Breathing Fragments

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When doing mindfulness exercises, to connect with a landscape, a road, or people through breathing, simply inhale and exhale: neither the weight on your shoulders nor the weather should distract.

In 1972, the astronaut Harrison H. Schmitt, a member of the Apollo 17 crew, took the first photo of the blue planet as a whole. The atmosphere that protects and allows us to live seemed so thin and fragile. In his excitement, breathing in and out must have happened a little faster than usual. Paying attention to his air consumption required extra concentration.

The city is out of breath: on one side, fine dust is exhaled into the air through ventilation shafts. On the other side, technology is applied to absorb it at the bottom of the cold air corridor.

Another common specimen is the Schopftintling (Coprinus comatus)—it will not only garnish risotto, but it is also useful for writing. When liquefied, it produces a black ink the same colour as cuttlefish. Its shape is also similar to a cuttlefish. The number of fine particles in this ink is yet to be determined.

There is no air in space: in order to breathe, it is necessary to recreate an environment and make artificial air. The air produced by the mixture of oxygen and nitrogen, gradually released from the cylinders, is breathed in by the cosmonauts, who release carbon dioxide. A production and control station compensates for the losses and ensures the recycling of the air.

By breathing, you participate in the biogeochemical cycle of the Anthropocene. Perhaps you have a storage function—in your body—for the fine particles emitted by your car? All living organisms function as filters.

Fine dust does not only escape from car exhausts. Most of the microplastics that pollute our environment by mixing with other fine particles come from tyre wear. Brake emissions from the friction of the brake pad on the disc also produce fine dust. Thus, electric cars also generate pollution while driving. Not to mention the production of their batteries.

Fine particles are part of suspended dust, or *Particulate Matter* (PM). They are present in the air and do not fall immediately to the ground. They remain in the atmosphere for some time. Depending on their size, these particles are divided into different fractions: for simplicity, PM10 is defined as all dust particles with an aerodynamic diameter of less than 10 micrometres (10 millionths of a metre). In general, this PM10 fraction of airborne dust is called fine dust.

Fine particles are a threat to health. The smaller they are, the more dangerous they become, as they can penetrate deep into the lungs. Fine particles are carcinogenic and can carry harmful substances, such as heavy metals, into their last bronchioles branches.

Ivy leaves are also used in remedies to relieve the respiratory tract in cases of chronic bronchitis or acute inflammation. The ingredients in these leaves have expectorant and mucolytic properties for the respiratory tract. Does urban ivy retain the same properties?

The atmosphere does not only consist of gases, such as nitrogen or oxygen. It also contains a large quantity of aerosols, a suspended mixture of inorganic particles—sands, soot, plastics. Air also contains organic components such as pollens, microbes and spores. Every year, about a billion bacteria travel in these flying dusts around the Earth.

The CityTree and The Cube resemble the totem poles of the coast of the American Northwest. Wikipedia says: “The sculptures may symbolise or commemorate cultural beliefs that relate to family legends, clan lineages or notable events. (…) Given the complexity and symbolic meanings of totem pole carvings, their location and importance lie in the viewer’s knowledge of and connection to the meanings of the figures and the culture in which they are embedded.” Wouldn’t The Cube and the CityTree be simulacra of a society that dreams of clean air, rather than real technological solutions?

Respiration is a process that takes place fundamentally at the cellular level. The respiratory organs and processes that capture and transport gases to and from cells are complex adaptations of organisms to maintain a continuity of communication with the external environment.

Fungi breathe like plants and animals: they take in oxygen and release carbon dioxide. The limewater test can be used to demonstrate respiratory exchange in living things.

Particle filtration is a profitable business. The CityTree is, according to its producer Green City Solutions, “the world’s first biotechnological particle filter for urban areas.” It is a bench with an oversized backrest, with moss modules that should ensure the absorption of micro-particles. Their effectiveness is not at all verified and some city residents feel cheated. Perhaps planting real trees may be less divisive and more effective?

Highways cross mountains through tunnels. Their ventilation must be provided mechanically. Ventilation systems sometimes materialise in the heart of wild forests. The architecture of these monuments can play the card of mimicry to conceal itself in its environment. Inside these structures is a mechanism. It may be four vertical exhaust pipes, painted bright red, which are activated when the level of fine particles emitted by the thousands of cars passing through the tunnel every day becomes too high. The tunnel air containing the fine particles is inhaled and exhaled without any filters a hundred metres into the sky, so that it disperses quickly, depending on the wind.

Cities can have breathing problems. Their topography and buildings can prevent the exchange of air masses and produce the accumulation of fine dusts. Wind corridors are essential to mitigate the urban heat island effect.

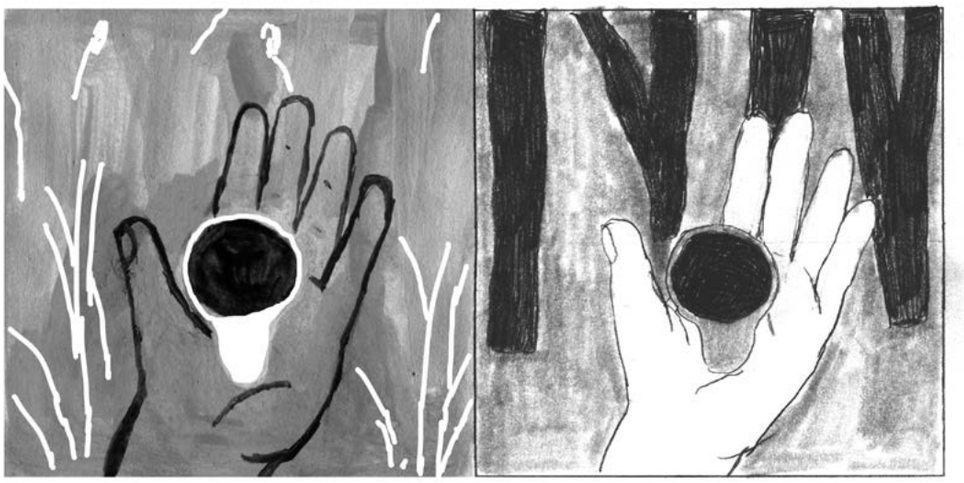
The fine particles are only visible as black clumps of dust that collect in the corners of the machinery and settle on the joints and bolts of the exhaust pipes. The dust is black. It has no particular smell, it sticks. Are the corners of your lungs lined with this substance? Are your lungs able to send the fine particles a hundred metres away?

If humans filter the polluted air, it's a serious public health problem. If it's plants, it's a biological miracle.

In contrast to synthetic ivy, living ivy has an absorption capacity of six grams of fine particles per year and per square metre. In order for ivy to absorb as many particles as a mature tree, 23 square metres of facade are sufficient. Ivy, unlike most urban trees, has evergreen leaves that filter particles throughout the year.

The rapid and unstoppable spread of COVID-19 was a reminder of the political importance of breathing: almost all living things are connected by the fact that we inhale and exhale the same air.

Filter columns called The Cube from MANN+HUMMEL consist of a microfibre layer coupled with activated carbon. Each cube consumes about 1.5 KW/h which corresponds to a professional hoover. The filters must be changed regularly and incinerated. After that, the ash can be disposed of in landfills.



Respiration is a function that has accompanied life since its origins, but it has not been expressed under the same conditions throughout Earth's history, undergoing or resulting in profound changes, making a decisive contribution to the main biogeochemical cycles.

The car of the future could redefine the reason for movement. One reason for driving a car could be catching up with more fine particles than it emits. A sport in which the driver would race to catch more fine particles—like ivy.

The word breath is built on the Latin root spīro, breath, which mixes up with spīrĭtŭs: spirit, seat of vital energy. Eastern traditions give this gas transfer a central virtue of energetic balance and harmony, developed through yoga and breath control techniques. They paved the way for modern forms of breathing exercises.

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