



THINK WRITE PUBLISH

SCIENCE & RELIGION

Kepler's Carol

A GHOST STORY ABOUT JOHANNES KEPLER



SCIENCE MUSEUM OF
MINNESOTA

EXPLORING COMPELLING NEW STORIES
★ AND THOUGHT PROVOKING IDEAS ★



KEPLER'S CAROL: A GHOST STORY ABOUT JOHANNES KEPLER

Science Museum of Minnesota

PROJECT BACKGROUND

This public program was developed as part of a three-year project, *Think Write Publish—Science & Religion*. Through a series of programs, fellowships, and a writing competition, the project sought to explore the relationship and intersections between science and religion. Rejecting a common narrative that the two are necessarily at odds, this project explored a different proposition: that science and religion can reinforce each other to allow a more nuanced, profound, and rewarding experience of our world and our place in it.

The project resulted in 12 creative nonfiction stories, as well as five experimental public programs designed to promote productive conversations about the relationship of science and religion in museums and other cultural spaces. Each program was inspired by one of the project's creative nonfiction stories, and was designed for a different audience using an appropriate programmatic format. The public programs were held in communities across the United States: Phoenix, Arizona (led by Arizona State University); San Francisco, California (Children's Creativity Museum); Durham, North Carolina (Museum of Life and Science); Boston, Massachusetts (Museum of Science); and Saint Paul, Minnesota (Science Museum of Minnesota). In addition to providing a safe space for multiple and diverse audiences to consider the relationship of science and religion, a larger goal of the programmatic effort was to explore techniques for addressing potentially polarizing topics in ways that are constructive and build bridges among different perspectives and experiences.

CONTENTS

This package contains:

- Program overview document and example supporting materials
- Summary of program evaluation findings

PROGRAM DESCRIPTION

Title: Kepler's Carol

Target audience: Public audiences age 10 and up

Format: Theatrical play

Setting: Theater, auditorium, or open stage with screen, projection capabilities, and sound system

Length of program: 13 minutes

Inspired by: *A Harmony of Views: Kepler's Dream for Life on Earth and Beyond*, a creative nonfiction story by Sarah Jozina Reynolds.

Program overview: Utilizing the familiar structure of Charles Dickens' Christmas Carol, *Kepler's Carol* examines how the scientist Johannes Kepler balanced his scientific work with his religious devotion. At the top of the show, we learn that Kepler is considering giving up scientific pursuits. Throughout the play, the ghosts convince him to continue his work.

Length of program: 13 minutes

Story summary: Sarah Jozina Reynolds' story, *A Harmony of Views*, describes Johannes Kepler's struggle to reconcile his scientific work with his religion. The author also describes the reasons for her interest in Kepler, recounts her study into his life, and reflects on the relevance of his work and biography to her own life.

Key ideas: Exploring the topic of science and religion in a way that is accessible to all ages and inclusive of multiple viewpoints, this short play utilizes the familiar structure of Charles Dickens' *A Christmas Carol* to examine how Kepler balanced his scientific work with his religious devotion. The show is bookended with information about a current female scientist, updates on recent discoveries, and group discussion time among audience members. The nature of the content and themes addressed in *Kepler's Carol* offers up an invitation into science learning to people who may see a division between religious beliefs and scientific pursuits. To quote Joannes Kepler, "I hoped that a better understanding of the harmonious order of the heavens would help to create a more harmonious world upon Earth. I study astronomy not looking for God in the heavens, I already have my faith, but instead I study in hopes of bettering the world."

Program goals: Participants will:

- Find the program to be interesting and relevant;
- Consider conversations about the relationship of science and religion to be timely and important;
- Experience insight(s) or new ideas about the relationship between science and religion;
- Reflect on their own values and consider the relationship of science and religion in their own lives.

Additionally, participants will:

- Consider Kepler's ability to reconcile his religion and his scientific work
- Learn about Kepler's scientific accomplishments
- Think about what life on other planets may mean to them

ADVANCE PLANNING

This program requires familiarity with producing and performing live theatre. It is strongly recommend that professional performers are hired to perform *Kepler's Carol*.

- Cast the production, using trained actors
- Design the set, props, and audiovisuals
- Rehearse the production
- Publicize the production

MATERIALS & RESOURCES

Set, costumes, and props: See script (next section).

Slides and special effects (see attached example).

SCRIPT

KEPLER'S CAROL: A GHOST STORY ABOUT JOHANNES KEPLER

Inspired by *A Harmony of Views: Kepler's Dream for Life on Earth and Beyond*
by Sarah Jozina Reynolds

Set: Kepler's study. A tall desk with a tall stool. A Picture frame with title and the date of Kepler's life span, 1571-1630, hangs on the door.

Characters: Two actors.

Kepler: Of his time period. He is not an imitation of Scrooge.

Narrator: All in black.

First ghost: Classic ghost costume made with a sheet. Serves as a warning. Desires to be terrifying. He is not.

Spirit 1: Ghost of Science Past. Wearing a white tunic and a crown with a jet of light. Serene.

Spirit 2: Ghost of Science Present. Green robe with fur. Red wig. Cheery with a joyful air.

Spirit 3: Ghost of Science Yet to Come. A solemn Phantom, draped and hooded. Plays with a fidget spinner.

Narrator: If you like ghost stories, raise your hand. *(Waits for response)* Me too. Do you know the story *A Christmas Carol* by Charles Dickens? *(Waits for response)* As you know, it is a ghost story. We will meet some ghosts in our story today, and a real scientist from the past, Johannes Kepler. Have you heard of Kepler? *(Waits for response)* Kepler was a very significant mathematician and astronomer. He was also a deeply religious man. He lived a very long time ago. Now, are you ready to hear a ghost story? *(Waits for response)* Great. Let us begin. *(Holding up the book)* Kepler's Carol with apologies to Charles Dickens. *(Opens and reads from book)* Ghosts, if there is such a thing, are dead. There is no doubt whatever about that. If ghosts were to exist, they would be dead, dead as a doornail. The hero of our story, Johannes Kepler, is about to meet his first ghost. *(Exits)*

(Kepler enters with manuscript and crosses to his standing desk)

Kepler: They want to ban my book on Copernican astronomy. *(Throws the manuscript on the desk)* I give up. I'm not going to work anymore. I, Johannes Kepler, am done. No one wants to listen, no one wants to *learn*. They just want to fight – about science and religion. What is the point of trying to understand new things about the universe, if no one else will even consider them?! Let them keep their science and religion at war and I'll keep mine at peace. I quit. *(Put his head on the desk. Starts to snore. Sounds of door closing and someone climbing the stairs. Kepler looks around. To the audience.)* Quiet, you. I'm trying to sleep. *(Puts head back down)*

First ghost: *(Behind Kepler)* Boo! *(No reaction from Kepler)* Boo! *(No reaction from Kepler)*
Boogity. Boogity. Boogity.

Kepler: *(Looks up)* What do you want with me? I'm trying to sleep. *(Head back down)*

First ghost: Much! *(Ghostly cry)*

Kepler: *(Looks up)* Are you supposed to scare me?

First ghost: *(Removes ghost hood)* That is the point, Johannes Kepler. *(Hood back on. Stupid ghostly cry to audience)* Was that scary? *(Waits for response)* No? I must work on that.

Kepler: You could just be a bad dream caused by indigestion. A piece of undigested turkey giving me nightmares. There's more of gravy than grave about you! *(He weakly laughs)* I'm too depressed to laugh. Bah. Humbug! *(Puts his head back down on the desk.)*

First ghost: *(Hood back on. stupid ghostly cry to audience. Hood off.)* Was that scary? *(Waits for response.)* Stop being such ghost busters. I WILL slime you!

Kepler: *(Head up)* Who are you?

First ghost: I'm here as a warning. *(Ghostly cry.)* To give you a chance at hope.

Kepler: Well, get on with it.

First ghost: You must not give up on your scientific work exploring the universe.

Kepler: What is the point of sharing my work with the world when all the world wants to do is fight amongst each other? *(Ghost makes ghostly cry)* Mercy! Dreadful apparition, why do you trouble me?

First ghost: You cannot give up. I warn you. *(Ghostly cry.)* You will be haunted by Three Spirits.

Kepler: THAT'S the chance at hope you mentioned? More ghosts?

First ghost: It is.

Kepler: I—I think I'd rather not.

First ghost: Without their visits, you are doomed. Expect the first soon.

Kepler: Couldn't I take 'em all at once, and have it over?

First ghost: No. Ohhh - ghostly exit noise - Ohhh. *(He exits)*

Kepler: *(Looking around)* Let us make haste, three spirits, let us be finished with this charade. *(Looks around. Nothing.)* Bah. Humbug. *(Looking at his manuscripts)* I hoped that a better understanding of the harmonious order of the heavens would help to create a more harmonious world upon Earth. It has not. I study astronomy not looking for God in the heavens, I already have my faith, but instead I study in hopes of bettering the world, but if I can't publish, what good is it? *(He puts his head on the desk. Spirit 1 enters to mystical music. Kepler looks up.)* Are you the Spirit, whose coming was foretold to me?

Spirit 1: (*Soft, low, and gentle*) I am! I am the Ghost of Science Past.

Kepler: Long past?

Spirit 1: Your past. Rise! Walk with me into your past!

Kepler: I am a mortal.

Spirit 1: Bear but a touch of my hand and you shall travel back in time!

Kepler: I'm not one for touching.

Spirit 1: Do it or your fate will be sealed. (*Kepler hesitantly does.*) We now travel to the past. (*Lines are spoken while the time travel video with SFX plays.*) It is no Tardis, but it does the trick. (*Giggles*)

Kepler: I do not understand.

Spirit 1: You wouldn't. (*Slide of a witch hunt*) We have reached our destination.

Kepler: Oh, no. Let us not go there. That was not a pleasant time. I can't relive this.

Spirit 1: Your mother was accused of witchcraft.

Kepler: She was. As were many women. Women were accused of being a witch for simply looking at another person the wrong way. It was ludicrous and dangerous. Many lives were lost because of ignorance and fear.

Spirit 1: And who was it that defended your mother?

Kepler: It was me. I defended her in court.

Spirit 1: Successfully. You saved your mother. Because of you, your mother lived to see another day.

Kepler: Yes, but many women were not so lucky. Fear and hate can wreak such havoc. Please, let us leave this place.

Spirit 1: As you wish. (*Image of 30 Years War*) Do you know this year?

Kepler: I don't want to be here either.

Spirit 1: Do you know it?

Kepler: Know it! 1618 marked yet another year of war. People of my faith were forced to convert or be banished from their homes.

Spirit 1: And you?

Kepler: No one trusted my efforts to find common ground among religions.

Spirit 1: Yet, you convinced them to let you stay.

Kepler: It was difficult. I do not wish to be here. Show me no more.

Spirit 1: One more. You were excluded from your own church, but again you continued your work and kept your faith. *(Slide of Galileo)* Do you know this man?

Kepler: It is my friend, Galileo, he too suffered, as I did. *(Crosses to desk and puts head down)*

Spirit 1: Speak your thoughts.

Kepler: Since Earth is a home filled with living things, then wouldn't its sibling planets prove the same. I thought why would God create planets to go empty of life, moons to go unobserved, and mountains to go unclimbed? Who is permitted to remain silent at the news of such momentous developments? Ideas should be shared! I cannot bear to think on this any longer! Remove me!

Spirit 1: These were shadows of the things that have been. They are what they are, do not blame me!

Kepler: Take me back. Haunt me no longer!

Spirit 1: As you wish, but do me one favor. Call me Dr.

Kepler: Dr. Who? *(Spirit giggles)* Dr. Who? *(Spirit exits giggling)*

Kepler: I fear I do not understand ghostly humor. Now to the matter at hand, one ghost completed. What lesson was learnt? *(Paces)* I surmise even when times were hard and people were difficult, I continued to pursue the truth in my scientific work and my religion. There is a universe full of possible points of view and I kept my science and religion at peace during challenging times. Yes! That is the lesson. *(To audience)* Now, how many more ghosts to encounter? *(Waits for response)* Two. Thank you.

Spirit 2: *(Mystical music plays)* May I enter?

Kepler: It appears as if I don't have a choice.

Spirit 2: Greetings! Come and know me better, man! *(Crosses timidly. Spirit gives Kepler a big bear hug).* Look upon me! *(Kepler attempts to but is trapped in the hug.)* You have never seen the like of me before! *(Releases Kepler)*

Kepler: Never.

Spirit 2: Not even at the Guthrie?

Kepler: I beg your pardon?

Spirit 2: *(Big hearty laugh)* Time travel humor. Allow me to introduce myself, I am the Ghost of Science Present.

Kepler: My present?

Spirit 2: No. We will travel to 2018 to examine present day science. Touch my robe!

Kepler: *(Kepler does)* Always with the touching.

Spirit 2: We shall travel, my friend, as Bill and Ted did. *(Lines are spoken over time travel video)*

Kepler: Whom do you speak of?

Spirit 2: We shall have an excellent adventure. *(Laughs)*

Kepler: Time travel humor?

Spirit 2: It never gets old. *(Laughing. Slide changes.)* We've reached the present, 2018. And your work is everywhere.

Kepler: Spirit, do not taunt me.

Spirit 2: I do no such thing. Let me prove it to you. Look upon these people of 2018. *(To the audience)* If you know someone who wears glasses, raise your hand. *(They do.)* That's everyone. This good man, Kepler, improved lenses making it possible for people both near-sighted and far-sighted to see. *(Slide)*

Kepler: I did do that.

Spirit 2: Due to your calculations, the good people of 2018 understand the elliptical shape of planetary orbits. And because of you, they understand the laws governing the motion and speed of the planets as they move around the Sun in different distances. *(Slide)*

Kepler: I did discover that.

Spirit 2: Now we know that those laws apply to many other objects that orbit in space – to comets, and stars, and galaxies. We have satellites that we have sent up to orbit around Earth, because of what you discovered. *(To audience)* Because of this fine man we have GPS, cell phones, and TVs. *(Slide)* *(To audience)* Give him his due. *(Beat)* Applaud, applaud the man. *(Audience applauds)* Thank you.

Kepler: You have sent these things up there?

Spirit 2: We have. In fact, just as you have suggested, humans themselves have left the Earth and traveled to the Moon. *(Slide)*

Kepler: This gives me such comfort. Speak more comfort to me.

Spirit 2: Operas are written in your honor. *(Slide)* Craters on Mars and the moon are named after you, *(Slide)* and if that isn't enough, the people of the future have named a space telescope after you.

Kepler: *(Slide)* The Kepler Space Telescope.

Spirit 2: And it has found over 2,400 confirmed planets and 2,000 possible planets orbiting other stars, out beyond our solar system. *(Slide)* It is possible that they will find evidence of life on these newly discovered planets.

Kepler: *(Overwhelmed)* Spirit, will it be successful?

Spirit 2: I cannot say more. The time to depart is drawing near. *(Slide: drawing of a child. Wailing SFX.)* Oh, good man, I hate this part. *(Points to slide.)* Look, look, up here!

Kepler: Who is he?

Spirit 2: He is Ignorance. Beware of him, for on his brow I see that which is written Doom.

Kepler: Ignorance is our doom.

Spirit 2: Indeed.

Kepler: Has he no champions for learning?

Spirit 2: Let them keep their science and religion at war and I'll keep mine at peace. I quit.

Kepler: Wait. I said that. *(Beat)* Oh, I said that. *(Bell SFX.)*

Spirit 2: That's my bell. Farewell. *(Exits)*

Kepler: Wait! Stay! *(Beat)* Ignorance cannot be our destiny. Something must be done. It has been my great grief that religions have torn the truth so terribly among themselves, but truth is the daughter of time, and I feel no shame in being her midwife. I much prefer the sharpest criticism of a single intelligent man to the thoughtless approval of others. I must do something. *(To the audience)* How many ghosts left? *(Response)* One. Let us hope that this ghost brings good news.

(Mystical music. Spirit enters playing with a fidget spinner)

Kepler: I am in the presence of the Ghost of Science Yet To Come? *(Ghost nods, playing with fidget spinner)* You are about to show me things that have not happened, but could. Is that so, Spirit? *(Ghost nods, playing with fidget spinner.)* Ghost of the Future, will you not speak to me?

(Spirit 3 points to slide, still playing with fidget spinner. He grabs Kepler's arm. Time travel film plays.)

Kepler: *(Slide changes to title "The future without scientific exploration.")* The future without scientific exploration. In this future, all the scientists have given up? They've quit?

(Spirit 3 nods, playing with fidget spinner.)

Kepler: *(Images change as Kepler speaks. End with image of a fidget spinner.)* Without science there are no cures for diseases. No new medicines for pain. Buildings fall apart. Our water is undrinkable. A lack of food. Extreme storms. No new - what is that? No new whatever these fidget things are. Good Spirit, assure me that I may change these shadows you have shown me! I will continue my work. I will not shut out the lessons that they teach. *(Grabs the fidget spinner)*

and the ghosts exits.) Wait! I should have known not to touch this (looking at the fidget spinner) WHAT IS THIS? Now he is gone. (Slide of giant storm with sound effects. Kepler screams) I hope I have not come too late to reason. Oh, no. Spirits, is it too late for me to change my mind and continue my work? (Slide of Sun) Wait. It is a new day and I am still here. I am as light as a feather, I am as giddy as a goose, I am as merry as a schoolboy with a fidget spinner. I don't know how long I've been among the Spirits. (To the audience) What's to-day? (Gets response) The Spirits have done it all in one night. I still have time to finish my work. I will continue to let science and my religion inspire me to keep discovering new things! I will keep sharing what I learn with others, even when it is hard to find agreement. I shall love questioning and learning, as long as I live! (Joyously runs off stage holding manuscript.)

Narrator: Kepler had no further interactions with the ghosts, and it was always said of him, that he knew how to keep his science and religion at peace with the true spirit of learning. May that be truly said of us, and all of us! The end. *(Closes the book)* Kepler lived a long time ago, but his work continues to this day. Scientist, Ellen Stofan *(Slide of Tesk as the Chief Scientist at NASA)*, and many others think there's a very strong chance that we may find evidence of life on other planets in the Kepler system. If we do find it, what do you think that means to you? Take a moment to tell the person sitting next to you or write your thoughts down and share them with us – like these folks did. *(Allow time for visitors to discuss. Slide show of visitor feedback as actors strike the set.)* And after that enjoy the rest of your visit!

CONTACT INFORMATION

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Inspired by an original creative nonfiction story, *A Harmony of Views*, by Sarah Jozina Reynolds.

Museum Liaison for the project is Rae Ostman at Arizona State University.

Director of the project and programming is Michael Zirulnik at Arizona State University.

Program evaluation conducted by the University Office of Evaluation and Educational Effectiveness at Arizona State University.



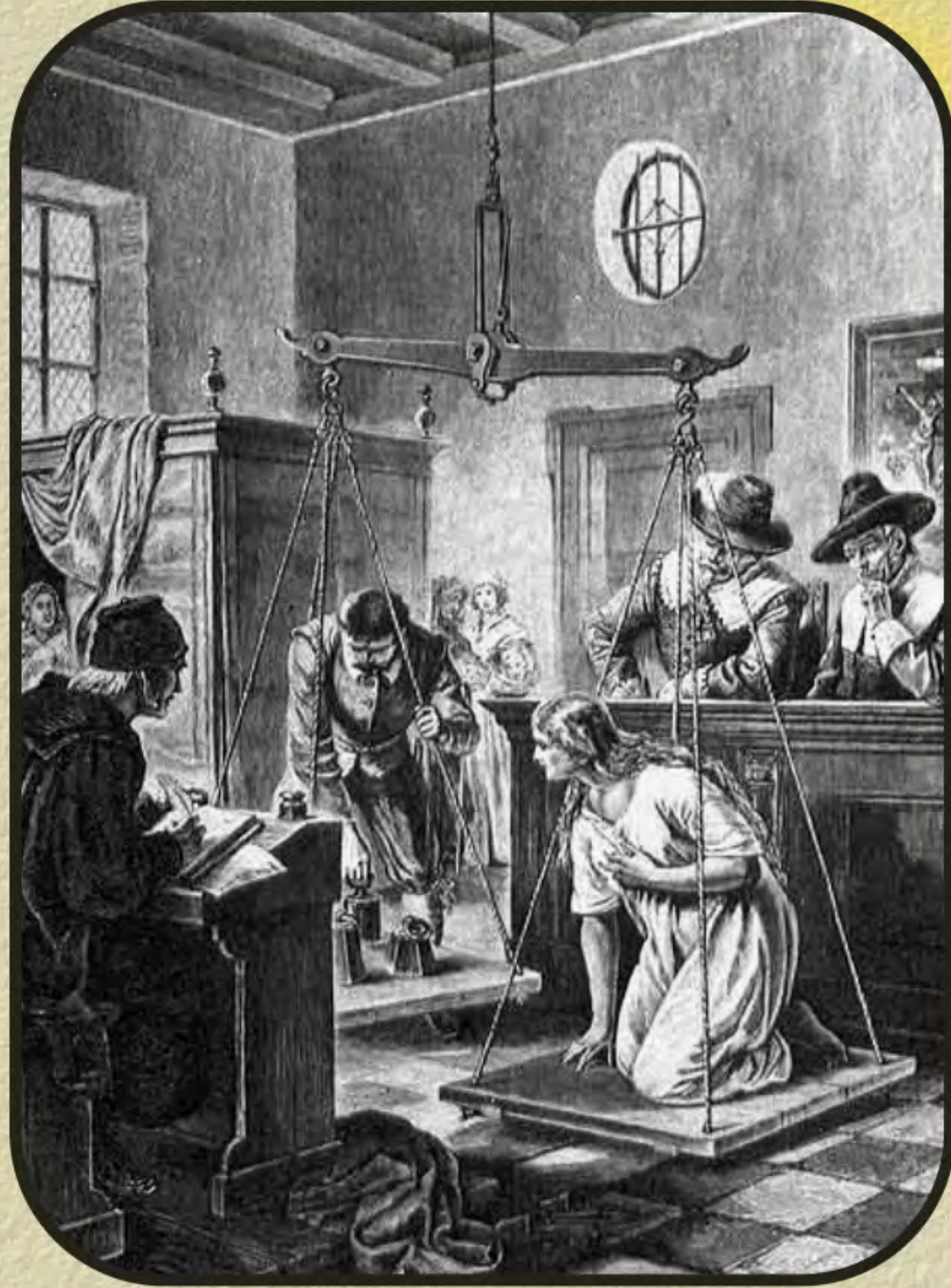
KEPLER'S CAROL

A GHOST STORY

about Johannes Kepler



inspired by the work of
DR. SARAH JOZINA REYNOLDS

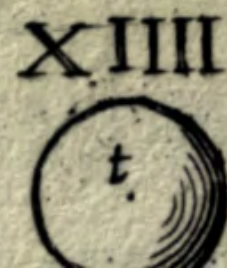
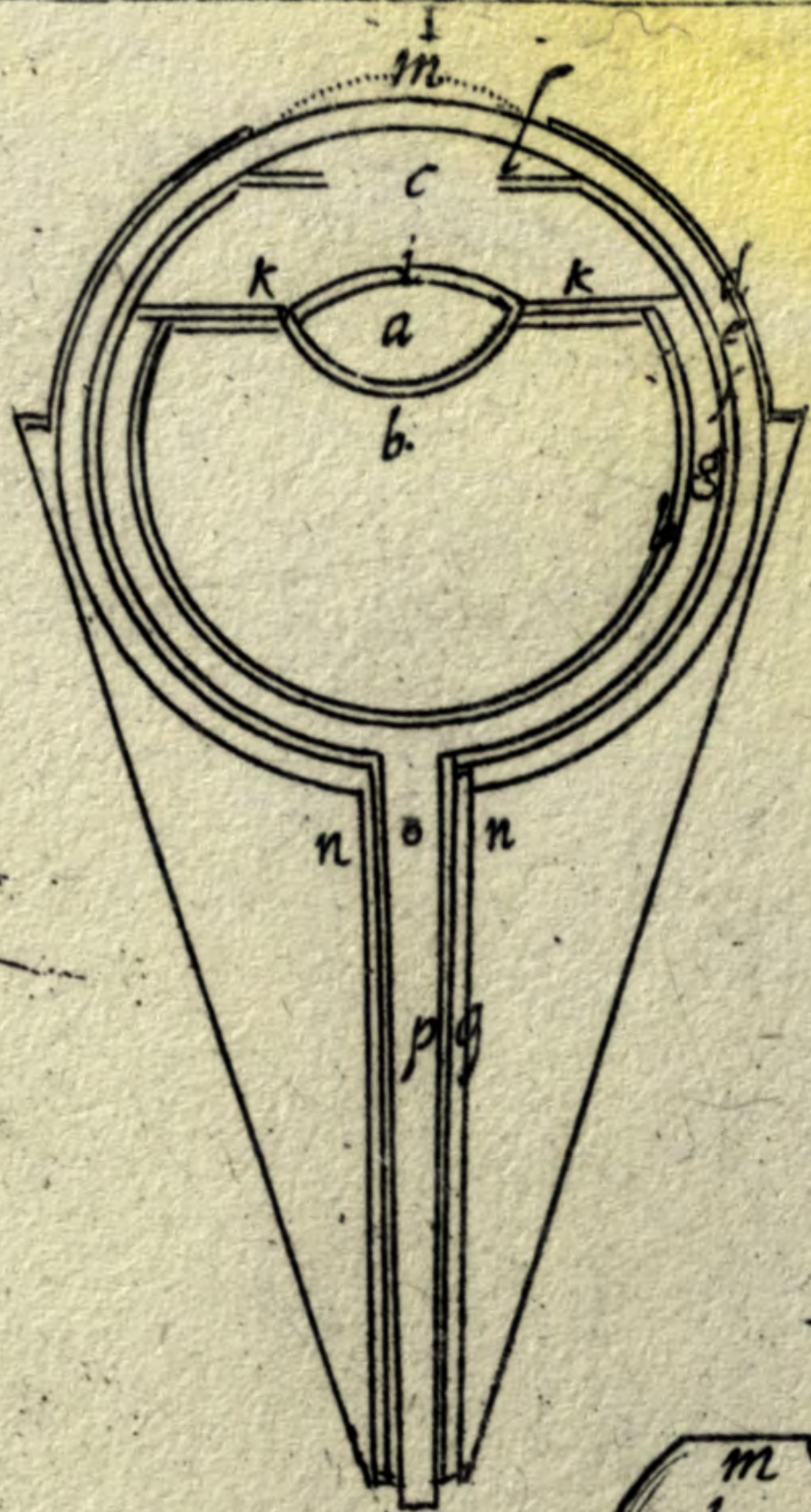


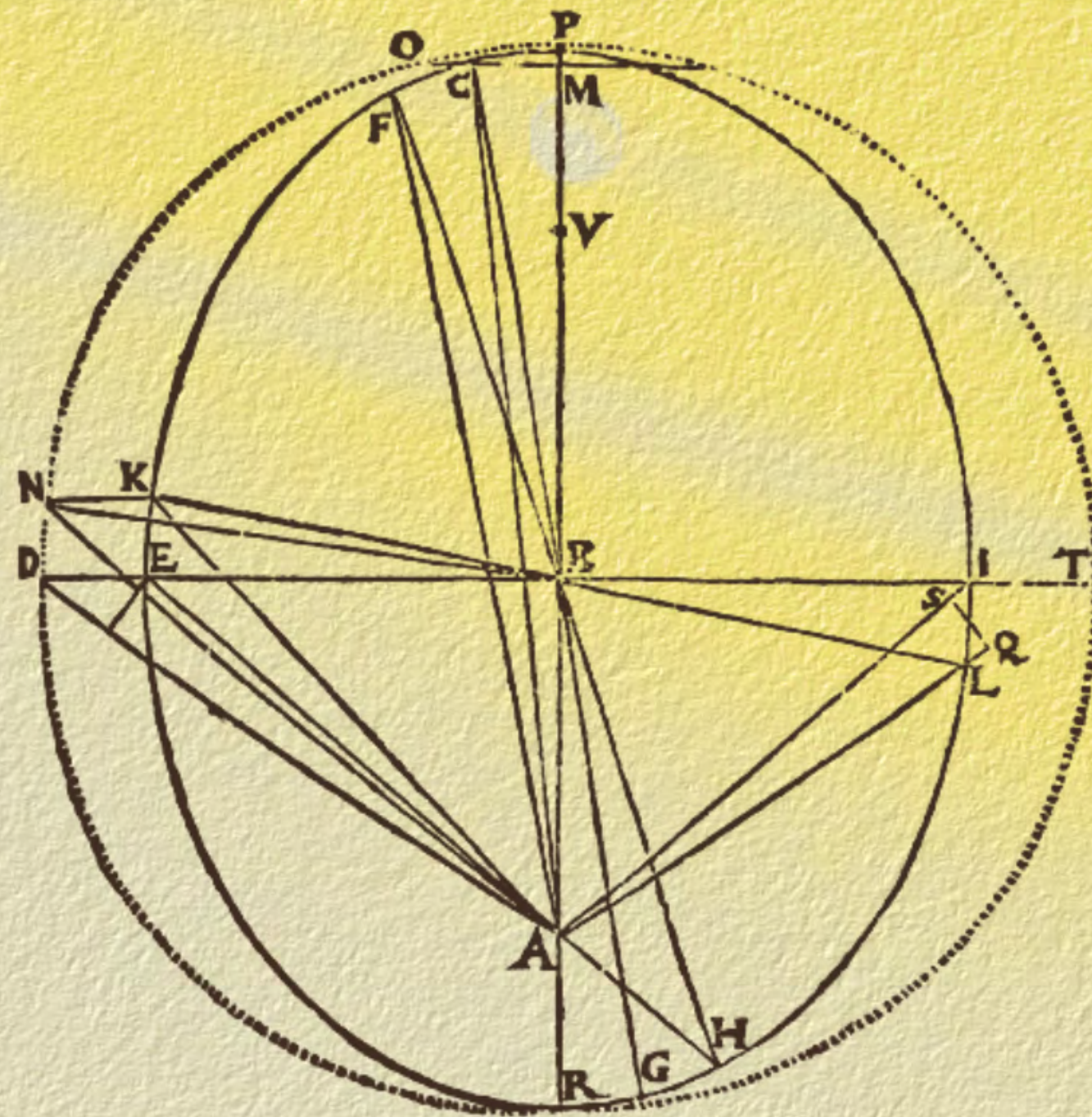




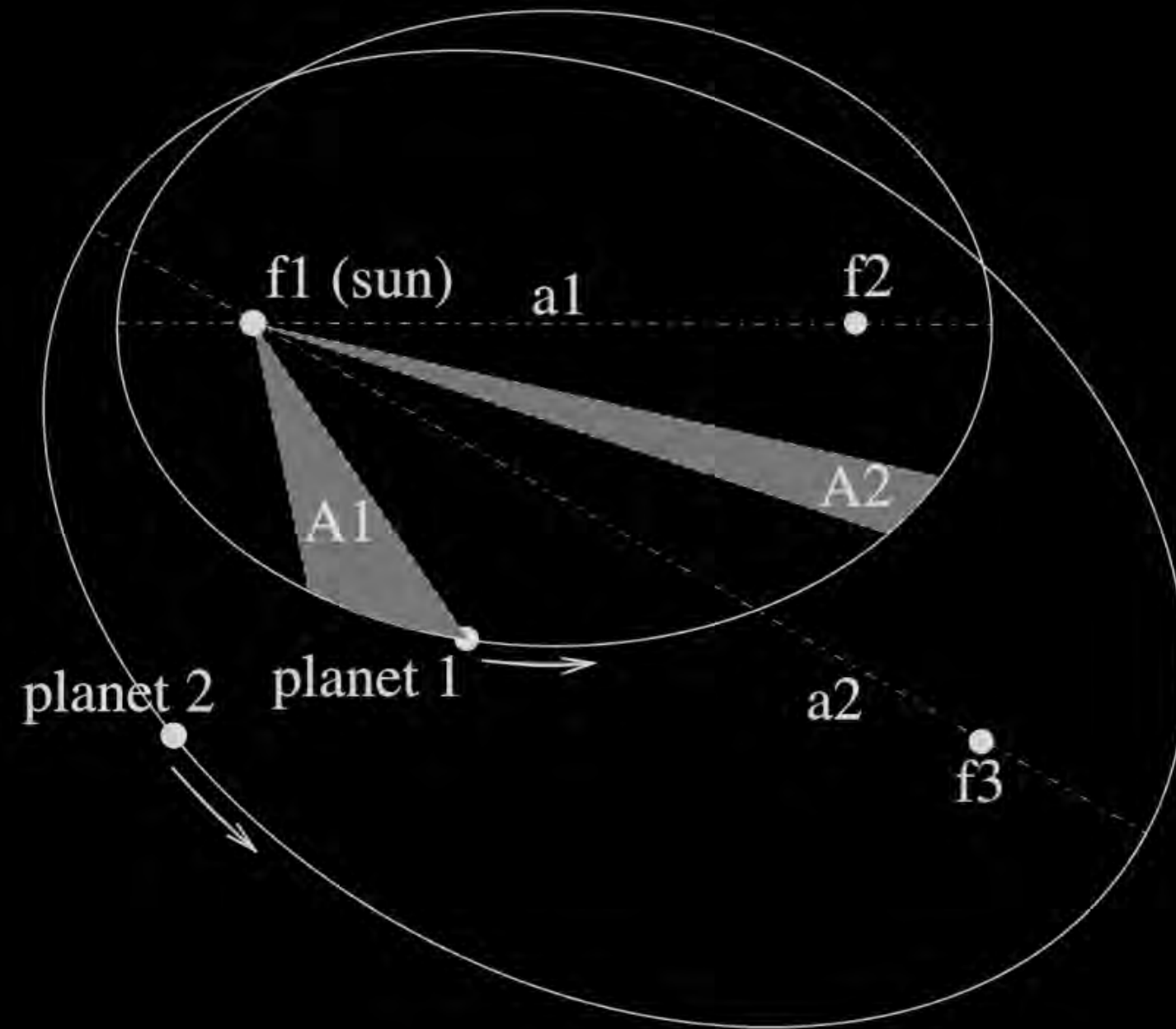
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III





KEPLER'S DRAWINGS

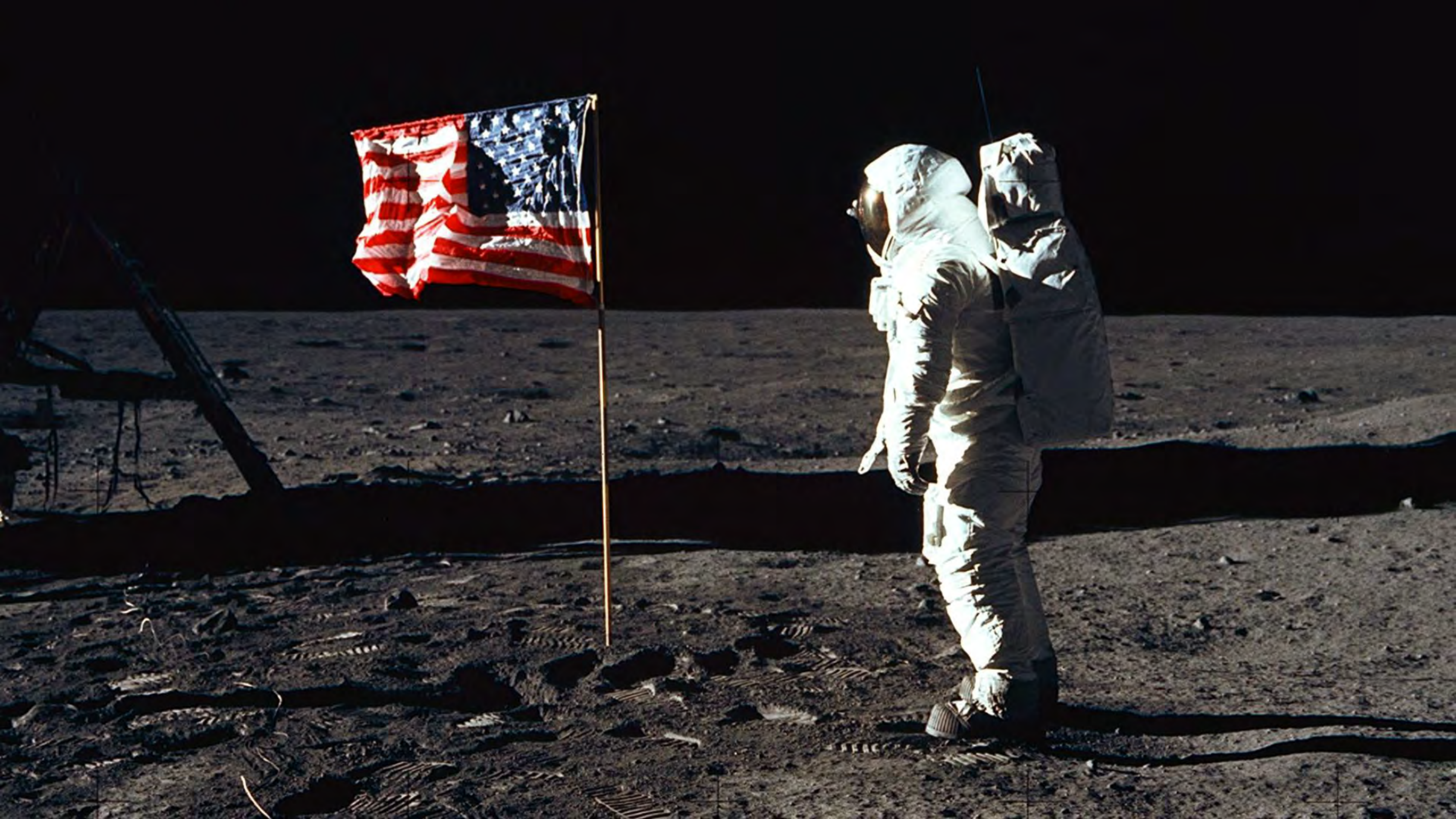


LAWS OF PLANETARY MOTION

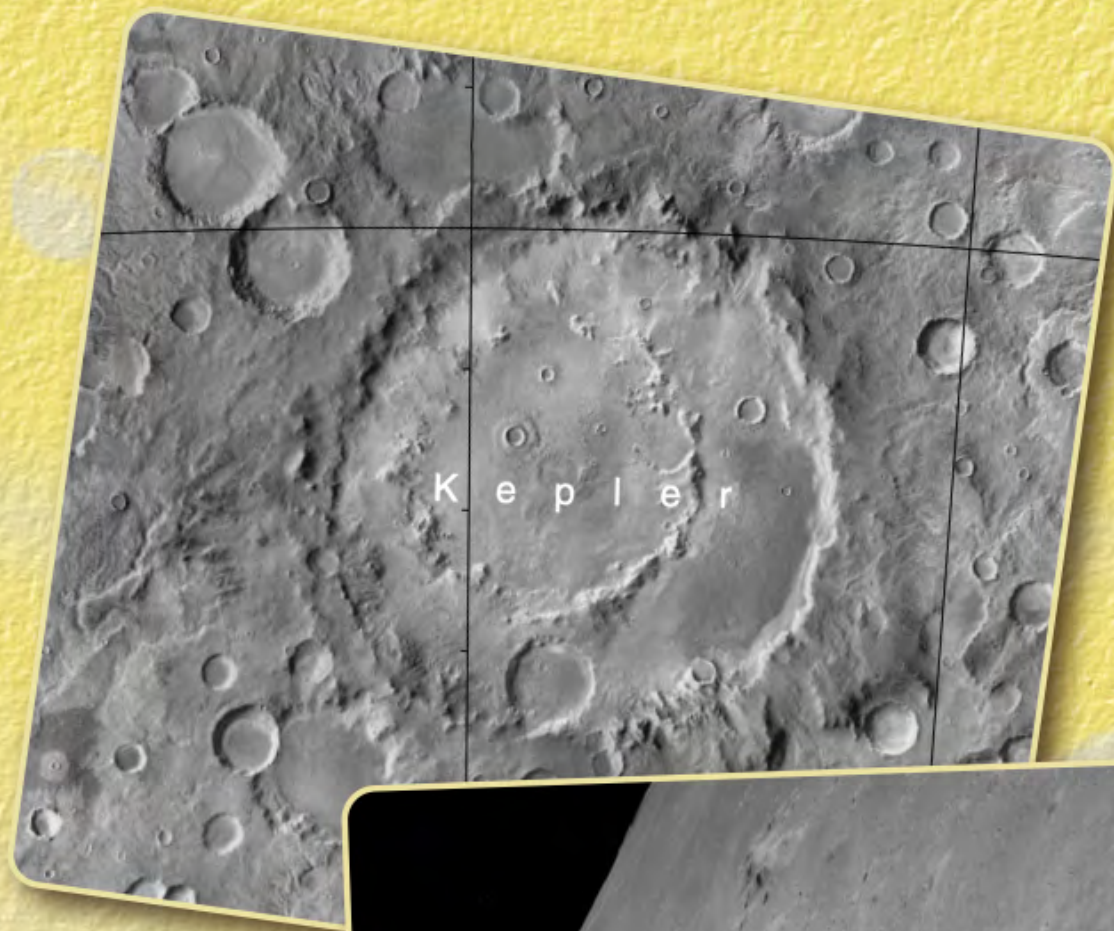


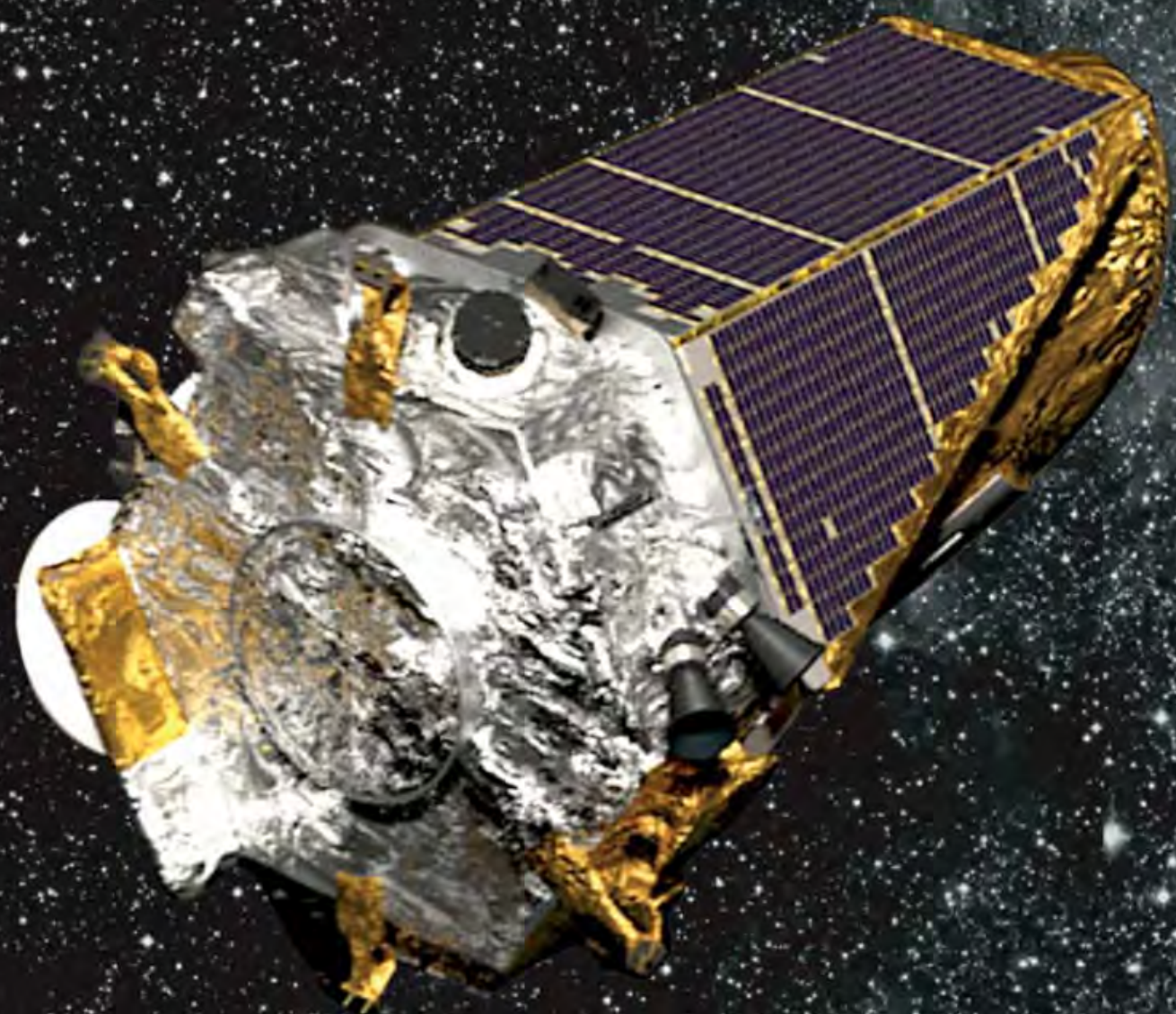


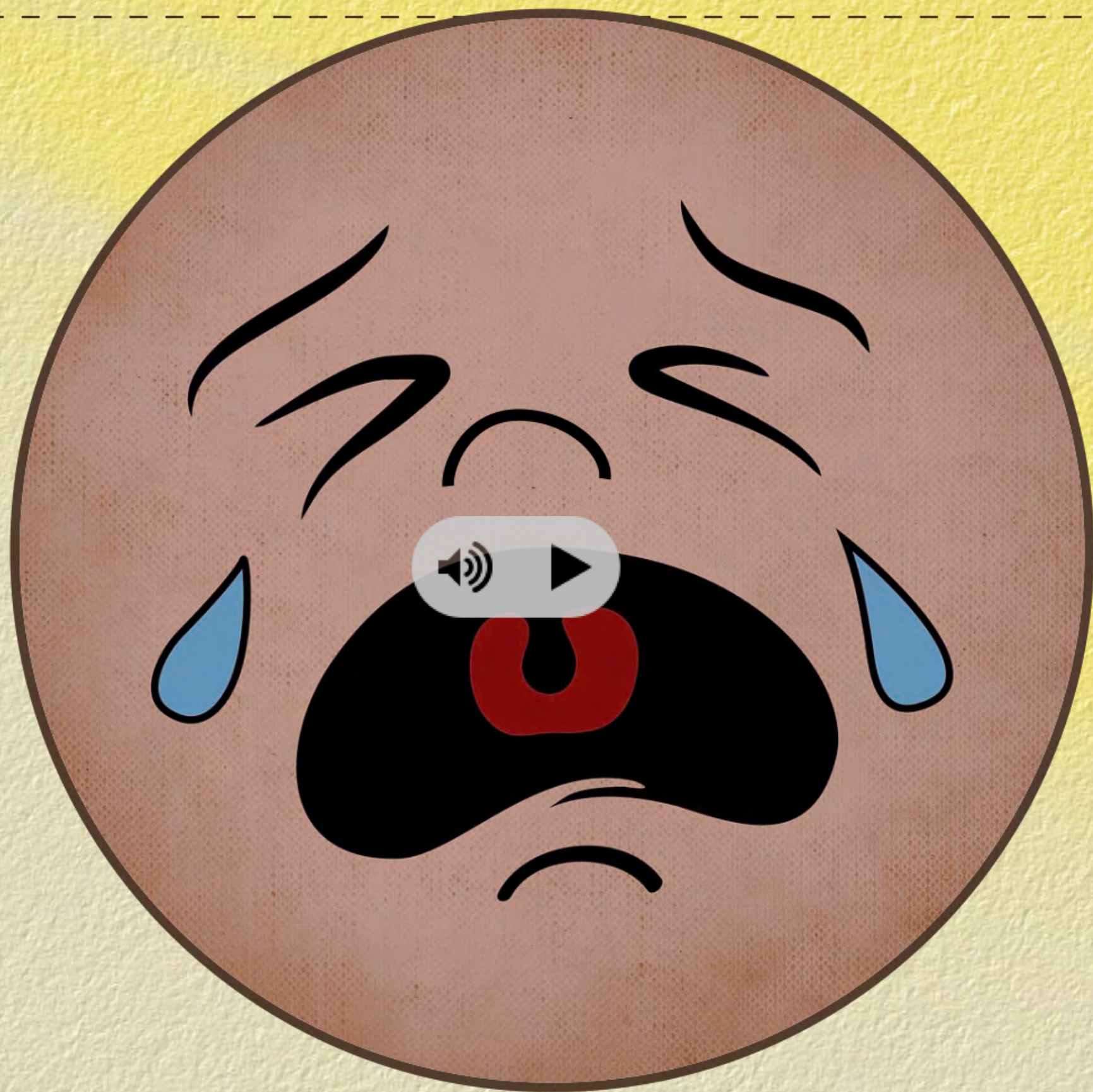


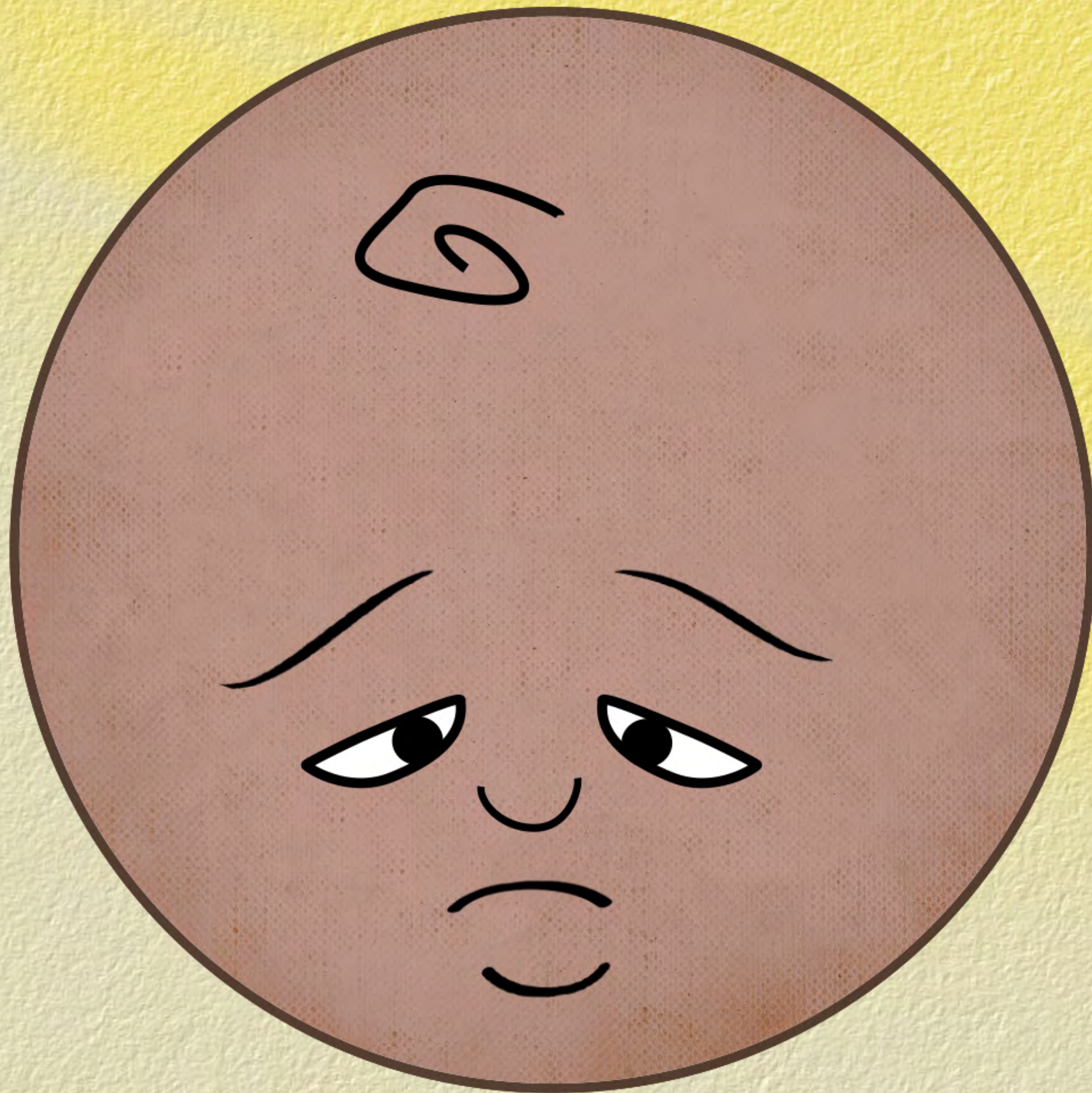










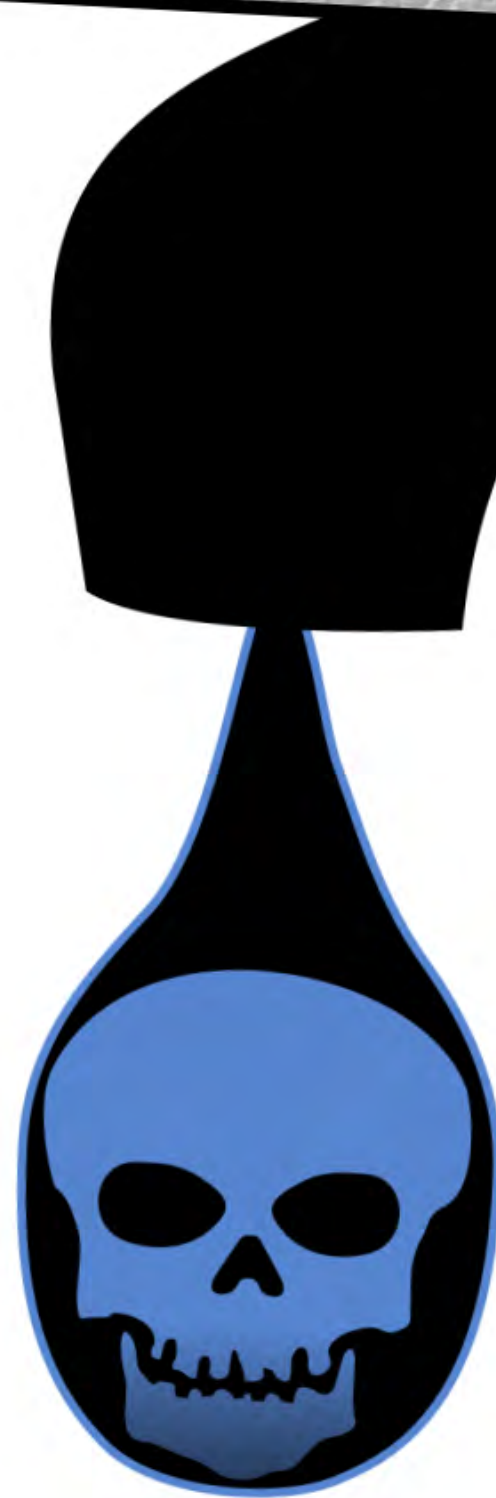


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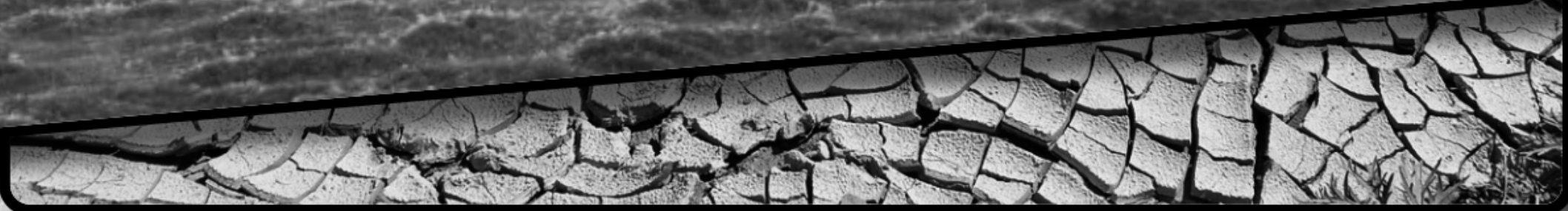
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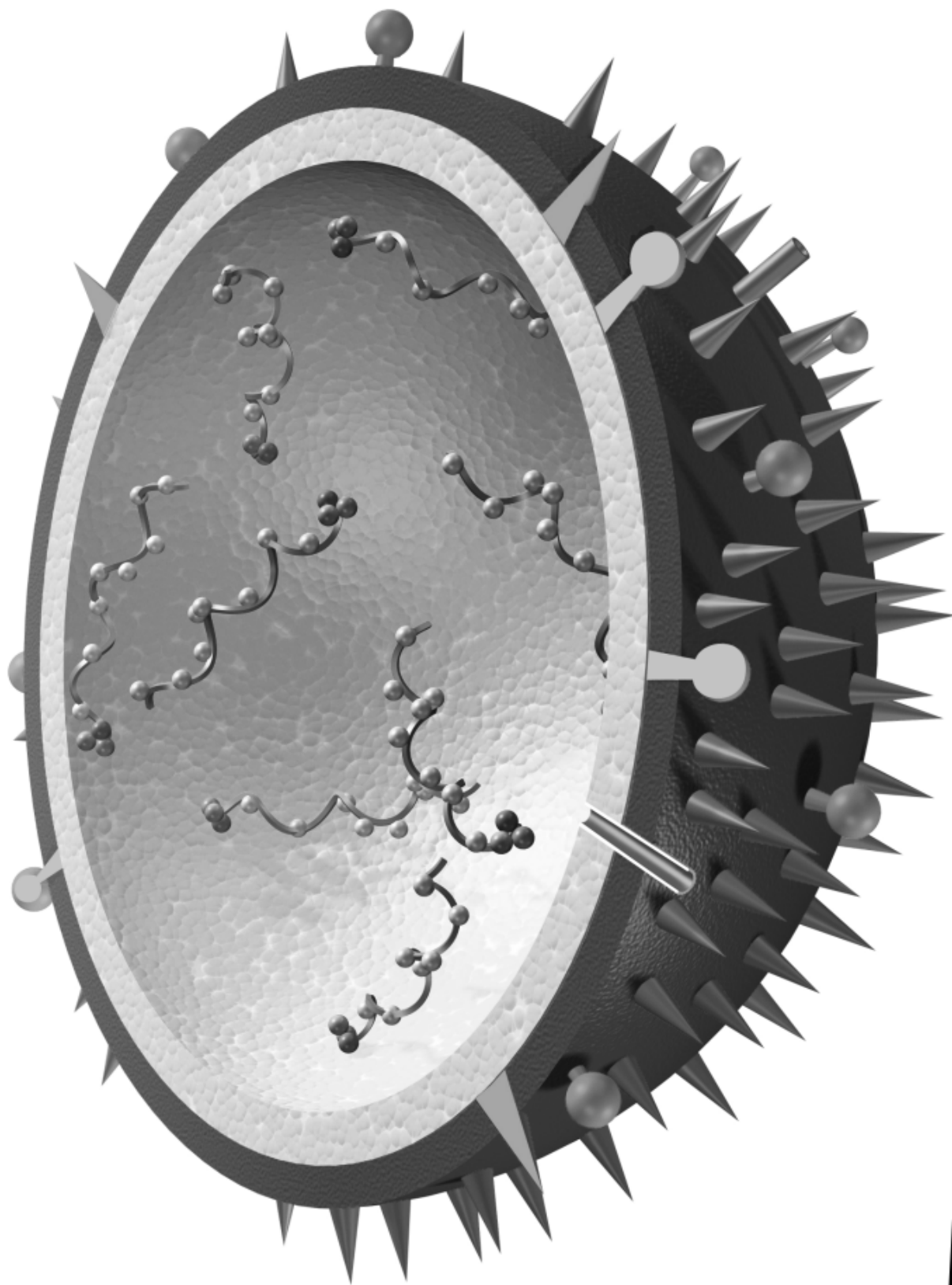
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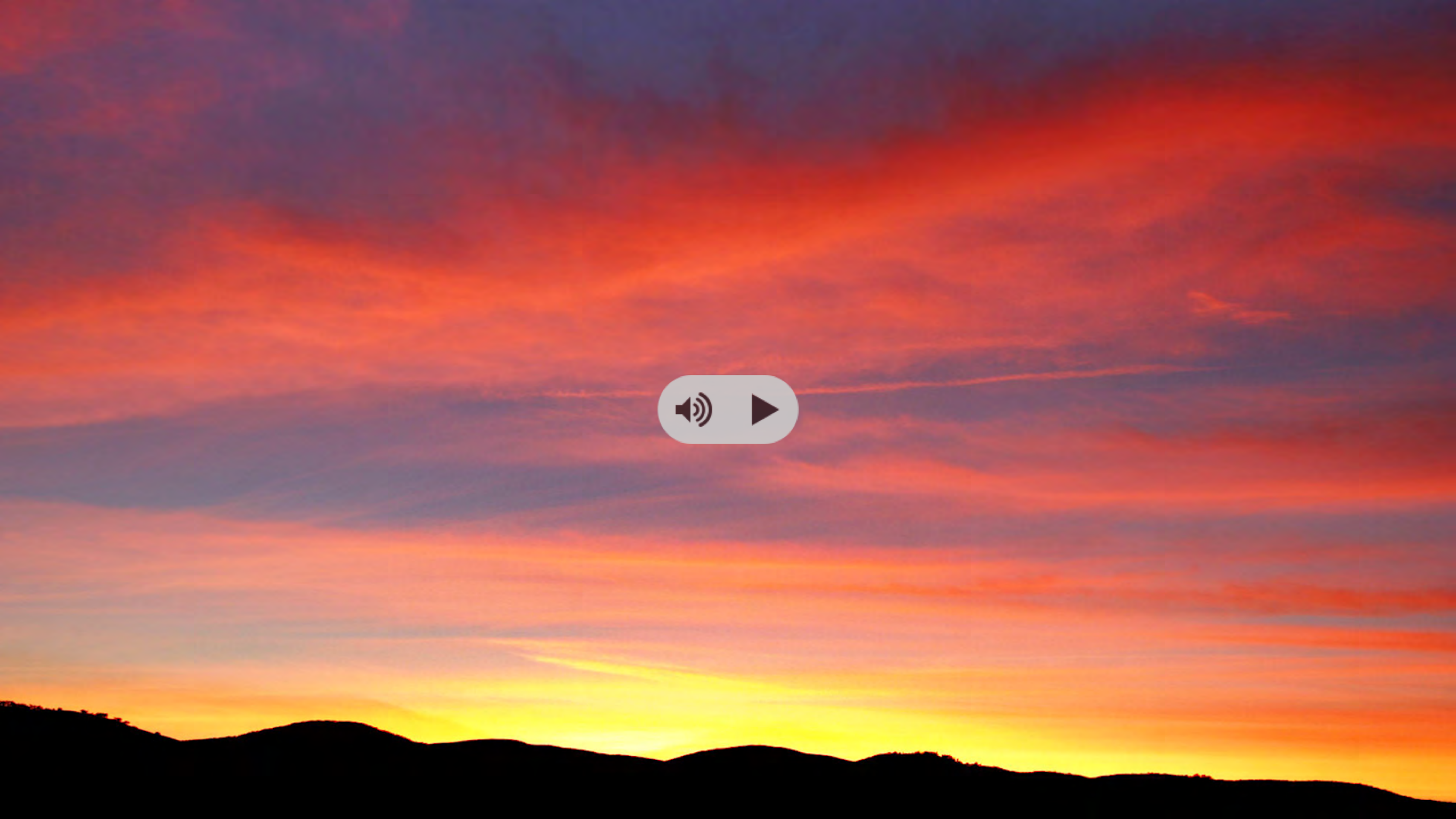






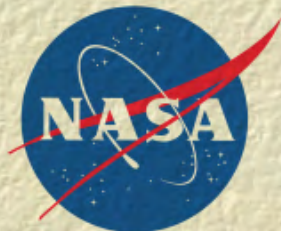








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Former NASA Chief Scientist
August 2013 - December 2016

CREDITS

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STORIES OF SCIENCE & RELIGION

We asked: Can we bring new, compelling and true stories about harmonies between science and religion into public discourse?

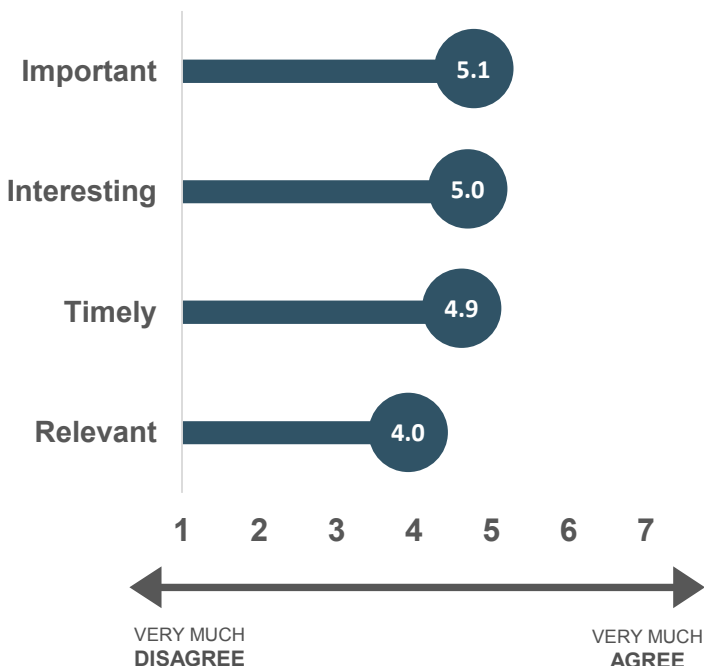
KEPLER'S CAROL: SCIENCE MUSEUM OF MINNESOTA

This event utilized the familiar structure of Dickens' *A Christmas Carol* to examine how Kepler balanced his scientific work with his religious devotion. The show opens with participants learning that Kepler is considering giving up scientific pursuits. Throughout the play, three ghosts convince him to continue his work. This event was inspired by the narrative, *A Harmony of Views: Dreaming with Kepler about Life on Earth and Beyond* by Think Write Publish Fellow Sarah J. Reynolds.

Message excellent - reachable for many backgrounds - I am science-heavy educated and saw with my mother-in-law who is religion-heavy educated. Very timely and not accusatory.
- Event Attendee

PARTICIPANT OUTCOMES AND IMPACT

Below we illustrate average agreement from attendees (n=23) on statements about conversations about science and religion. Most participants agreed that these conversations are **important**.



We thematically analyzed participants' written responses. The word cloud illustrates the themes that emerged from those responses. The **size** of the word is related to the **frequency** of the theme.





— THINK WRITE PUBLISH —
SCIENCE & RELIGION
TRUE STORIES WELL TOLD



JOHN TEMPLETON
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Consortium for Science,
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at Arizona State University

**CREATIVE
NONFICTION**
True stories, well told.