50 Years Ago

The Leningrad astronomer Dr Nikolai Kozyrev has made another remarkable spectrographic observation of the Moon's vulcanism, according to *Novosti*. It purports to link earthquakes on the Earth, particularly in the United Arab Republic and off the coast of Japan on March 31, with the venting of gases from the Aristarchus crater on the Moon on the following day (April 1). Dr Kozyrev is said to hold that this shows that the Moon "responded" to the earthquakes. Dr Kozyrev is also quoted as saying: "My investigations dealt with the Aristarchus crater. Two spectrograms of the inner slope of the crater … showed an unusual red spot approximately one to two km across … after measurements of the spectrograms obtained by the Crimean observatory, it was established for the first time that this spot is the result of an escape of gases — molecular nitrogen and cyanic gas."

From *Nature* 3 May 1969

100 Years Ago

A snowstorm of unusual severity … occurred generally over the British Isles on Sunday, April 27, and in the south-east of England the storm was particularly severe … In London snow commenced at about 1 p.m. after somewhat heavy rain, and it thoroughly covered the ground by 3 p.m. The depth of snow by the early morning of April 28 in the north of London was 12 in. to 15 in. … The snowfall occasioned much dislocation of the telegraph and telephone services, and the rapid melting of the snow caused floods in many parts. Temperature on April 27 was abnormally low for so late in the season, the thermometer in London during the afternoon standing at about freezing point. Agriculturists and fruit-growers have suffered somewhat badly.

From *Nature* 1 May 1919

describing nuclear rotation is a challenge when one tries to build the nucleus from scratch on the basis of individual nucleons, and when, as in the *ab initio* computations of the present work, one starts with two-nucleon and three-nucleon interactions that were constrained solely from the properties of light nuclei (isotopes of hydrogen and helium). The experimental identification of nuclear deformation also requires the measurement of transitions between the energy levels of a sequence of states called a rotational band. Such measurements need relatively high production rates of rare-isotope beams. Taniuchi and colleagues' work is both a milestone in the Segrè chart and an entrance to a previously unexplored region of it. For theory and experiments, the best is yet to come. ■

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ECOLOGY

Sea animals vulnerable to warming

The impact of climate change on biodiversity is a pressing concern. A study now combines experimental data with careful modelling to compare the vulnerability to warming of animal species on land and in the ocean. SEE LETTER P.108

ANTHONY J. RICHARDSON & DAVID S. SCHOEMAN

Ecologists, conservationists and policy-makers are struggling to understand how much of a threat climate change poses to Earth's biodiversity — estimated to be some 3 million to 100 million species[1] — and what to do about that threat. Knowing whether terrestrial or marine species are more vulnerable to climate change, as well as how the risks vary with latitude, could inform the deployment of limited conservation resources, nationally and globally. On page 108, Pinsky *et al.*[2] combine robust experimental data with a careful model-based approach to compare the vulnerability of biodiversity to warming across latitudes on land and in the ocean.

There is contradictory evidence about the relative vulnerability to warming of land and ocean animals. Terrestrial species could be at greater risk because they are less able to adapt to new climatic conditions[3] and because they are exposed to higher extreme temperatures than are ocean-dwelling species. But marine species could be more affected because temperature strongly controls their geographic limits[4], nutrient supplies[5] and oxygen availability[6].

Temperature extremes, rather than average temperatures, are an important determinant of population survival at the warm edge of a species' temperature range[7]. Guided by this evidence, Pinsky *et al.* calculated the thermal safety margin — defined as the difference between the highest temperature at which an animal can survive (its maximum thermal tolerance) and the maximum body temperature that it will effectively experience under natural conditions — for 387 species of ectothermic animal, which rely on external heat to maintain body temperature. The authors calculated two versions of the thermal safety margin for each species: one for when the animal is fully exposed to heat and one for when it is in a thermal refuge. Terrestrial thermal refuges include microclimates such as shade under a tree or rock, whereas marine thermal refuges comprise deeper, cooler waters.

Pinsky *et al.* found that there are no thermal safety margins for land-dwelling ectotherms when they have no access to thermal refuges, whereas such margins exist for their ocean-dwelling counterparts. This suggests that land species might be more at risk from climate change than ocean species are. However, when thermal refuges were taken into account, the situation was reversed, with the thermal safety margins being broader for species on land than for those in the ocean (Fig. 1). This implies that marine species might actually be more at risk.

The authors went on to observe that, when thermal refuges were considered, the thermal safety margins of land species were narrowest at the subtropics and widened towards