Editorial*

Krishnapriya Tamma, Guest Editor

Why are species found where they are? Why is the kangaroo not found in Java or the snow leopard in Malaysia? Naturalists, explorers, and scientists have pursued such questions for centuries now. We have come a long way in our understanding of what determines species distributions—from invoking the hand of God to understanding the role of climate and evolution. Much of our understanding has been aided by the pioneering work done by 18th and 19th-century naturalists and explorers such as Alfred Russel Wallace, Charles Darwin, and Alexander von Humboldt.

In this issue of *Resonance*, we celebrate the life and contributions of Alexander von Humboldt, a naturalist, scientist, and writer par excellence. His curious nature and keen observational skills helped him uncover patterns in Nature that form the basis of many concepts in ecology and biogeography.

A polymath, his contributions span the fields of geology, biology, and ecology. Humboldt's work led him to some profound insights that are relevant even today—he charted species distributions during his travels across Europe, the Americas, and the Russian empire, highlighted the importance of climatic patterns in influencing these distributions, described elevational gradients in biodiversity, and created isotherms to track mean temperatures across the globe, among others. His interest in geology, zoology, botany, and natural history allowed him to see the interconnections between various biotic and abiotic factors that influenced the natural processes. Apart from writing various books that described his travels and observations, Humboldt also produced many beautiful artworks that summarised the patterns he observed in nature.

Alexander von Humboldt used his observations and his under-

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standing of natural processes to articulate instances of overharvesting and environmental degradation, and warn of its impacts on human societies; warnings that we should be taking very seriously now. He also was unique in his time for the respect and empathy that he extended to the indigenous communities in South America. He was an abolitionist and worked to abolish slavery within Prussia. Apart from his enormous contributions to biology and geology, Humboldt should also be remembered for his political and social stands.

Although not as well known in the public realm, many books have been written about Alexander von Humboldt, including a fictional account of his life. Shobhana Narasimhan reviews a novel, *Measuring the World* by Daniel Kehlmann, that re-imagines the lives of Alexander von Humboldt and Carl Gauss. After reading this review, I am tempted to get my hands on the novel! We hope you enjoy the focus on Humboldt and are as inspired by him as many of us are. Apart from these articles that take us through the fascinating life and work of Alexander von Humboldt, this month's *Resonance* has other contributions that span the breadth of science—from bicycles to complex numbers.

Amitabha Ghosh takes us through a fascinating history of the bicycle, touching on the scientific and social engineering that has made the cycle what it is today. As an avid bicyclist, I thoroughly enjoyed reading about the innovations and the social transformations that are part of the humble bicycle's history. Amrit Mitra introduces us to another extraordinary scientist, Robert Burns Woodward. Chemist extraordinaire, Woodward is considered to be one of the greatest synthetic organic chemists of all time. Did you know that he was also the one who synthesized the anti-malarial drug quinine, and the chemical strychnine that has starred in many mystery novels?! Pritham Goswami writes about the fascinating atmospheric phenomenon that is the aurora, or polar lights that are seen in the skies around the Arctic and the Antarctic circles. Turns out that these are caused by the impact of solar winds on the atmosphere. Do read the article to know exactly how solar winds cause polar lights. Other contributions in the issue

include one on complex numbers by Geethamma and colleagues and one on stochastic thermodynamics by Sushanta Dattagupta.

In the classroom section in this issue, we have Victor Oxman discussing the special properties of a triangle with an angle of 60° . Vivek Lohani et al. discusses a problem that was featured in the Indian National Physics Olympiad 2020, and Hariom Gupta provides a solution to the problem of finding partial fraction expansion. Finally, Shobhana Narasimhan brings to you a fun crossword that surely will test your knowledge and skill.

The Covid-19 pandemic will be remembered as one of the worst public health crises that our country has seen in the recent past. The pandemic held up a mirror to the inequities that exist in access to healthcare, livelihoods, and social security. However, the Covid-19 pandemic will also be remembered, globally, for the rapid development of vaccines, with a vaccine approved for emergency use *less* than a year after the pandemic broke out. Previously, the fastest vaccine rollout was recorded for mumps, which took about four years from virus isolation to approval. It is worth noting that this rapid vaccine development was possible due to years of research, including on other related coronaviruses that cause diseases such as SARS and MERS. Data collected so far suggest that the Covid-19 vaccines are effective at preventing severe disease and hospitalisation. If you haven't already, do consider getting the vaccine to protect yourself, your friends, and family.