Introduction

THE GLASS AGE

Material is fascinating! Wars are conducted for it; popes, emperors and kings have derived their power from it; alchemists have examined this base material and craftsmen have given it form while some materials were even used for currency. Glass, rock crystal, obsidian, silver, gold and iron; wood, marble, textile, paper and clay; quartz, cobalt and uranium, pearls, diamonds, salt, soda and silvers….
Material is our world.
Searched for by archeologists who link materials to eras, that's how common materials were in the development of humanity and culture. In the late Paleolithic or Old Stone Age the first metalworking and processes were discovered for gold, silver and copper. Cobalt glass was made from the residue of melted silver and also, in the Netherlands, many bangles of imported Hungarian glass rods have been dug up. Later, the Bronze and Iron Ages followed.

Some materials play a paramount rôle in the arts and crafts disciplines: ceramics, textile and glass art focus on matching the material to a corresponding mentality, vision or technique. This three-some developed in the '60ties of the last century, because of the disentanglement of artists and designers from industry who were then, free to create their work, in their own studios and ateliers. Material disciplines should be judged with the same criteria as all other art disciplines such as architecture, autonomous art, monumental art, design and industrial design, or photography, sculpture and painting.

Me, I am mad about materials. That I own a D-Tex diploma says enough. Knowledge of textiles as commodities is the word itself! As a child I pillaged the city's slaughterhouse; everything was of great interest from the splashing of pig's brains to slippery intestines and cow's eyes. Also, the bladder used for my Shrovetide music drum was a fascinating material. The bombed-out Bezuidenhout in the Hague, was my archaeological site and, with its cooked-clean skulls and bones, the kitchen was my laboratory; my bureau was my Wonderkammer with its fossils, coloured boxes, bottles of coloured inks and materials organized by colours, types and measurements. Later on, at the Academy of Industrial Design textile became my field of investigation. Under protest, because I was a girl and product design, still, was men's work!

Aided by the Marshal Plan, the economy accelerated after World War II and industry developed at fast-forward speed. Now, as the industrial age has passed in the Netherlands, many questions remain: who still knows the factories as industrial temples with their storage cellar's crates with cones of rough wool andmohair; the halls filled with material? The heaps of salt, soda and other chemicals? The storage room from the mouldmakers with beech and pear wood? The rolls and reams of paper from theprinter;

the containers with dyes and print paste in the dye works? The roaring machines and thunderous furnaces, where even the sound became a material as the dramatic opera of falling crates of glass-house window glass mixed with the orchestra of glass shards shovelled by bulldozers?

That world is almost gone. Knowledge land? But, what is knowledge when you can't take material in your bare hands? Information land? What a sad information that one cannot hear, smell, taste and touch! "Hands on!" the Americans warn us when one can work in a workshop with actual materials. Pre-packaged and in small, measured-out parts, but never again, at the source itself….

The tartish iron odour from the factories is more endearing to me than Chanel No. 5!

Between all my books on glass and my glass magazines, I can't stand too much glass in my surroundings. The biggest collection is in my head. What I do have is a small aisle, a 'seekers centre' for ugly glass that nobody wants to have: a pepper and salt box like a refrigerated glass of milk; the first premiums of General Motors from 1920 and a Belgian wine bottle with a holy cross, ladder and all the passion's tools, these are the top pieces. And, of course, in white milk glass, a pressed cannon boat from the Cuban War against America, as a butter dish. Each material has its own history and glass has a special one because it was already man made thirteen centuries before the Christian epoch.

Until in the 18th century, melted glass was produced from sand, soda, potassium and chalk with, sometimes, additions of metal oxides. Nowadays, 60 of the 90 substances found on earth are oxygen compounds used to make a vitrified mixture with a decolourising material and coloured pigments or colouring elements like iron oxide, cobalt oxide, copper oxide and gold; flux material like soda; stabilisers like chalk and purifying medias to homogenize the glass melt and intermediates like lead.

Glass is one of the first man-made materials to have been created. It is multi-functional and multi-interpretable, in a manner unmatched by any other material, and it has numerous characteristic properties. In the realm of the visual arts, glass is frequently interpreted as a primary matter, quasi-protoplasm or proto-material, and is thus deployed for the purposes of dematerialising art. Materialisation is the process whereby energy is converted into matter; dematerialisation –the converse process –repudiates the intrinsic value of the material, as in the case of a statue made of glass instead of bronze.
Glass is an ingredient, a working material, an industrial material, and an imitative material; it's a base material, an insulating material, a packaging material and a recycling material. Also, glass can be categorised by composition, for its special qualities, function and appearance, or its original processing, working and later processing techniques, brands and trade marks. From the abrasive CIF to the glass ships painted on our flood barriers and the hand polished Hubble telescope lens of eight meters ø: glass is everywhere.

Where did the glassiness of the Netherlands actually start to take shape with its rich tradition of utilitarian glass, decorative glass, art glass and stained glass windows?

The word glass arrived etymologically from “glaren” (glare) meaning to glow and shine: nouns for the qualities of light and the most obvious, qualities of glass as reflection and transparency. The Old Germans said ‘glaes’ to suggest amber and the Romans called it ‘glacis’ like ice. Just then, and there, is the pact between glass and light. In antiquity, glass was used for dice, hucklebones and medical instruments made by sintering Batavian beads and, in the glass huts next to the great rivers used for making household utilitarian goods and cast window panes. The Romans brought all their glass techniques with them: flash and overlaid glass; free blown glass and mould made glass; reversed glass painting**;** painting layered between glass; enamel painting on glass, and glass mosaics, in addition to slumping, glass cutting and polishing. The Romans introduced much of the utilitarian glass to the Netherlands from Germany.

The Roman Empire marks a distinct change in the way glass was used. The incredibly important discovery of glassblowing was made somewhere around the year 50 B.C.E. Once vessels could be made by blowing glass instead of forming it around a core, the possible shapes of vessels seemed infinite**.** The Roman Empire was made up of France, Spain, Portugal, England, Belgium, Switzerland, North Africa and parts of the Netherlands, Germany and Austria. During the reign of the Roman Empire, glass became much more of a household object. Blowing a vessel was more efficient than core-forming, and so glass became available to more people. Molds were used to help shape the glass, and for leaving imprints on the walls of a vessel. After the glass was removed from the mold, the glassblower could continue to work with it. Despite glass production of commonly used objects, glassblowers were also making some of the most lavish glass objects ever made.

Next to the big rivers, new glass factories sprang up, first in Antwerp and Liege, then in Maastricht, along the four Schies (rivers) near Rotterdam, Schiedam, Delt, the Linge in Leerdam and later on the peat bogs of Groningen and Drenthe. The techniques of stained and leaded glass became well known as techniques typical of the Occident, for the production of church windows. In 1258, the word ‘glass’ became popular in English literature. In 1500, the diamond cutter replaced the iron cutter and, the polishing of glass lenses was developed. A golden era resulted: The Golden Age represents the time when our small country became known. When, after the pronouncement of the 80 Years’ War of the Republic in 1587 and, when this fact was recognised internationally along with theVrede van Munster, in 1648, the Republiek der Zeven Verenigde Nederlanden (Dutch Republic of the Seven Provinces of the Netherlands) in the 17th century) no longer belonged to the German Reich or Empire. The VOC (East India Company) founded in 1602 brought wealth, more territorial expansion and power. The first roads were paved; polders and dikes were already built and enlarged. The wealth’s unrestrained activities in the field of the visual arts, architecture, literature and science provided recognition far beyond our borders.

What gold meant to the alchemists, glass was after the Industrial Revolution. Everywhere there was activity towards making glass suitable for mechanical production and for building to let light flow in. Only now, there are far better formulas than those for turning lead into gold: sand, soap and soda were simple enough to make glass.

During the Age of Enlightenment from 1650 until the French Revolution (1787-1799), the great inventors/philosophers, and scientists like Galileo, Kepler, Newton, Spinoza, Descartes, Hooke, Huygens and Van Leeuwenhoek sowed much of the interest in light. It is no small incident that they also were glass grinders and polishers whose investigations of glass lenses were developed from the first reading glass or reading stone (a half globe used as a magnifying glass), a pair of eyeglasses, a telescope, spy glasses, binoculars and microscopes that magnified and reduced and focussed and, this made zooming in and out of visible reality possible. Mirrors reflected reality as writer Joost van den Vondel versified: "Oh mirrors child! While your fairness shines, lives straight before you in pure crystalline...." Crystalline and diaphanous were nouns used at that time for materials so thin that light and sight could shine through it. Cylinders were blown for glass then stretched flat and, for the small panes of glass panes in houses. Cast and polished glass plates took care of the larger windows. With a thermometer, a barometer, glass disks for electrical apparatus, the glass dielectric and the Leiden Jars or the electrical capacitor these laws of nature were investigated, as ever, by alchemists like Isaac Newton, who proved in 1666, that natural white light comes from a rainbow of colours.

The Hague was the centre of the Republic. Here, one ruled the world leaders who travelled faraway, to and from and, where the painters and writers lived. The university of Leiden produced many mathematicians, physicists, philosophers and thinkers. Who doesn't know Rembrandt, the Goude Glazen (the famous stained glass windows in Gouda), the Haagse School, the Symbolists, or those painters of light? Where the French used the glass as a canvas and Germans as graph paper, there the Dutch used glass to paint with light.

On his website, Erno Eskens describes the History of the Philosophy of the Low Lands – the early Enlightenment (1637-1720 –about this combination of inventors, scientists and philosophers: "Vice makes the Netherlands big" Rotterdam philosopher Bernard Mandeville (1670-1733) concluded "The Dutch, can ascribe their contemporary grandeur, as they like to do, to virtuousness and austerity from their ancestors; but what actually made that contemptuously small piece of land so distinguished under the most important Great Powers of Europe, was their political wisdom with which they put behind everything from the trade and shipping, the infinite freedom of conscience that rules under them and the indefatigable diligence with which they make use of the best means to encourage and extend the trade in general."

Paul van Aken wrote: "Several light beams derive from the body of the sun –Notes about light and the Enlightenment, where in the changes of the Golden Age are described by Anthony Ashley Cooper, 3rd Count of Shaftesbury, under the title *Characteristicks of Men, Manners, Opinions, Times*. More than a half century before Kant, he wrote: "*There is a mighty Light which spreads itself over the world especially in those two free Nations of England and Holland; on whom the Affairs of Europe now turn; and if Heaven sends us soon a peace suitable to the great successes we have had, it is impossible but Letters and Knowledge must advance in greater Proportion than ever...*"

So light is more than a symbol in the passage from the 17th into the 18th century. And it is no coincidence that the quest for explanations of a natural phenomena are how the refraction, reflection and compilation of light takes such an important place." Enlightenment: to explain, to make clear, to bring to clarity…
Also, the relation between light, air, sea and the landscape, is the natural habitat for all this investigation. The website on the movie Dutch Light/Holland's Light describes the rôle of Dutch light in painting: "Light and air, these are the big wizards" Jan Hendrik Weissenbruch said. "We have to have it from above". And, Gabriël said: " I don't paint cows, I paint light." Herman Gorter wrote in his poem May: "one more time yet, as under the brushes from The Hague's' masters, the Netherlands tingled with dew and morning sunlight and sang an uninhibited song…."

As a daughter of a glass painter, I saw that 'being different' about the light, somewhere between Utrecht and Gouda on our way to my grandparents, when we finally made our approach, after 3 hours of bumping in the Volkswagen's luggage bay: The Hague, the light had changed… Via the Benoorden Hout and the Prinsessengracht that atmosphere became more intense, about to explode from the sun and sea and sand reflecting the white-diaphanous light and, when fog was hanging over the dunes, then, on that very moment, the light's enchanting! Jan Wolkens once told me during our interview, strikingly, that each morning he takes a walk to the sea: that it is really a pool of glass!"

On the website www.dekunsten.nl Ingrid van der Bergh describes in an article on the Symbolists: "The concept of Dutch Light goes back to the Golden Age. The time of the big discoveries in the field of light and perception and from the painters who began working with it." Factors influencing the working of light are, among others, the height of the dunes, the movement and temperature of the seawater, the vastness of the land lying behind the dunes, the buildings, the position of sun and moon, and, in our times – the pollution. All these factors mix and influence the artist, who sets free his own reflection on the perception of reflection."

The book *Die gemeinsame Geschiechte von Licht und Bewustsein* by Arthur Zajonc pays attention to the connection between physics, psychology, mathematics and intuition within science and art. Elsa-Brita Titchenell wrote in 1996 in the magazine Sunrise: "Professor Zajonc not only refers to the latest science. He also sees within its boundaries the mysterious working between the mind and the world of phenomena and turns to the discoveries of the big thinkers in several fields –poets, philosophers, scientists, mystics– who cast with their insights on light onto the all penetrating mystery we call light."
Until the Golden Age, the painters of light were called illuminists with Rembrandt as one of the most famous. "The Masters of the Light", a beautiful exposition in de Kunsthal, Rotterdam, showed paintings by Vincent van Gogh, Heinrich Campendonck, Kees van Dongen, Piet Mondrian, Jan Sluiters, Henry van de Velde, Wilhelm Wieger, Johan Thorn Prikker and many other symbolists. The Dutch stained glass artists are well known, far beyond our borders: Willem Bogtman, Joep Nicolas, Charles van Eyck, Jan Toorop, Theo van Doesburg, Johan Thorn Prikker, Willem van Konijnenburg, Richard Roland Holst, Max Nauta, Bart van der Leck, Albert Troost, Chris Lebeau, Henri Jonas, Heinrich Campendonck, Andries Copier, Antoon Derkinderen, Daan Wildschut, Jan van den

Broek, Karel Appel, Sylvia Nicolas and many, many others shaped the light. Glass and light, the everlasting fascination.

Due to the work in the book The Glass Age, about glass in Dutch architecture and, this bundle of essays in the series of catalogues under the same title, several people from the trade have described more than 100 years development in glass art, art of glass and glass architecture, with a dash, right up to 1900 until now. And, who knows, when we are no longer here, archaeologists will find shards of a bowl of Copier, a Coca-Cola bottle, and a broken TV-tube and, will they be amazed, why they can read so much about glass but hardly can find any of it. As strange as metal containers with round openings filled with glass gullets, sorted by colour.

Maybe they get the idea to call this time The Glass Age with the Homo Vitreous who, with his glass lenses to repair eyesight; glass enamel teeth; glass fibres to repair nerves in his spine and bio-glass: spin rag-gen combined with a glass gen from one cell alga to repair bones or bioactive glass facial implants for a new nose or eye socket, grown in a petri dish a bladder and the latest Dutch Invention: Varibel, The Glasses That Hear, **or** glass fibre legs and a nano- muscle structure seems to have extended his life.

The essays in this bundle clarify what the meaning of the Dutch glass is, in the surrounding countries, and in reverse, what their influence was on us.

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