A Homage to the Fluorescent Tube - a Light Installation by Volkhard Kempter.

The Light Installation

A total of ten fluorescent tubes have been randomly, casually placed on the flour. Only the eleventh stands out. It seems to have been set upright, leant against one of the walls of the exhibition space. Each fluorescent lamp is connected to a transformer. One can see the many connecting cables. All of the fluorescent tubes are constantly flaring up. In doing so they divide up the light spectrum, interrupt the continuum of time and space. They are all doing the same thing, but asynchronously. They flicker at fixed time intervals, are visible between two blinks of an eye. They flicker in the rhythm of the installation and meet the eye. In doing so, the fluorescent tubes obey a simply understood principle; they intermittently interrupt the darkness of the space, more often than one opens and closes ones eyes in minute. These fluorescent tubes are not working properly. They should actually be constantly lit, rather than repeatedly flaring up. They should be permanently lit, and stay that way, until they are turned off. Uniformly, constantly, consistently. That is what one expects from them. Because fluorescent lamps are lighting, they are artificial lines of light. One does not usually give fluorescent tubes much further thought because they usually behave according to expectation – they are fixed to walls or to the ceiling, or are integrated into floor lamps. Light is a medium through which things become visible, it floods the room until it hits objects, only then has the light fulfilled its purpose.

History and Origin of the Fluorescent Lamp

The nature of artificial lighting has always corresponded to the particular standard of the age. Modern day lamps have a long history. Previously vegetable and animal-based materials were used as burnable light sources. The use of candles nowadays is a relict from this time and practice, a tradition that continued into the modern age. One should understand the genesis of electrical lamps as a widely branched family of lighting objects that were designed, using the technical knowledge standards of the time, to artificially produce light.

The naming of 'fluorescent tubes' is suggestive of their particular construction form. Practically seen, this construction is a glass cylinder for which the diameter and length are precisely calculated to achieve a specific desired brightness. Light-producing materials, so-called *illuminants* can be inserted into the cylinder following which it is sealed, such that the effects of the surrounding environment, as one has in the case of candles, can be made irrelevant. One member of the large family of different lighting types is the gas lamp. Gas lamps require the air from the surrounding environment as a natural fuel. Gas lanterns are only partially protected from the surrounding environment by glass and have a pleasing effect due to the yellowish light they produce.

Long, straight, tube-like fluorescent lamps appear to us as uniform lines of light. Fluorescent tubes are gas discharge lamps; this fact addresses an important kinship within the family of electric lighting. Gas discharge lamps draw attention to the physical principles of artificial light production. From the very beginning the functionality of fluorescent tubes has been related to this mechanism. The gases, trapped within the tube of the fluorescent lamp, cause, through an electric voltage, visible light to be emitted. The gases emit predominantly invisible light in the UV spectrum. It is the coating on the inner side of the tubes that transforms the UV light into visible spectrum light. Technically explained they function as follows: Fluorescent lamps are gas containers into which gas is pumped at a low pressure (a few mbar). Inside the lamp the gasses take on the function of an illuminant. The inner surface of the tubes is coated with a fluorescent material (phosphor) and the glass tubes are filled with gas - usually mercury gas, though they can also be filled with other noble gases such as argon.

There are electrically conductive iron rods placed on both ends of the tube. When a voltage, which in a normal household is usually an AC voltage of 220V, is applied across these two iron ends it triggers a chemical reaction within the gas-filled glass tube. The two iron rods are recessed into the ends of the tube and function as electrodes. When the circuit is closed they act as an anode and a cathode and a voltage drop exists between them. This causes electrons within the glass tube to drift from cathode to anode. These travelling electrons bump into gas molecules on their path, stimulating them to emit

light. This process takes place through the entire length of the glass container. The invisible light from the gas discharge is made visible by its interaction with the coated inner surface of the glass. The light spectrum produced by fluorescent lamps is relatively similar to that of natural light. It can however be manipulated by altering the types and ratios of the gases within the tube.

Fluorescent lamps can produce differently coloured tones of light. Most commonly mercury, mixed with either neon or helium is chosen to fill the tube. Cold light is closer to the daylight spectrum and has less of a sleep-inducing effect, whereas warm light causes melatonin to be released, which is an important hormone for falling asleep.

Neon tends to produce a reddish light, neon and mercury tend towards blue, brown coloured glass tubes result in a green light, helium results in a whitish pink, whereas nitrogen tends more to a yellowish pink. This is the complete list of the various artificially producible colours of light. In the German language the name 'neonröhre' (neon tubes) for fluorescent tubes has been culturally passed down and is still commonly used today despite the fact that neon is traditionally no longer used in these lamps. This is perhaps due to the fact that in beginning the red neon light penetrated the smoke from airports more impressively than the light of other colours.

We have thus far not yet discussed the circuit of a fluorescent lamp, a vital extension to the fluorescent lamp. This circuit is what produces the initial high voltage that is necessary for the gas to electrically discharge whilst emitting light. It would be simple to use a circuit diagram to explain the placement and function of the components. But let us try it without. The so-called *starter* is connected in parallel to the glass tube. In its rest state it has an open bimetal-switch – that is to say a temperature-dependent switch that together with the so-called inductor is connected to the glass tube in parallel. As previously mentioned, there is an alternating voltage across the two ends of the glass tube. The starter, bimetal-switch and inductor, all of which are connected to the tube in parallel consequently experience this same voltage. The trick is that the voltage placed across the electrodes of the glass tube, also runs across the starter, subsequently switching it on. The bimetal-switch heats up and closes, closing the circuit and resulting in a connection to the inductor. The coil of the inductor subsequently charges, resulting in a high voltage output that excites the fluorescent medium in the tube. At this stage, when the current is flowing through the fluorescent tube, the starter no longer needs to serve its purpose as an inducer and becomes superfluous. This is because the current always searches for the path of least resistance and this path is usually through the bright and uniformly lit glass tube. The bimetal switch then has time to return to its initial, open, state. It is however precisely this moment that is inhibited in the fluorescent lights in the installation, the tubes instead continue to repeat this starting up process. Exactly how the functionality of these lights can be manipulated like this is, and remains, Volkhard Kemptner's well kept secret.

On the Aesthetics of Flashing

In accordance with the intended purpose and functionality of a lamp, the circuitry in a fluorescent tube would normally excite the gas in the tube, causing it to light up. In Volkhard Kempter's installation however, something abnormal takes place. The fluorescent tubes spark intensely and repeatedly. What the visitor to this exhibition perceives is not a spectacle of nature, where lightning discharges into the sky. He may also compare the sensation to other familiar experiences. But the flickering tubes in the exhibition space are not fireworks – those visually pleasing rockets that are shot into the sky, where they proceed to devolve into bright shapes and patterns. The visitor is also most certainly not in the midst of the flurry of flashes at the scene of a media spectacle. Nor is he at a disco, where stroboscopic lights flash constantly such that the movement of other entities in the room, as well as his own movement appear to be broken up to the point of standstill. Is he perhaps in a laboratory? Where the modern phenomena of micro- and macrophysics are made visible? Or is the visitor a student, studying a physical experiment, expected to recognise and determine the observed patterns? Exploring the many other comparable experiences would

be to say that the flashes of the fluorescent tubes on the floor of the exhibition have different message than the intended one.

The visitor isn't coming close to a tamed force of nature such as the spectacle of light seen coming from the glowing red fountains of lava at an active volcano. Nor are the effects of these lamps fitting to illustrate a practical seminar in which an intrinsic tension between system and environment are to be demonstrated.

The visitor is familiar with the use and risks of the technology seen here. The keywords here are: electrosmog and light pollution, environmental impact and energy efficiency. He is informed about harmful environmental factors that through the increasing and poorly regulated use of natural resources are becoming a serious, heavily debated problem for all of humankind on the this planet.

Since time immemorial light has been power in the hand of man, which he succeeded in creating artificially - first he created fire and then he artificially replicated natural light. Discharge, connecting und disconnecting are fundamental to life. Natural light has been extended through the use of artificial light. The Earth's biosphere requires sunlight; continuous artificial light on the other hand is not only useful, as one can see from the hazy glow of light pollution floating above large cities, but rather it is also a threat, no longer just a source of life or artistic inspiration. This aspect of human progress has a dark side.

Hearing and Seeing

There is a constant audible sound cloud surrounding the flickering fluorescent lights. This noise causes the individual protagonists within the installation to merge into a unified group. One can hear the hum of the frequencies when the voltage drop reaches the flickering tube, one sees how the starter clicks metallically here and there. One can follow the course of the consecutive events taking place within the lights, periodically repeating, until the sounds, which are being recorded by the microphone, gradually get dampened. The amplification of the irregular audio disturbances has two consequences. Firstly, it gives the installation the impression of being an assembly of related technical parts. Secondly, the electric devices exist on the threshold of unfamiliar sounds and vibrations. These sounds are however not perceived as disturbing. The repetitiveness of this process gives one the impression that one is able see the electrical force jolting through the electronic devices, dividing up and then returning to where it started. It is as if the energetic river that one hears were also visible. This is very much in contrast to the natural dialogue of lightening and thunder with its time-delayed response and the accompanying patter of rain as it gains and loses momentum. It is completely different to this for the reason that the installation is not an acoustic image of a natural phenomenon, but rather signifies a humble polyphony of technical, mechanical slaves.

Light as a Medium for Design

Volkhard Kempter's installation is minimalistic. One has to metaphorically place oneself within the materials; that is to say within the given functional context of the light installation. One has to confront oneself with it and engage with it. The discernable analogy of the piece is that of the difference between nature and technology. Ever since industry first permeated our world, both within cities and in the countryside, one has understood that both nature's energy and human labour can be extended through use of power plants and machines. The exhibition space in which Volkhard Kempter's installation is located makes permanent us of the presence of a source of electrical power, the room is part of a network. The aforementioned rhythm of abruptly increasing and decreasing light affects

one's perception of the room. When the tubes flicker on their light moves through the room, chopping it up. One believes to see a recurring pattern in the flickering. This pattern takes on a calming and meditative character. Due to the fact that this movement of light is a permanent feature of the space, both of the contrasting rhythmic effects (chaos and order) have the same origin. The visitor knows that light, wavelike and divided into tiny light packets, spreads through the room, travelling from the source to the objects within the room. He knows that there exist objects that are separate from one another. It is comfortable for the visitor, or rather advantageous that his surrounding environment can always be illuminated. The artificially produced light suppresses the darkness. At the exhibition the visitor experiences a chaos that puts into question the permanent continuum of light within reality.

Older technologies, seen in juxtaposition to modern ones serve to illustrate the nature of the latter, to make it perceivable. This means that the chaotic flashing of the installation disintegrates the uniformity of the room. Stated in contradictory terms, it makes the distance and the darkness visible. The brightness penetrates the darkness. This artificial reversal of the behaviour of light within the installation refers to a reality that doesn't allow for any darkness. Looking into the installation, with its fragments of light, is looking into the flames of an artificial fire. Inside the flickering of the fluorescent tubes, Prometheus, whose mythical crime gave fire to humankind, comes alive again. Mechanical artificial light generation has successfully circumvented the metaphysical demand for 'more light' as it has standardised everything that is made visible under these conditions. Light has henceforth been normalised.