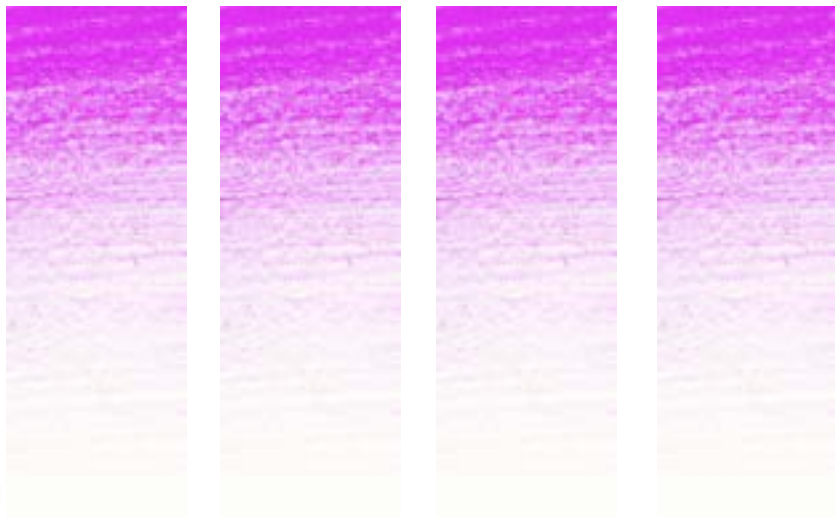
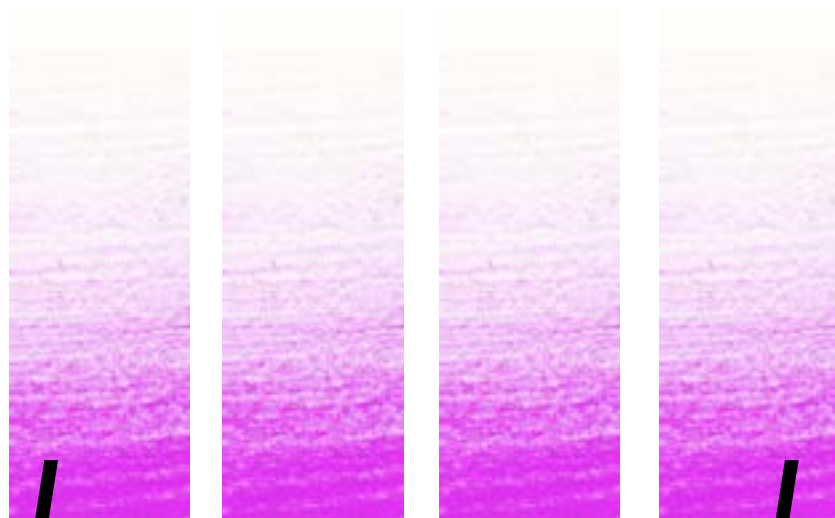


sleep



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book

CA

NT

sleep



take a warm
lavender bubble

BATH



put on (your favorite)

SOCKS



drink chamomile tea

TEA

They all evaporate: oceans and seas, microdroplets of fuel in engines and the sweat on our own skin. For every one of us evaporation is of paramount importance: it shapes the climate of the planet, it affects the cost of car travel, and is one of the most important factors controlling the temper-

Chemistry of the Polish Academy of Sciences (IPC PAS) in Warsaw, Poland, that this belief was erroneous and that the mechanism of evaporation must operate very differently than had previously been assumed. Nature copes badly with descriptions of processes occurring in nature. We are not exactly able to describe the states at the beginning of the process and at its end, but what happens in between? How does a given process really take place? For many years we have been asking ourselves this question in relation to the phenomenon of evaporation -- and we are con-

quite an intuitive feeling that a given temperature the pressure of the liquid depends on the actual pressure at the surface, which would be present if the liquid were to be in thermodynamic equilibrium with its environment.

"The further the system is from equilibrium, the more dynamically it returns to it. It's so intuitive! So we checked the Hertz-Knudsen equation -- because we like to check. In order to do this we prepared exceptionally accurate computer simulations which allowed us for the first time to take a closer look at the process of evaporation," explains Dr. Marek Litniewski.

Advanced computer simulations carried out using molecular dynamics showed that the values of some parameters describing evaporation are even several times larger than those predicted by the Hertz-Knudsen equation. However, an even more inter-

esting effect was noted: the stream of gas being liberated from the surface of the liquid during evaporation changed very little despite significant fluctuations in pressure.

"There could only be one conclusion from this observation: the rate of evaporation and the vapour pressure, that is, the physical quantities which are usually considered to be independent of each other, are in fact

on the principle of conservation of the mass of molecules leaving the surface of a liquid must increase the mass of the gas in the surroundings. Physicists from the IPC PAS, however, that since molecules leaving from the surface have a certain momentum, in order to describe this phenomenon should be applied is the principle of conservation of momentum.

to some extent evaporation is a

momentum, there must be recoil, the pressure of molecules on the surface of the liquid is different," says Prof. Holyst. Computer simulations were used to measure the velocities of molecules released from the liquid surface. It proved to be small, of the order of a few micrometres per second. This fact means that pressure occurring flow over the surface has to strongly

for, among others, the understanding of the real mechanisms responsible for global warming. Contrary to common belief, the most abundant greenhouse gas in the atmosphere of our planet is not carbon

dioxide but water vapour. At the same time, it is known that the speed of flow of air masses over the oceans can significantly exceed one hundred kilometres per hour and therefore they will certainly affect the rate of evaporation. The hitherto evaluation of the rate of evaporation of the oceans

which will be predicted by the Earth's climate, the rate of evaporation of the oceans, and therefore they will certainly affect the rate of evaporation. For example, the rate of evaporation of fuel from the skin. For example, the rate of evaporation of paramagnetic substances from the skin, and is one of the factors controlling the temperature of the human body. So it is not surprising that evaporation is a phenomenon that had been strongly neglected. In the renowned Institute of Soft Matter Physics from the Polish Academy of Sciences (IPC PAS) in Warsaw, they have proved that this belief was erroneous. The mechanism of evaporation is completely different than had previously

given process really take place. For many years we have been asking ourselves this question in relation to the phenomenon of evaporation -- and we are coming to more interesting conclusions," says Dr. Robert Holyst (IPC PAS).

In scientific and technical descriptions we use the Hertz-Knudsen equation for over a hundred years, to describe the evaporation rate. What follows from quite an intuitive prediction: that the temperature the rate of evaporation of the liquid depends on how different the actual pressure at the surface is from the pressure which would be present if the evaporating liquid were to be in thermodynamic equilib-

rium with its environment.

"The further the system is from equilibrium, the more dynamically it should return to it. It's so intuitive! So we checked the Hertz-Knudsen equation -- because we like to check. In order to do this we prepared exceptionally accurate computer simulations which allowed us for the first time to

on several times larger than those predicted by the Hertz-Knudsen equation, an even more interesting effect was noted: the stream of gas being liberated from the surface of the liquid during evaporation changed very little despite significant fluctuations in pressure. There could only be one conclusion from this observation: the rate of evaporation and the vapour pressure, that is, the physical quantities which are usually considered to be independent of each other, are in fact

we had all been making a mistake in the theoretical description of the phenomenon of evaporation!," says Dr. Holyst. The hitherto model of evaporation is based on the principle of conservation of mass: the mass of molecules leaving from the surface of a liquid had to increase the mass of the gas in the surroundings. Physicists from the IPC PAS, however, that since the particles leaving from the surface have a certain momentum, in order to describe this phenomenon should be applied is the principle of conservation of momentum.

realized that to some extent evaporation is like assembling shooting from a cannon: the projectile flies in one direction, but the momentum of the system

of the liquid will be different," says Prof. Holyst.

The new computer simulations were also used to measure the velocities of the molecules released from the liquid surface. They proved to be small, of the order of hun-

**A GOOD LAUGH
AND A LONG SLEEP
ARE THE BEST CURES
IN THE DOCTOR'S
BOOK.**

~IRISH PROVERB

And if tonight my soul
may find her peace
in sleep, and sink in good
oblivion,
and in the morning wake
like a new-opened flower

then I have been dipped
again in God,
and new-created

~D.H. Lawrence

do not look at the

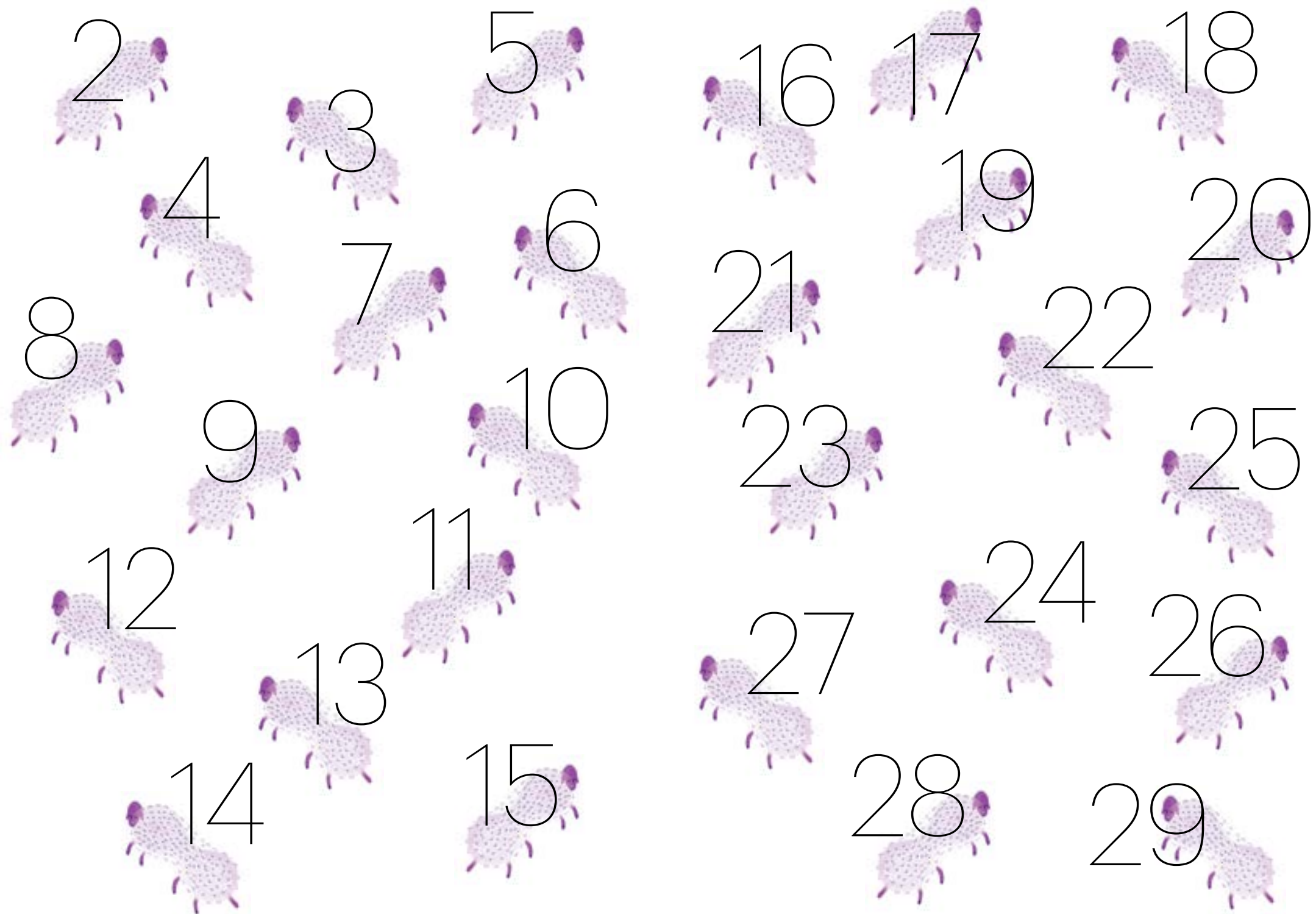


and close your eyes



.....and
count.....
.....sheep





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