ABOUT THIS ISSUE

Mercury is one of the five planets in our solar system that can be seen from our night sky without the aid of a telescope or binoculars. It has been observed by humans for thousands of years. One of the earliest records of Mercury comes from a pair of ancient Babylonian tablets that report astronomical events dating from about 1300 BC, the Mul.Apin, which was a formal catalogue of constellations, stars, and planets in Babylonian astronomy. These tablets contain the cutting-edge science by ancient astronomers who were the first to recognize that astronomical phenomena were periodic and the first to apply mathematics to their predictions. Mercury was known as one of the five "wandering stars" that appeared to move across the sky. Because of its comparatively rapid motion across the sky with respect to the stars, the ancient Greeks may have associated this celestial body with the swift messenger of the gods, Hermes. The official scientific name we now use, according to the International Astronomical Union, corresponds to the ancient Roman name for their messenger god, Mercury. It wasn't until Copernicus (1473–1543) developed his model of a heliocentric solar system in 1543 CE that astronomers realized that Mercury was a planet. Galileo (1564–1642) confirmed this in the 17th century.

Despite being known for millennia, Mercury poses a challenge to astronomers. Mercury is small, less than one half of Earth's diameter, making it only about as wide as the Atlantic Ocean. Furthermore, although visible from Earth, Mercury never travels far from the Sun in the sky. That means it always rises or sets within two hours of the Sun, sits low on the horizon, and is rarely observable when the sky is fully dark. Conditions need to be just right to observe this planet from Earth. Most of us, especially those of us who live at latitudes higher than the 45th parallel, have probably rarely noticed Mercury in the sky. Venus, Mars, and Jupiter are much easier to spot. It's challenging to obtain clear detailed images of Mercury from Earth. Even the most powerful land-based telescopes only reveal Mercury as a small, relatively "featureless", grey disk (Fig. 1A) or as a small black dot transiting the Sun (https://svs.gsfc.nasa.gov/12235; https://www.cosmos.esa.int/web/cesar/mercury-transit-20161). Despite the observational difficulties, Greek astronomer Eugène Antoniadi, while working at the 33-inch refractor telescope at the Meudon Observatory (France), was able to produce a map of Mercury, which he published in 1934 (Fig. 1B). The map showed bright and dark features which were, according to Antoniadi, were "very pale and difficult to distinguish". Interestingly, Antoniadi named many of these albedo features by drawing upon Greek mythology, in particular the myths about Hermes, and after locations in Italy (e.g., Liguria) and Greece (e.g., Pieria). His map of Mercury was used by astronomers for almost 50 years and the regional names coined by Antoniadi are still in use today.

Mercury was one of the least understood planets until the latter part of the 20th century. It was only after the advent of space exploration that we were able to study Mercury in more detail. During 1974 and 1975, the NASA space probe *Mariner 10* provided the first close-up images of Mercury. And, as discussed by the authors in this issue, NASA's *MESSENGER* (MErcury Surface ENvironment, GEochemistry, and Ranging) mission to Mercury (2004–2015) has further advanced our understanding of this fascinating planet. We look forward with eager anticipation the results of the recently launched ESA/JAXA *BepiColumbo* probe to Mercury: it should arrive at the planet in December 2025. While we wait for the next batch of scientific measurements from Mercury to arrive, we hope you enjoy the articles in this issue of *Elements*.

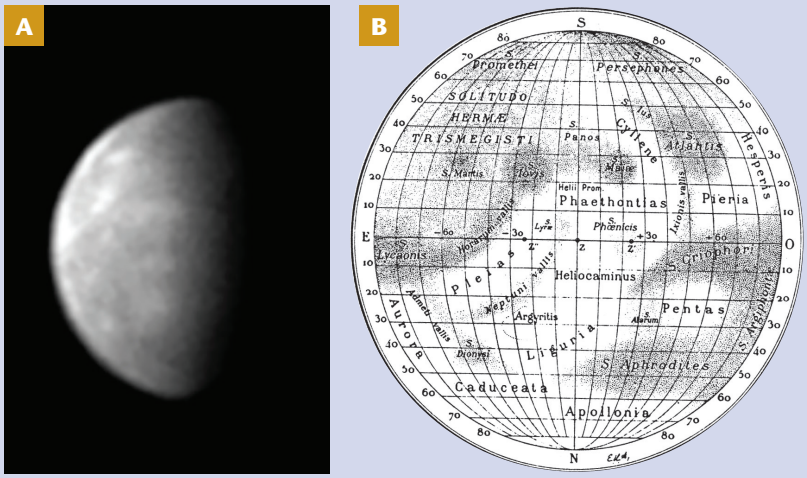

Figure 1 (**A**) Image of Mercury collected in 2007 using the 4.1-meter Solar Astrophysical Research Telescope at Cerro Pachon (Chile). Credit: G. Cecil, University North Carolina, USA

(**B**) The 1934 map of the planet Mercury that was used by astronomers for almost 50 years. It was drawn by Eugène M. Antoniadi (1870–1944), a noted Greek astronomer who worked most of his life in France.

INTRODUCING JOHN M. EILER, PRINCIPAL EDITOR (2019–2021)

With the start of 2019, John M. Eiler joins the *Elements* editorial team. He is taking on the role as our geochemistry principal editor.

John is an isotope geochemist who aims to "reveal the genetics of everything" – the history of each molecule in the natural world as written in its isotopic signature. He likes to tackle a diverse and wide range of topics: for example, studying the history and petrology of ancient mountain belts; elucidating the role of subducted materials in the origin and evolution of igneous rocks; "taking the temperature" of meteorites from Mars, of 150 million-year-old dinosaurs, and of deep-sea corals; and determining the magnitude and duration of past glaciation events. John, and his research group, continue to develop technologies and methods to unleash the power of isotopes for studying almost every area of the natural sciences. One of his more visible developments has been with "clumped isotope" geochemistry.

John is based at the California Institute of Technology (USA) where he has worked as a research fellow (1994–1998), professor (1998–2008), and now as the Robert P. Sharp Professor of Geology and Geochemistry (2008–). John has been recognized for his contributions to the geosciences and has been the recipient of the 2002 James B. Macelwane Medal (American Geophysical Union), the 2002 Mineralogical Society of America Award, the 2012 Arthur Day Medal (Geological Society of America), and was elected a member of the US National Academy of Sciences in 2016.

We are pleased to have John join the *Elements* editorial team. John is already working with the guest editors and authors of the August 2019 issue "Weathering: A Unifying Process in the Geosciences".

PROPOSE A TOPIC FOR *ELEMENTS*

There are so many more topics to feature in *Elements*. In March 2019, the editorial team will meet to evaluate proposals for inclusion in our lineup. We invite you to contact one of the *Elements* editors and submit a thematic proposal for consideration! For more information about submitting a proposal, please visit http://elementsmagazine.org/publish-in-elements/.

Nancy Ross, **Jon Blundy**, **John Eiler**, and **Jodi Rosso**

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