she speaks with the voice of "fifty men" to the Greeks, shaming them for fleeing the field of battle.

ANSWER: Stentor (Whence the word "stentorian.")

[10e] Unfortunately, Stentor's voice did not give him the super strength he needed to defeat this god in a shouting contest, so Stentor's lungs burst from exhaustion. This god carried the *caduceus* staff.

ANSWER: Hermes [or Mercury]

[10m] This god took a lot of credit for the gods' victory in the Titanomachy because his great shout frightened the Titans. He lends his name to a type of fear, which he caused by shouting loudly after being awoken from naps.

ANSWER: Pan [or Faunus] (Whence the word "panic.")

<Legends, Will Alston>

12. The so-called "common deletion" in this structure is often found in photoaged skin, and changes in it can cause Leber's ("LEE-burz") Hereditary Optic Neuropathy. For 10 points each:

[10e] Name this circular segment of D·N·A, which contains 16,569 base pairs. Several of its genes code for the complexes of the electron transport chain.

ANSWER: mitochondrial DNA [or mtDNA or the mitochondrial genome]

[10h] This most polymorphic segment of the human mitochondrial genome contains hypervariable regions and the transcriptional origins for both strands.

ANSWER: D-loop [or control region or DLP or D-Loop and associated promoters]

[10m] In humans, the U·G·A codon in mitochondria is reassigned to tryptophan, giving it two codons. Thus, the last position of the codon can be written with this letter, which in IUPAC ("EYE-yew-pack") nomenclature signifies a purine.

ANSWER: R

<Biology, Eric Mukherjee>

13. For 10 points each, please answer the following about the misleadingly-named author Antal Szerb:

[10e] Disappointing Balkanists everywhere, Szerb is not actually a Serbian, but rather of this nationality. This is also the nationality of Imre Kertész (“IM-ray CARE-tess”), who wrote the novel *Fatelessness*.

ANSWER: **Hungarian** [or **Magyar**]

[10m] Szerb’s book *A Martian’s Guide to Budapest* describes how the neighborhood of Pasaret is home to several “affluent” versions of these people. In the novel that introduced them, the two chief political parties among these people are the Tramecksans and Slamecksans.

ANSWER: **Lilliputians** [prompt on **High-Heels**, **Low-Heels**, **Big-Endians**, or **Little-Endians**]

[10h] *A Martian’s Guide to Budapest* describes how the Martian brushes this substance off of his suit. The poem about Dolores Haze in *Lolita* ends by describing how the rest is “rust and” this substance.

ANSWER: **stardust** [prompt on **dust**]

<Long Fiction, Matthew Lehmann>

14. The massive debt incurred through this act was negotiated down by Mark Lanier, who turned over everything it funded except the Wabash and Erie Canal. For 10 points each:

[10h] Name this ambitious act passed by Indiana governor Noah Noble, which borrowed about two hundred times the state’s annual revenue to finance infrastructure. You can just give the adjective it’s commonly known by.

ANSWER: (Indiana) **Mammoth** Internal Improvement Act [accept **Mammoth** Act or **Mammoth** Bill; prompt on **Internal Improvement Act**]

[10e] Unfortunately, Indiana went bankrupt after the financial collapse in this event brought down the state’s skyrocketing land values. This panic was brought on in part by Levi Woodbury issuing the Specie Circular.

ANSWER: Panic of **1837**

[10m] The company which built the large canal of this name in New Jersey owned many of Indiana’s canals after the bankruptcy. This is also the surname of a man who chaired the Erie Canal Commission and wrote the preamble to the U.S. Constitution.

ANSWER: **Morris** [accept **Morris** Canal or Gouverneur **Morris**] (The common-link isn’t accidental, as Morris, New Jersey is named for Gouverneur Morris’s family.)

<American History, Will Alston>

15. The construction of the Dike Kokaral has reduced the size of the northern portion of this desert substantially since 2005. For 10 points each:

[10m] Identify this desert whose extreme salinity has resulted in toxic dust storms that spread drug-resistant tuberculosis. Many muskrats were once trapped near the town of Muynak in this desert, which today mainly caters to tourists who visit it to view rusting hulks.

ANSWER: **Aralkum** Desert [accept any answer indicating the land that the **Aral** Sea used to cover]

[10e] Despite benefitting from extensive water diversion, many of the lakes created by this country’s Toshka Lake Project have already dried up into deserts. This country’s Aswan High Dam also created a man-made lake.

ANSWER: **Egypt** [or **Misr**]

[10h] This lake on the border of Iran and Afghanistan, which was one home to the richest wetlands in the region, now alternates between being a seasonal lake and a desert thanks to dams impeding the flow of the Helmand river.

ANSWER: **Hamun** Lake [or Lake **Hamun**]

<Geography, Brad McLain>

16. The audience gave an ovation at the first reading of this author's line "I am human and I think nothing human is alien to me," which was intended to portray nosiness but was interpreted as more profound. For 10 points each:

[10m] Name this author who included the saying "fortune favors the bold" in his play *Phormio*, in which Geta uses the phrase to encourage the young Antipho to deal with his father.

ANSWER: **Terence** [or Publius **Terentius** Afer] (The former quote is from *The Self-Tormentor*.)

[10e] Another popular Roman proverb preserved in *Phormio* is uttered by Antipho, who describes his marriage as like holding one of these animals "by the ears." A female one of them nurtured Romulus and Remus.

ANSWER: **wolves** [or **wolf** or Canis **lupus**; accept "I hold the **wolf** by the ears" or "auribus teneo **lupum**"]

[10h] In *Phormio*, the lawyer Hegio advises Demipho that there are as many of these things "as there are men," encouraging him to drop his lawsuit against Antipho. In *Pericles, Prince of Tyre*, the title character calls these things "fool[s] that makes us scan the outward habit by the inward man."

ANSWER: **opinions** [or **sententiae**]

<Drama, Will Alston>

17. An *International Handbook* of this phenomenon edited by Yael Danieli gives examples of it such as the lasting impacts of Japanese internment and the Cambodian genocide. For 10 points each:

[10m] Identify this phenomenon, in which the biological and social consequences of atrocities continue on past the lives of the people who experienced them, possibly through epigenetic methylation.

ANSWER: inter**generational trauma** [or trans**generational trauma**; or multi-**generational trauma**; or **communication** of violent **trauma**; accept International Handbook of **Multigenerational Legacies of Trauma**; prompt on historical **trauma** or epigenetics of **trauma**; reject "second hand trauma"]

[10e] Intergenerational trauma was first identified in the children of survivors of this event. Viktor Frankl used his experience of this event to develop logotherapy in *Man's Search for Meaning*.

ANSWER: the **Holocaust** [or the **Shoah**]

[10h] Intergenerational trauma from Japanese colonization and the aftermath of the Korean War is encapsulated by an emotion known by this Korean term. This difficult-to-translate term is associated with the sorrow caused by the loss of traditional culture and the symbolic end of Korean history with the death of the Sunjong Emperor.

ANSWER: **han** [or **haan**]

<Social Science: Psych, Brad McLain>

18. This piece's second movement has been arranged many times for separate performance under the title *Adagio Cantabile*. For 10 points each:

[10e] Give the nickname of this C minor piano sonata by Ludwig van Beethoven, which it shares with Tchaikovsky's sixth symphony.

ANSWER: **Pathétique** [accept **Pathétique** sonata or **Pathétique** symphony]

[10m] The somewhat unusual four-note chord which ends the *Adagio Cantabile* features the lowest, second-lowest, and third-lowest examples of this note on the piano. The second movement of Pathétique is in the major key rooted on this note, whose relative minor is F minor.

ANSWER: **A-flat** [accept **A-flat** major; reject "G-sharp"]

[10h] The opening theme of the *adagio* of this C minor Mozart piece is often thought to have partly inspired the opening theme of the *Adagio Cantabile*. This piece begins with staccato chords ascending from C to high E-flat.

ANSWER: **Piano Sonata** No. **14** in C minor [accept answers indicating a **fourteenth sonata** for **piano**; prompt on piano sonata, or **Sonata** No. **14**, or **fourteenth sonata**]

<Classical/Opera, John Lawrence>

19. The fact that the “concentration” types of these deposits preserve soft tissues allows paleontologists to reconstruct nearly complete ecosystems. For 10 points each:

[10m] Name these snapshots in time with a German name. They contain a large amount of highly-preserved fossils.

ANSWER: fossil-**lagerstätten** (“LAH-gur-shtet-en”)

[10h] The Soom Shale lagerstätte preserves some of the largest and most complex samples of these structures that are used for Paleozoic era biostratigraphy. These phosphatic structures are remnants of extinct agnathans.

ANSWER: **conodont elements** [accept **conodont feeding apparatus**; accept **conodont teeth**; prompt on **conodont** fossils] (Conodont elements are not truly teeth, but are tooth-like.)

[10e] To preserve soft tissues in lagerstätten, remains must be buried quickly to avoid exposure to this gas. The introduction of this gas into the atmosphere is linked to a massive extinction event during the Paleoproterozoic era.

ANSWER: **oxygen** gas [or **O₂**] (That is the Great Oxygenation Event.)

<Other Science: Earth Science, Jonathen Settle>

20. A member of this social class named ‘Arib served under several caliphs and won a famous singing contest against a younger member of it, Shariyah. For 10 points each:

[10h] Name these performers who were roughly analogous to the later *geisha* of Japan. They served as both entertainers and courtesans while enslaved to Baghdad’s elite.

ANSWER: **qivan** [or **qayna**]

[10e] ‘Arib was purchased by al-Ma’mun, a ruler of this Baghdad-based Islamic dynasty. al-Ma’mun also built this dynasty’s great center of learning, the House of Wisdom.

ANSWER: **Abbasid** caliphate [or **Abbasid** dynasty]

[10m] ‘Arib claimed to have been born into this family of Iranian nobles, who were originally a group of Buddhist leaders in Balkh. Under the Abbasids, this family became a dynasty of viziers, starting with its member Khalid.

ANSWER: **Barmakids** [or **Barmacides**; accept **Barmakid** viziers]

<World History, Matthew Lehmann>