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A picture of this breathtaking scenery shown immediately below might need to be copyrighted in the near future. The European Parliament will put to a vote the so-called Freedom of Panorama Act*), whether it should be restricted. Artists, photographers, film-makers would then need the consent of the copyright holder when representations of modern art in public space and architecture if used within the last 70 years from date of the creator's death.

Congratulations to Helmut Jahn (75), the architect of Frankfurt's Messturm (Exhibition Grounds Tower)!

extends

*) Debate and Vote in plenary on 9.7.2015: Implementation of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society.

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...goes to: Stefan Hell

Impressum



Trade-Fair Exhibition Complex Frankfurt: For five days, the Chemical, Pharmaceutical and Food Industries were showing their products and equipments – from small packaging machinery for single tablets to complete filling systems for bulk goods. Over 166,000 visitors thronged the exhibits – and 3,813 exhibitors from 56 countries came to Achema.

ACHEMA 2015

Information,
Inspiration, Innovation
in Process Industry

ACHEMA stands for:

Ausstellungstagung für
chemisches
Apparatwesen



A Typical Achema Booth: Display of sensors for temperatures, pressures, analysis of liquids, filling levels, moisture.

Since 1972, once every three years, the international trade fair Achema takes place on Frankfurt's Trade-Fair Grounds. At the last one in 2012, three quarters of all exhibitors in the fields of biotechnology, chemical industry and process engineering were from Germany. This year, their share had shrunk to 46 percent; largest foreign representation on a percentage basis was from Mainland China. Not only that, Chinese visitors' share was noticeable too, among them many very young ones appearing to still be in their study years.

In the initial press conference, Professor Dr Rainer Diercks, president of the host DECHEMA, a non-profit professional association, extended his welcome to all attendees, to have a close look at the almost 4,000 exhibitors and choose to participate in one or more of the over 800 lectures and presentations. Alas, in a country where

the label **produced without chemicals** has become a highly valued seal of approval, the public has become much less open-minded towards chemical industry. The regional daily newspaper for the neighboring Mainz-Wiesbaden area didn't even deign to write an article about this »World Exhibition of the Chemical Industry«. It's easier to find avid readers for the »news« item that mother's milk is **a most natural product** for grown-ups, which created a lot of hoopla among many gullible readers.

Industry Reduces Their Need For Water

Be it water for processing, for cooling, highly purified water, water as a way to transport, water as solvent – modern industry needs water almost everywhere. The need to protect this resource as well as economic considerations require intelligent use of water and to make use of it sparingly. Water

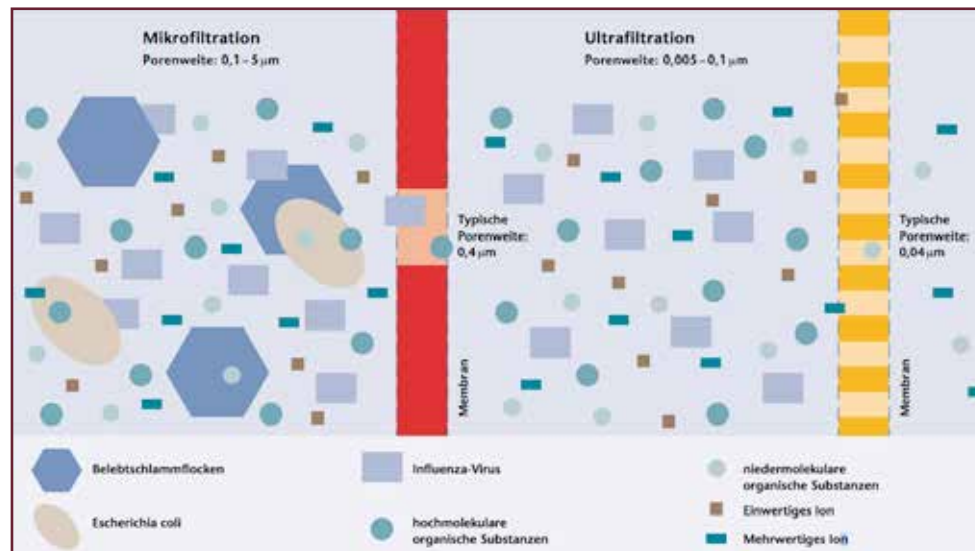
shouldn't be moved, heated, polluted more than the absolute minimum necessary. The industry continuously strives to improve production processes with utmost care for resources, to use them most efficiently which leads to an effort to reuse water as much as possible: process water is re-cycled, additives and chemicals used in the processes are recovered before reuse of the water. Such water which runs through multiple uses is being called, even in German, smart water.

The ways and methods of handling water depends on the field, the process itself, location. Re-cycling of water can be done economically only if its degree of pollution is fairly low. If it contains contaminants of different chemical and/or physical characteristics, most experts are of the opinion that water re-cycling will not be efficient. One basic idea in the concept of water re-use is to separate effluents in its early stages so that re-cycling can be done individually, with the least efforts and costs. Most re-cycling processes within a plant or production unit are taking place close to, or even within, a production process; the effluents' mix is limited and therefore costs are relatively small.

In the field of water treatment, application of membrane technology has increasingly become important. The advantage is that the equipment operates fully automatically and continually. Worldwide, already two thirds of all newly installed desalination capacity uses the reverse osmosis principle, such as the *Carlsbad Desalination Project* built by Poseidon Water in the northern part of San Diego County, California, and planned to take up operations by the end of 2015, to provide additional water to

that region which so often has been afflicted by droughts.

Still another trend is a movement towards production without creating any effluent. Here, no water at all will be set free. Globally, approximately 400 such units are already in operation. Pros are: independence from water supply – important in arid regions – , severe restrictions in regard



to using salt-containing materials, recovering of production material, all of which also contribute to a positive image of the manufacturer/processor.

Production without creating any effluent does, however, have problems, for example the handling of concentrates resulting from production. Also, it requires a lot of energy.

Experts agree that if put to the choice, enterprises will prefer a location with abundant supply of water and rather optimize its water management, over investing in effluent-less production and its high operating costs. They rather put their bets on even higher integration of water and energy management. □

Membrane Technology for waste water treatment: Scheme of the size of particles and the corresponding size of pores from 0,4 µm to 0,04 µm (Institut für Siedlungswasserwirtschaft RWTH Aachen).

Security

Where Man and Machine Interface



Danger of Explosion: in potentially explosive areas even mobile devices have to conform to the highest safety standard: industrial tablets need a certificate for explosion-proof performance according to ATEX-Zone 2.

If from the center of the city of Ludwigshafen one drives north on the throughway, one will see to one's right apartment blocks and family homes, but on one's left, between the road and the Rhine river are lined up more than one hundred plants of BASF, the large chemical concern. Within that compound, over 3,000 km (1,860 miles) of pipelines crisscross above ground that area; it's the world largest contiguous chemical complex. One would shudder to imagine what a chemical catastrophe of the kind that happened in Bhopal, India, in 1984 would do to this densely populated Rhine-Neckar area. This is not such a far-fetched idea: I still remember what my father told me about the so-called Oppau Explosion (*Oppauer Bauernunglück in der Anilin**). As a young boy he was living in Ladenburg, a small town about 20 km (12 miles) away from Ludwigshafen, known nowadays for its Automuseum Dr. Carl Benz situated in the old Daimler plant of 1906. In 1921, there was a huge explosion on BASF grounds of a silo filled with 4,500 tons of fertilizer. 561 people died, more

**) Locally used nickname for: Badische Anilin- und Soda-Fabrik = BASF.*

than 2,000 were injured. My father and other curious people streamed afterwards to the scene to see the devastating effects of the accident. 25 km (16 miles) away in Heidelberg the blast blew a street car out of its tracks; even 300 km (186 miles) away in Munich, the explosion's loud bang was heard. To this day it was Germany's biggest accident at a chemical plant.

No wonder that in order to ensure safety for workers as well as inhabitants living close to chemical plants, a large section of presentations, discussions and round table conferences at theACHEMA were devoted to that subject. Though surveillance of plants and processes have become more and more automated, human beings often are still needed close-by, be it for simple tasks, or to carry out complex activities. But where man and machine interface risk is high. One topic was creation and implementation of a unified system of symbols denoting danger, to avoid language difficulties which could very well lead to dangerous situations. Safety instructions are presented in comic-strip format. There exist now even card games – such as Doppelkopf (literally »double-head«) which is very

popular in Germany – with safety precaution motives depicted. One should not neglect the thought that workers coming from very different cultures may interpret pictures not necessarily the same way we do. In addition to the »traditional« *Gastarbeiter* (literally: »guest workers«) – those who came from Southern and Southeastern Europe and continued to stay on – , refugees from farther away lands now streaming to Europe in masses may at some time in the future be authorized to work in German industries. Then, communication could very well become a major problem. I'd doubt they know how to play *Doppelkopf*...

With increasing physical strain, accident risk increases. Co-workers are therefore encouraged to evaluate on their own their work load, work

flow, and to make improvements in this regard. This is now encompassed under the term »participatory ergonomics« (an aspect, by the way, of the methods Deming had introduced to Japanese companies right after World War II). This is becoming critical in view of the work-force's aging and its potential affecting work processes; already this year, 2015, one third of the labor force in Germany is over 50 years old.

It is true that with age, willingness to accept risks and aggressiveness diminish; similar to what can be seen in another segment, street traffic, young people cause significantly more incidents and accidents. Notwithstanding, rate of accidents among 55 to 64-year old workers is double the one among 35 to 44-year old ones.□



Explosive-sniffing dog: Its very fine nose is further trained on a pallet soaked with explosives rendered harmless through an admixture of special chemicals.

Munich Center, Marienplatz: a piece of luggage left on the subway station creating a lot of commotion. But the place was cordoned off just for two minutes while a sniffer dog checked the luggage; no explosives.

To make training of explosive-sniffing dogs safe, a team around Prof. Dr. Siegfried R. Waldvogel at the Johannes Gutenberg University, Mainz, had found a »solution«, in both senses of the word: they dissolved explosives in ionic solutions.

Explosive-sniffing dogs are indispensable when it comes to suspicious packages. Their capabilities exceed those of technical devices. Even explosives hidden in a barrel of malodorous slurry can't fool them. These dogs can be trained to detect different kinds of explosives. Needless to say, training

Protection at Work – For Animals!

Research Institutions Helping Out Dog Schools

conditions have to be completely safe, for dog as well as for trainer.

Once the dog has discerned the smell of something of interest it is to indicate the suspicious location by lying down; the dog is trained not to

a special ionic liquid ignitability is inhibited. Additionally, having a high boiling point, the liquid can't dry out.

Trial samples containing dissolved explosives were manufactured in co-operation with a small and medi-

No Danger!
the new type of training material doesn't carry any risk ... neither for the animal nor the trainer.



bark, or scratch, or bite. That way, it doesn't attract attention or, worse yet, trigger an explosion due to nervous behavior. Training is intensive and takes a long time, to be successful.

To learn how to detect the scent of the type of explosive, authentic samples are needed. But the risk is too high to do training with pure explosives, particularly with some that are sensitive to even the slightest vibrations. To dissolve explosives in

um-sized business and tested, also at a dog training center proving to be highly effective and having a long shelf life. □

Winner of Nobel Prize for Chemistry

Stefan Hell was awarded the 2014 Nobel Prize in Chemistry for his development of extreme-resolution fluorescent microscopy, together with the U.S. Eric Betzig und William E. Moerner

In his stimulating introductory lecture, Prof. Hell also showed some pictures from the Nobel Prize Award ceremony. Among them a picture of his table companion, crown princess of Sweden Madeleine. He instilled courage and perseverance in the winners of theACHEMA Award for Students. »Not everyone can win a Nobel Prize, but just plain success feels very good, too...«, he said with a smile.

Prof. Hell was awarded for his improvement in a light microscope of detail resolution from 200 to 50 nanometers. With his STED method (Stimulated Emission Depletion). two laser beams stimulate minuscule areas of a cell to fluoresce which can be switched on or off.

The sample is scanned and the »light dots« are re-assembled to a picture. Some structures of living cells, such as cancer cells or HIV viruses, can be rendered down to the molecular level. □



Nobel Laureate Stefan W. Hell, Director at the Max-Planck-Institute for Biophysical Chemistry in Göttingen, at his introductory lecture, ACHEMA

Impressum



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Photo by Maurice de Chlouriçon

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