CANS OF JAM ^{2}

Issue 2, April 2010

From the editors

Welcome again to this new issue of Cans of Jam², the science magazine made **by** Paul Langevin High School pupils **for** Paul Langevin High School pupils.
Well, we **have** done it : we have managed to publish a second issue, so this one is dedicated to all the unbelievers…
This month, the articles have been written and collected by pupils from 1ère S, and of course, the important news is the eruption of the volcano Eyjafjallajökull ; but maybe the end of the world will also come from space, as you will learn in these pages…

The beginning of the end ?

A long time ago, in 1815, a volcano erupted and killed 92,000 people in Indonesia (10,000 on the spot, and 82,000 from starvation, which means 'having nothing to eat'). So last week's eruption was not very important in comparison , but in the long term it may be something really serious. Not really in the fact that the ash cloud makes air companies lose 150 million € per day. Or that export companies may lose even more. This is more serious…

People in Iceland say that each time the Eyjafjallajokull erupted before (that happened three times), its neighbour Mount Katla also goes into eruption within a year or so, and it could be castastrophic, because Mount Katna is HUGE compared to Eyjafjallajökull, and its eruption can last for months !

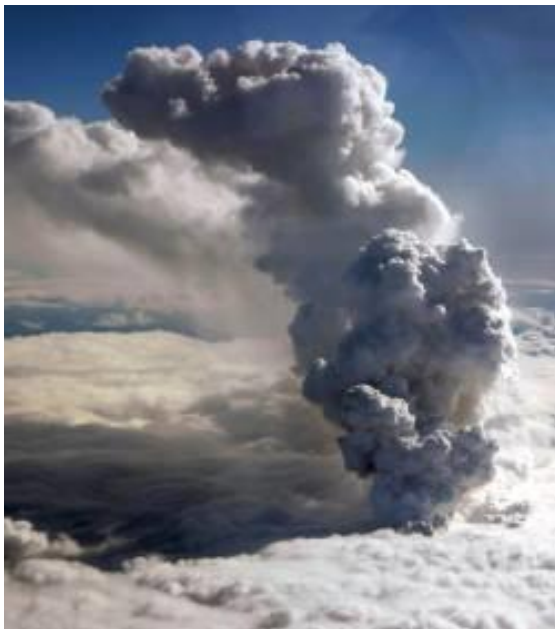
Eyjafjöll: anatomy of a cloud

FINE PARTICLES

The characteristic of Eyjafjöll is the presence of a glacier at its top. The volcano is covered by a broad icecap named Mýrdalsjökull . Under these conditions, we can speak then about a"sub- glacial" eruption . If an important mass of ice melts, the water accumulated under the glacier threatens to be violently released on the surface and to cause floods and flows of mud.

In contact with the ice, the magma will produce great quantities of steam. This is the origin of giant columns of smoke leaving the crater, which are then transformed into clouds of fine particles. These are composed of tiny pieces of stone and glass, able to go up very high in the sky. The higher the clouds of ashes go up, the more time they need to disperse. Volcanic ash does not have anything in common with ashes resulting from *(continued on page 2)*

Eyjafjöll: anatomy of a cloud *(continued)*
combustion, they are more abrasive and thus present a big risk for planes.



PERNICIOUS EFFECTS

In activity, the volcano start by projecting stones and ashes, then lava. For a long time after the end of the lava flows, the volcano continues to produce sulphur dioxide. The last level of the volcanic activity, which precedes the extinction, is the emission of hydrocarbon, then of carbon dioxide.

The cloud of ashes currently stationed above the English Channel does not present immediate dangers for health. On the other hand, the effects of the fall of ashes are pernicious from an ecological point of view. The vegetation suffers from the corrosive effect of the acid rains (resulting from the condensation of the vapors charged with sulphur dioxide).In the most extreme cases, the clouds of ashes spend several months to be dispersed and can even, by filtering the rays of the sun, cause a cooling of the temperatures.

Apophis trip to Earth

Apophis is the name of an asteroid discovered in June 2004, which risks to strike the Earth in 2036, on the 13th April. It measures around 270 meters. Indeed, Apophis' orbit crosses our orbit on two points. After the firsts observations, the risk of a collision with the Earth or the Moon in 2029 -when it crosses the orbit on the first point- was classed level 4 on the Turin's scale, which was the most important probability ever seen.

But after new observations about the asteroid, scientists concluded that Apophis will pass around 42,000 kms from our planet, and the collision's risk fell to 0 on the Turin's scale.

Just now, the asteroid is behind the Sun, so we can't see it before a few years, then we'll receive new informations about its trajectory to make others suppositions about its possible collision with our planet.

If, on April 2013, the asteroid passes near Earth, in an area named the “lock hole”, which measures 600 meters in length, we'll be able to say that Apophis is a serious threat for the humanity.

After the movie “2012”, about the Maya's predictions, perhaps they will bring out a “2036” movie...

The large collider of high-energy particles

The large collider of high-energy particles is a gigantic scientific instrument located close to Geneva, between France and Switzerland, at 100 meters deep. It's the biggest and the most powerful particle accelerator in the world.

It was created to help scientists about the crucial questions of the physics of the particles without answers.

The Higgs' boson is a essential particle of the standard model of this physic, but this particle is theoretical. With the large collider of high-energy particles, the scientists could prove this particle's existence.

Moreover, this instrument could help scientists understand if there are other dimensions, how the matter was before the Big Bang, or know what composed the universe.

The large collider of high-energy particles consists in a ring of 27 km circumference formed by superconductive magnets and accelerating structures which increase the energy of the particles which circulate there.

Inside the accelerator, protons or lead ions , hadrons, are collisioning at the speed of light to create energy which is examined later.

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An experiment to find DNA !

1) Peel, then crush a half onion in a mixer, (to crush it well) then put it in a glass container.

2) In another small container, pour lukewarm water in which you will dissolve a lot of salt (2-3 pinches for half a glass).

3) Then pour the salted lukewarm water in such a way as to cover the crushed onion.

4) Mix a little using a spoon.

5) Now you will have to disorganize and dissolve the membranes ; in order to do it, put 2 teaspoons of washing-up liquid and mix delicately until obtaining a viscous substance.

6) Wait for 5 minutes.

7) Then it is necessary to filter the substance obtained using a small strainer to collect the liquid in a glass container. You must press what remains in the strainer to obtain the most liquid.

8) Pour the liquid in a high and rather narrow glass container (such as a test tube).

9) Methylated spirits should be poured delicately along the walls of the recipient to avoid too much movement.

10) Wait for 15 minutes ; a substance is formed in alcohol ; in contact with the 2 liquids, it is the DNA which precipitates.

Plants produce electricity

Stanford scientists have measured a tiny electric current from algae cells. They found it at the source of energy production : photosynthesis, a plant's method to convert sunlight into chemical energy. The process takes place in chloroplasts, it divide the water in oxygen, protons and electrons.

Sunlight penetrates the chloroplasts and bring the electrons to a high energy level. The scientists developed a nano-electrode made of gold for insert inside cells.

The electrode collected electrons which had been energized by light and it generated a very small current.

The result of the experience is electricity production that doesn't release carbon into atmosphere.

However, this method draws from each cell just one pico-ampere. For one hour of photosynthesising, it produces only the energy stored in a AA battery. Furthermore, the cells which product energy die after one hour. Unfortunately this energy production method is not comparable with the nuclear energy or the combustion of gas…