Science and technology

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Vehicle telemetry: Calling all cars

Tapping remotely into a carâ€™s data systems provides lots of useful services

IN THE early hours of the morning two men are robbed at gunpoint and ordered out of their Chevrolet Tahoe. The thief jumps in and roars off, but he does not get far. The vehicle is fitted with a telemetry system that provides a data link to a control centre. Soon after being reported stolen, the Tahoe is located by an operator who interrogates its satellite-navigation device. A signal is then sent to the engine-management system to prevent it restarting once stopped. Finally, once a police car has the Tahoe in view and the road ahead is clear, a second signal slows the engine down. The vehicle stops and the thief tries to run for it, but he is apprehended.

The robbery took place in California last month. It was the first time the â€œslowdownâ€? feature had been activated by General Motorsâ€™ OnStar service to respond to a carjacking since it became available a year ago. However, 38 other cars have been slowed down remotely after other types of incident, such as the car having been stolen from a dealership, or to prevent a high-speed chase. OnStar itself was introduced in 1996 as a quick way to summon roadside assistance, but it has become increasingly sophisticated over the years and has nearly 6m subscribers in North America. Other carmakers are now offering or developing similar services, or plan to do so. ...

Sex and pharmaceuticals: Arousing interest

The search continues for a pill that will lift a womanâ€™s libido

BACK in the 1990s a drug firm called Pfizer thought it had a treatment for angina. Unfortunately, the new medicine failed its clinical trials. But a curious side-effect was seen in those trialsâ€”and Viagra was born. It has helped make Pfizer into a pharmaceutical powerhouse and, since then, people have wondered if what is sauce for the gander might ever be sauce for the goose. Many have tried, not least Pfizer, which has gallantly tested Viagra to see if it works on women, too. (It does not.) This week, though, saw the results of trials on a drug that might.

The story of flibanserin, as the new drug is known, has echoes of Viagraâ€™s own tale. In this case its developers, Boehringer Ingelheim, had depression in mind as the target condition. But it was women, rather than men, who reported increased sexual desire as a side-effect. ...

Tuna fishing: Changing tides

The bluefin tuna is still being managed badly. A trade ban is on the cards

IN A world where wildlife is under increasing pressure, good management can mean the difference between survival and extinction. In the Atlantic Ocean and the Mediterranean Sea, the management of bluefin tuna is in the hands of the International Commission for the Conservation of Atlantic Tunas (ICCAT)â€”and the results can scarcely be described as good. Bluefin have been fished from these waters for 7,000 years but in the past 40, while they have been under the aegis of this group, their numbers have declined by three-quarters.

In recent years the organisation, which is notorious for ignoring the advice of its own scientists, has been under some pressure. Moves have been made to transfer responsibility for the bluefin to a different body, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This organisation has the power to ban trade in an endangered species such as the bluefin entirely. ...

Conservation: In wolf's clothing

Wolves are being blamed for damage actually done by dogs

FARMERS have never liked wolves. That is why wolves are rare where farmers are common. Fashion, though, is swinging round to the wolfâ€™s point of view in many places where town-dwellers are even more common than farmers and the big, bad wolf is just a fairy tale, rather than a sheep-rustling reality.

How much sheep-rustling actually goes on is a moot pointâ€”and a pertinent one when the town-dwellers are prepared to put their money where their sentiments are, to compensate farmers for the damage done by wolves. Such is the case in Spain, where about â‚¬1.5m ($2.3m) a year is paid out to farmers in compensation for damage those wolves are alleged to have done. During 2003 and 2004, for example, 432 farm animals were attacked in 154 incidents in Spainâ€™s Basque country. Almost 95% of these attacks were blamed on wolves. ...

Correction: Peat

In â€œFor peatâ€™s sake, stopâ€? (November 7th), an overenthusiastic spell-checking system led to the word â€œrewettingâ€? being rendered as â€œreletting â€? in three different places. We apologise for any confusion caused. This has been corrected online.

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Dinosaurs: How to exterminate a dinosaur

Modern palaeontologists may exterminate a third of dinosaur species

This is the fossilised ornamentation of a dinosaur called Stygimoloch spinifer. Except that if Jack Horner of Montana State University and Mark Goodwin of the University of California, Berkeley, have their way, it isnâ€™t. As they describe in the Public Library of Science, they think it, and another like it, Dracorex hogwartsia, are actually juvenile versions of a third, Pachycephalosaurus wyomingensis. These findings follow the eradication of a three-horned dinosaur, Torosaurus, at Septemberâ€™s meeting of the Society of Vertebrate Palaeontology, in Bristol, and the loss in recent years of many duck-billed dinosaur species. Dr Horner and Dr Goodwin argue that, like the antlers of modern deer, the skull ornaments of dinosaurs changed radically over their lifetimes and that this has led to an overestimate of the number of dinosaur species by as much as a third.

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Lagrangian coherent structures: The skeleton of water

Research is revealing a hidden structure within liquids and gases that guides the movement of everything from pollution to aeroplanes

THE connection between an 18th-century savant called Joseph-Louis Lagrange and the problem of landing safely at Hong Kong International Airport may not, at first, be obvious. But there is one. Hong Kong airport is notorious for rocky and sometimes aborted landings caused by the disturbed air flow from nearby mountains. Though laser technology is deployed alongside its runways to monitor changes in wind speed and thus forewarn pilots, that is often not enough. What is needed is a better understanding of the theory of the winds themselves.

And this is where Lagrange comes in. He was a pioneer of the study of moving fluids (among many other things), but his ideas outran the computational tools of his day. Only now, with supercomputers available to help with the calculations, is it possible to explore those ideas completely. What is emerging is a picture of fluid dynamics more subtle and more complex than anything dreamed of even a decade ago. The atmosphere and the ocean are, it seems, dominated by invisible barriers that have come to be known as Lagrangian coherent structures. They govern the movement of everything from the trajectories of aircraft to the distribution of pollution, the migration of jellyfish and the tracks taken by hurricanes. They are, as it were, the skeletons of the sea and the air. ...

Anatomy and sport: Athlete's foot

Sprinters are different from other people

IS ATHLETIC prowess attained or innate? Those who have suffered the tongue-lashing of a tyrannical games master at school might be forgiven for doubting the idea that anyone and everyone is capable of great sporting achievement, if only they would put enough effort into it. Practice may make perfect, but not all are built in ways that make it worth bothering in the first place.

The latest evidence of this truth has been gathered by Sabrina Lee of Simon Fraser University in Vancouver and Stephen Piazza at Pennsylvania State University. They have looked at the anatomy of sprinters and found that their feet are built differently from those of couch potatoes. ...

Electronics: Seeing clearly

A transparent transistor that could be used in electronic displays

FAMILIAR friends can nevertheless sometimes surprise. Such has been the case with a compound used to make the first solid-state batteries some 40 years ago. Researchers have now found that it can also be used to build transistors that are transparent and hence suitable for use in electronic books and head-up displays.

Sodium beta-alumina was discovered in the 19th century when the process of extracting aluminium from its ore, bauxite, was being developed. It is formed of alternating layers of aluminium oxide and sodium ions. In 1967 researchers at the Ford Motor Company discovered that it conducts these ions as though it were a liquid. That spawned the first solid-state batteries. ...

Gut bacteria and obesity: Holy shit!

A new way of finding out how diet affects gut microbes

AS THE worldâ€™s fatties clock up the kilos, their excuses for being that way have piled up, too. Big bones, junk foods, genes or poor parentingâ€”there are plenty of directions in which to point a chubby finger. In the past few years, a new potential culprit has emerged: gut bacteria. Human guts are full of bugs that help digestion and also stop their disease-causing counterparts from invading. In this age-old symbiosis, some bacteria are better than others at providing food to their human hostsâ€”and also seem, by mechanisms yet unknown, to encourage those hostsâ€™ bodies to store that energy as fat and to keep the fat on.

In the past, when food was in limited supply, these bacteria would have been valuable allies. In an era of plenty, though, they are problematic. In particular, work on mice suggests obesity is associated with having a high proportion of bacteria called Firmicutes, whereas the lean favour another group, the Bacteroidetes. Such work has also raised the suggestion that transplanting â€œlean mouseâ€? microbes to fat mice can make them thinnerâ€”for a while. ...

The horse genome: Riding high

The DNA of the domesticated horse shows evolution at work

THE genomes of many mammals have now been completed, including the cow, the dog, the chimpanzee and, of course, the human. This week it was the turn of the horse to have its DNA sequence decoded. With it emerged further evidence of how horses have been close human companions and, like other mammals that share an evolutionary history with man, how they could help the understanding of hereditary diseases. But there was also a surprise: horses have a newly forming part in their genetic make-up which shows the evolutionary process in action in a way that has not been seen before.

A team of researchers led by Claire Wade, then at the Broad Institute, in Cambridge, Massachusetts, collaborated on the project, which is reported in the latest issue of Science. They analysed DNA from a mare called Twilight (pictured above) to reveal a genome that consists of up to 2.7 billion base pairs (the â€œlettersâ€? in which the genetic message is written). This is slightly larger than the genome of a dog, but smaller than that of a human or a cow. They also compared Twilight, a thoroughbred, with members of other horse breeds. ...

Agriculture and satellites: Harvest moon

Artificial satellites are helping farmers boost crop yields

FOR farmers, working out the optimal amount of seed, fertiliser, pesticide and water to scatter on a field can make, or break, the subsequent harvest. Regular laboratory analyses of soil and plant samples from various parts of the field can helpâ€”but such expertise is costly, and often unavailable. A new and cheaper method of doing this analysis, though, is now on offer. Precise prescriptions for growing crops can be obtained quickly, and less expensively, by measuring electromagnetic radiation reflected from farmland. The data are collected by orbiting satellites.

The spectrum of this radiationâ€”which can be in the form of either natural sunlight or artificial radarâ€”can reveal, with surprising precision, the properties of the soil, the quantity of crop being grown, and the levels in those crops of chlorophyll, various minerals, moisture and other indicators of their quality. If recent and forecast weather data are added to the mix, detailed maps can be produced indicating exactly how, where and when crops should be grown. The service usually costs less than $15 per hectare for a handful of readings a year, and can increase yields by as much as 10%. ...

Nanobiotechnology: Seeding the seeds

Carbon nanotubes find an unusual use as fertilisers

MANURE, compost and ash were used as fertilisers for centuries before the 1800s, but people did not understand how they worked until the science of chemistry was developed in the 19th century and it became clear that they supply plants with nitrogen, phosphorus and potassium. Today, something similar may be happening with a different sort of fertiliser altogether. For reasons that are not yet entirely clear, it looks as though exposing seeds to carbon nanotubes before they germinate makes the seedlings that subsequently sprout grow faster and larger.

A carbon nanotube is, as its name suggests, a tiny cylinder of carbon atoms. Such tubes have been proposed for all sorts of fancy uses, particularly in electronics, but they and other nanoparticles (so called because their dimensions are measured in nanometres, or billionths of a metre) have also been objects of concern. The fear is that if they became ubiquitous, they might damage living creatures, people included, by interfering with the way cells work. ...

Climate change: For peat's sake, stop

The worldâ€™s wetlands are big sources of greenhouse gases

Correction to this article

BOGS, mires, marshes, swamps, fens and quagmiresâ€”whatever they are called, and wherever they are found, peaty wetlands emit about 1.3 billion tonnes of CO2 a year as a result of human activity that drains them and thus exposes them to the oxidative effect of the atmosphere. Nor does this figure include the effect of fire on dried-up bogs. That can double the amount of CO2 released in a year, in those places it affects. ...

Cheaper desalination: Current thinking

A fresh way to take the salt out of seawater

THERE is a lot of water on Earth, but more than 97% of it is salty and over half of the remainder is frozen at the poles or in glaciers. Meanwhile, around a fifth of the worldâ€™s population suffers from a shortage of drinking water and that fraction is expected to grow. One answer is desalinationâ€”but it is an expensive answer because it requires a lot of energy. Now, though, a pair of Canadian engineers have come up with an ingenious way of using the heat of the sun to drive the process. Such heat, in many places that have a shortage of fresh water, is one thing that is in abundant supply.

Ben Sparrow and Joshua Zoshi met at Simon Fraser University in Vancouver, while completing their MBAs. Their company, Saltworks Technologies, has set up a test plant beside the sea in Vancouver and will open for business in November. ...

Nutrition and health: Food, glorious food

The way health claims about food are regulated is changing

BARELY a day seems to pass without a new study reporting the benefits of omega-3 fatty acids. A high intake of omega-3s has been linked with reduced rates of depression, cardiovascular disease and homicide. In pregnant women the consumption of these wonder molecules has even been associated with an uplift of the IQ of their offspring. The food industry has responded to this bonanza of evidence by putting omega-3s into everything from baby milk to drinks to margarine in the hope of increasing sales while bringing health benefits to fat and sickly customers.

Behind the silver lining, though, looms a black cloud: not all omega-3s are created equal. The good ones (long-chain fatty acids) come from expensive sources such as fish. The far less beneficial ones (short-chain fatty acids) come from cheap plant oils like flax seed and soya, as well as from leafy green vegetables. No prizes for guessing which type of omega-3s some less-scrupulous manufacturers have chosen to put in their products in order to imply health benefits. ...

NASA's new rocket: The first (and last?) flight of Ares

The launch of the Ares I-X raises hopes at NASA

NASAâ€™s new Ares I-X rocket was launched successfully from the Kennedy Space Centre, in Florida, on October 28th. It is part of the American space agencyâ€™s programme to replace its ageing shuttles and create a vehicle that could take people to the moon. The political backdrop to this test flight, which cost $455m and lasted only a few minutes before splashing down in the Atlantic Ocean, is uncertainty over whether Barack Obamaâ€™s administration will continue the course set by President Bush (high in ambition, low in funding) or set out on a new path that matches the agencyâ€™s goals with its budget. Without more money, this will mean conceding that Americans will not return to the moon by 2020, as Mr Bush hoped. And a change in this direction might mean scrapping Ares in favour of something cheaper.

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Wine and sea food: Red rags

An old rule of cuisine is explained by chemistry

THAT red wine is not to be paired with seafood is nearly a religious dogma among connoisseurs. Their reason is that the combination usually results in a strong and unpleasant fishy aftertaste. The traditional explanation for the bad pairing is based on the presence of tanninsâ€”the chemicals that make red wines taste dry and cause the mouth to pucker. Yet, every now and again, a tannin-rich red wine that does go well with seafood turns up. Which wines can manage this pairing, and why, has remained a mystery that even the best-trained sommeliers do not understand. A series of experiments just published in the Journal of Agricultural and Food Chemistry has, however, provided the answer.

Takayuki Tamura and his colleagues work at the Product Development Research Laboratory of Mercian Corporation in Kanagawa, Japan. They started their exploration of what was behind the strange aftertaste by asking seven experienced wine tasters to sample red wines and white wines while eating scallops. The panellists were instructed to rate the presence of any fishy aftertaste on a scale of zero to four, with zero indicating no such aftertaste and four indicating an extremely strong one. Over the course of four sessions, they were presented with a grand total of 38 red wines, 26 white ones, 2 sherries, a dessert wine, a port and a Madeira. The drinks were offered in random order, in coded glasses. ...

Nutrition: Note to self

The best ways to get enough omega-3 oils

THE best ways to get enough â€œgoodâ€? (ie, long-chain) omega-3 oils are either to eat lots of oily fish or to take, every day, supplements that contain at least 500mg of eicosapentaenoic acid (EPA), or docosahexaenoic acid (DHA), or both (though some studies have suggested as much as 1,100mg a day is better). Products that contain short-chain omega-3s, such as alpha-linolenic acid from plant oils like flax-seed oil, have not been linked with the strong health benefits shown by fish oils.

Having got enough long-chain oils, though, it is important to let them do their work. That means reducing consumption of omega-6 oilsâ€”those found in maize, sunflower, olive and most other seed oils. Many people have turned to these seed oils as a way of reducing their intake of saturated fats, but omega-6 fatty acids compete in the body with omega-3s, since the two have similar chemical properties. The best dietary ratio of omega-6 to omega-3 is reckoned to be less than 4:1. In Western diets, it is typically more like 10:1. The message, then, is: eat less fat and get more of it from fish. And those who buy omega-3 supplements that also contain omega-6s are probably wasting their money. ...