particle films at the liquid–air interface[13].

Drying droplets are of interest not only for their deposition patterns, but also for their transport properties. The fluid in a drying droplet exhibits all three classical forms of transport: it transfers mass, momentum and heat, the last of these because evaporation causes the droplet to cool. Deegan *et al.* were able to describe the first two of these forms of transport in their droplets using relatively simple equations. In other cases, the transport equations are coupled, and lead to complex deposition patterns and unstable flows of material that are usually studied only in large-scale experiments. In addition to transport phenomena, possible features present in a drying droplet include contact-line de-pinning and re-pinning, and friction between the suspended particles and the solid surface.

The range of materials that have been dried on a surface is vast. Liquids containing suspended particles that have shapes ranging from spherical to elongated, as well as nanoparticles, salts, polymers, DNA and proteins have been deposited in patterns that are complex, yet reproducible[3]. A drying droplet is therefore a small, simple and inexpensive platform on which multiple phenomena common to manufacturing and industrial processing can be studied and thoroughly understood.

In the past decade, practical applications of the work by Deegan *et al.* and others have extended in many directions. For instance, ink-jet and some other forms of printing require that a drying solvent leaves a deposit of ink. This process is shaped by the physics of drying, for which better control than is currently possible is desired[2]. Additionally, proteins dried on a surface leave a pattern distinctive of that protein, opening up the possibility of simple, low-cost detection of protein or other disease markers in blood or saliva[4,14].

More than 300 years ago, the Dutch microscopist Antonie van Leeuwenhoek discovered a world of microorganisms when he peered through a microscope into a tiny liquid droplet. In modern times, a world of physical chemistry can similarly be observed by watching a droplet dry — as Deegan *et al.* did. ■

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PHOTOBIOLOGY

How flowers get the blues to lure bees

The petals of a range of flowers harbour repeated patterns of nanostructures that show similar levels of disorder across species. This degree of disorder produces a blue halo of scattered light that helps bees to find flowers. SEE ARTICLE P.469

DIMITRI D. DEHEYN

The ability to effectively pass genetic material to a sexual partner is a powerful driver of evolution. Humans and other mobile organisms have evolved so that sexual partners are attracted to one another. But immobile organisms such as plants must rely on an intermediary carrier — bees carrying genetic material in pollen, for instance. These carriers are crucial to the survival of immobile species, and have co-evolved closely with them[1,2]. Moyroud *et al.*[3] report on page 469 that diverse flowering plants have evolved to produce a 'blue halo' of colour that attracts bumblebees (*Bombus terrestris*).

Pollinators use a combination of olfactory and visual cues to find flowers[4,5]. For bees, the colours and shapes of flowers are probably the dominant discriminatory factors. However, the idea that bees can see colours has been challenged by studies[6,7] of photoreception and spectral sensitivity, which showed that bee eyes are relatively insensitive to most colours, except blue.

Colour commonly originates from pigment

50 Years Ago

The total emission of smoke in Britain … has been declining for some years but reaches a higher concentration in winter. Deposited matter, including soot, tar, dust, grit and ash, is mainly derived from the combustion of solid fuels. So, too, is sulphur dioxide; in 1963, 68 per cent of sulphur dioxide came from burning coal, 7 per cent from coke and 25 per cent from oil. At Battersea and Bankside power stations in London, flue gases are washed with water from the Thames to which chalk has been added: this process removes 90 to 98 per cent of gases but it is costly … Fluorides are emitted by some brickworks and possibly by some potteries and cement kilns, but fluoride pollution is rarely reported in Britain now. It remains to be seen whether photochemical or oxidant smog, often referred to as Los Angeles smog, will be troublesome in Britain in future.
From *Nature* 28 October 1967

100 Years Ago

In general, in normal times it is perhaps no exaggeration to say that neither the average individual nor the average nation approaches within 50 per cent. of their possibilities. Nothing short of a war threatening the national existence can shake a nation out of its lethargy. Similarly, the average individual cannot be induced to put forth his best efforts without the strongest of incentives. It is unfortunate that this is the case. However, with sufficient attention given to the problem by trained experts in mental science, it is quite possible that at some future date as high as 60 or 80 per cent. of the possibilities may be realised without any appeal to arms for the nation or any unusual incentive for the individual.
From *Nature* 25 October 1917