

TimePeace

2010 Bamboo and Rattan Product Ideas Competition Essay

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INTRODUCTION

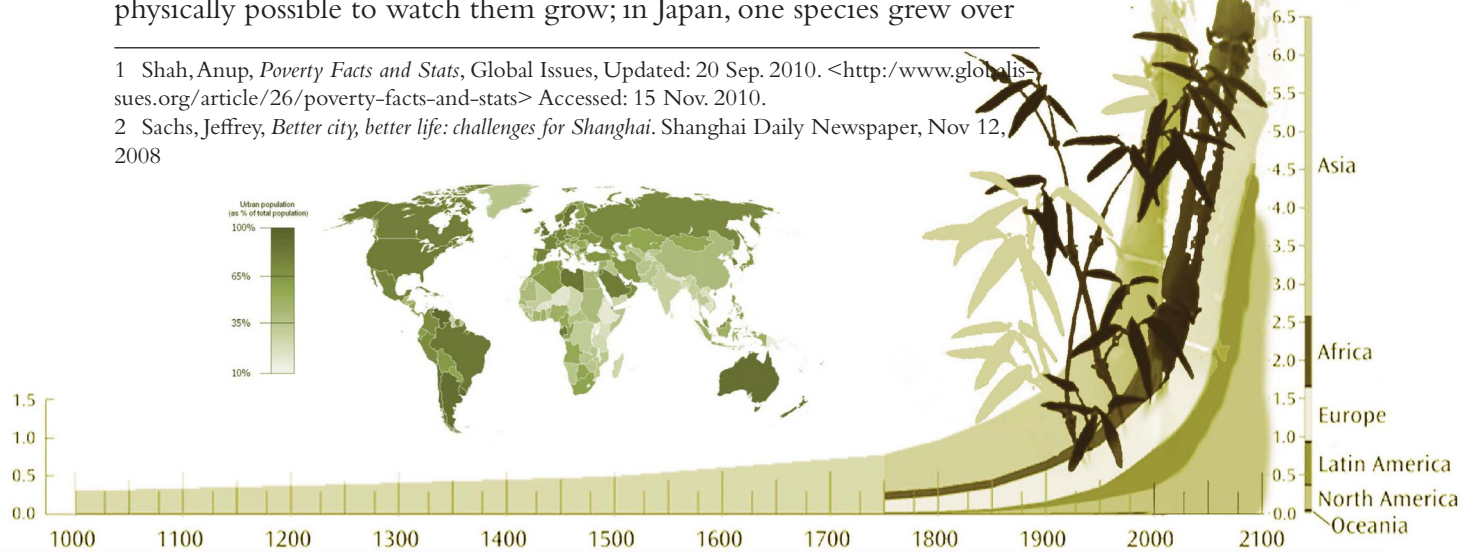
To coincide with the 2010 World Expo in Shanghai, the International Network for Bamboo and Rattan and the Federation of Hong Kong Industries organized a product ideas competition to respond to the Expo's theme: 'Better City, Better Life.' Like the bamboo plant, our societies today can also be characterized by their rapid growth. In 1800, 2% of the global population lived in cities; by 1950, it had raised to 29%; in 2000, almost 50% of the world's population have moved into cities,¹ some of which have practically grown around them overnight. According to an estimate by the United Nations, by 2010, the urban population will account for 55% of the total human population.

As modernization and globalization increases, all urban environments must address new ways to achieve sustainable development and design. The twenty-first century will be known as the century of the city. At present, there are no cities that have met all of the challenges of twenty-first century living: low-carbon energy, public health for an aging population, obesity epidemics, sustainable clean water, reduced water and air pollution, efficient waste management and resilience to global climate change.² During this century, the urban geography of the world will drastically change; hence, this ideas competition was aimed around sustainable design solutions that demonstrate and reflect this rapid transformation of the globe and remind us of the environmental responsibility we have in order to maintain its stability.

As the fastest growing woody plant in the world, bamboo is naturally associated with the passage of time. With approximately one thousand different species, bamboo grows in both temperate and tropical climates all over the world. In fact, some species grow so quickly it is actually physically possible to watch them grow; in Japan, one species grew over

1 Shah, Anup, *Poverty Facts and Stats*, Global Issues, Updated: 20 Sep. 2010. <<http://www.globalissues.org/article/26/poverty-facts-and-stats>> Accessed: 15 Nov. 2010.

2 Sachs, Jeffrey, *Better city, better life: challenges for Shanghai*. Shanghai Daily Newspaper, Nov 12, 2008



World population growth chart; based on 'World Population Prospect' and 'The World at Six Billion' United Nations Population Division of the Department of Economic and Social Affairs

a metre in height over the span of twenty four hours. Bamboo is also characterized by its seemingly contradictory properties, ranging from forms soft to hard, lightweight while sturdy. In the Chinese folktale of the Four Gentlemen, representing the four seasons of the year, bamboo signifies summer and represents Yin and Yang, upright growth and the flexibility to bend in the wind; hence, bamboo symbolizes balance and stability.



bamboo forest
life

As society changes so quickly, one of the only things that remains constant is a common conception of time. With the current economic situation, more demands are being placed on our daily working and personal lives as we strive to keep on top of communication challenges as we work globally across different time zones and cultures, keeping up to date with the latest developments, and balancing our personal commitments to ourselves, our families and friends. Today, keeping time is more than a crucial part of our everyday lives – we must always ‘make’ time, ‘keep’ time, ‘find’ time, ‘get’ time. In essence, our timekeepers have become extensions of ourselves. Time controls us. But we are at a point where we need to let go of this control in order to remain balanced. Taking cues from the physical and mythological spirit of bamboo, TimePeace attempts to embody this desire for balance within its design.

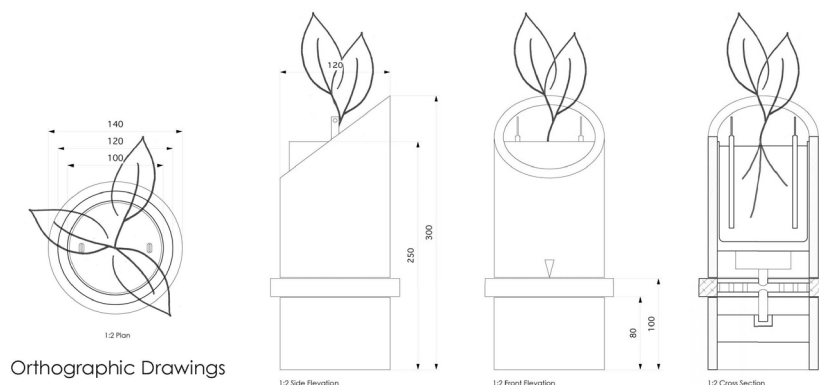


city
growth

TimePeace is a timekeeper for today that does not require commercial sources of energy. Utilizing an ‘earth battery,’ it relies solely on the life of the plant it contains to power itself and to quantify time. The bamboo used does not call for refining nor treatment, ensuring a more efficient and environmentally conscious manufacturing process while celebrating the bamboo’s natural beauty.



human
passage of time



Orthographic Drawings



TimePeace drawings & render

MYTHOLOGY AND BAMBOO

While human life ends with death and a return to the ground by way of burial or cremation, plants are the opposite. They draw nourishment from the ground and emerge from it. Hence, plants have been associated throughout mythology with conceptions of birth and life. For example, in the Epic of Gilgamesh, plants play an important role in symbolizing eternity and immortality. As Siduri, the immortal barmaid tells the hero Gilgamesh, when the gods created man, they consigned him to die; immortality was kept only for the deities themselves. When his friend, Enkidu, is sacrificed by the gods for having wrestled and slaughtered the Bull of Heaven, Gilgamesh becomes distraught with grief, keeping the body of Enkidu until it becomes fed on by worms. After burying him in the ground, he becomes to consider the predicament of his own mortality. Deciding that he doesn't want to die, he seeks out Utnapishtim, who is the only human being who is not part deity that has ever been granted eternal life by the gods. Hence, Utnapishtim points Gilgamesh to the sacred boxthorn plant at the bottom of the ocean which is the secret to eternal life. Unfortunately, the plant was stolen by a snake while Gilgamesh was later bathing, resigning him to his own mortality after all. Beyond Mesopotamian mythology, plants in general have long been used as symbols of life, and because they have their own growing cycles that cannot respond to human mortality, they are potent reminders of the passage of time.

Bamboo's physical and symbolic connections to time are deeply rooted. In several Asian creation myths, it is thought that humanity emerged from the bamboo stalk. According to a Philippine creation myth, the first man and woman each emerged from a split bamboo stalk following a battle between the Sky and the Ocean.³ Similarly, a Malaysian creation myth describes a man who dreamt of a beautiful woman while sleeping under a bamboo plant and upon awakening, he breaks the bamboo stem and finds the woman inside of it.⁴ According a Japanese legend, a princess from the moon is born from the section of the bamboo stem.⁵ In all of these stories, bamboo has been both a character in the myth as well as the container from which human life sprang forth, playing a central role

3 *Philippine Folk Tales* < <http://asiarecipe.com/phitales.html> > Accessed: 15 Nov. 2010.

4 Asian Form, *Bamboo Myths and Legends*, <<http://asianform.com/page.php?pid=41>> Accessed: 15 Nov. 2010.

5 Asian Form, *Bamboo Myths and Legends*, <<http://asianform.com/page.php?pid=41>> Accessed: 15 Nov. 2010.



Epic of Gilgamesh



creation myth
life and time begin

in the legends of Asian culture. Time as we know it begins with bamboo. Hence, with TimePeace the bamboo stalk becomes the keeper of time and once again, a container of life.

One of the most unique properties of bamboo is its unique physical shape: in plan, it is a circle. While eastern civilizations such as China have adopted the Gregorian calendar since the early twentieth century, their view of time has been markedly different than that of those in the western world. While the West is known for marking time in a directional and linear manner, starting from the birth of Jesus Christ, in China, time is a cyclical concept. Unlike linear time where a year occurs only once, the concept of cyclical time attests that years repeat themselves over a particular cycle. As Mexican poet Octavio Paz describes, 'for Plato and Aristotle, the perfect movement is circular: the image of the heavenly bodies. Linear time is accidental and finite; it is contingent; it moves not by itself, but due to the impulse of an outside agent.'⁶ TimePeace acknowledges this historical conception of time, nodding towards the circle as a symbol of the cycles, both of time and of natural growth patterns.



bamboo stalk
container



Chinese calendar
cyclical time



bamboo section
circular

6 Paz, Octavio. *In Light of India*, (New York: Harbourn Brace & Company, 1995) 192.

TIMEKEEPERS PRECEDENTS

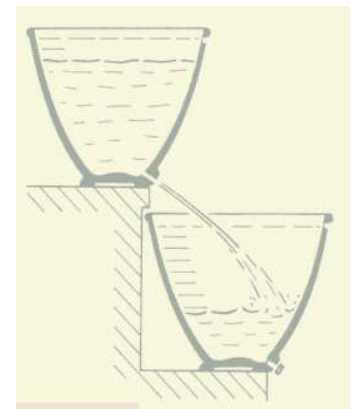
For thousands of years, devices have been used to measure and keep track of time. Particularly in Eastern cultures, time and sovereignty were inextricably linked – those who could master the art of reading time would inevitably have control over their rule of the region.⁷ Time is a quantity that can be measured by mechanical, electrical or natural means.

Timekeeping is a matter of counting cycles or units of time; timekeepers are what do the counting, and in modern times, display what has been counted. In the largest sense, the earth and the sun are both clocks and have been the inspiration for the earliest timepieces. Many ancient civilizations observed astronomical bodies to determine the time, date and seasons. For example, simply standing a stick in the ground allowed for people to measure the movement of the sun's shadow from sunrise to sunset. There are three main benefits of sun timekeepers: first of all, they are universally available – anyone on earth could easily read and use them; secondly, they are reliable – there is no foreseeable reason that the timekeeper may stop or mistake the time (as is possible with mechanical clocks); finally, they have great stability – of the basis of its time scale, people can predict such things beyond the hour and minute of the day, but also eclipses of the sun and moon and other time-oriented events.⁸ Of course, these were only useful if the sun was shining. Other early clocks included using water flow or sand to measure the passage of time. In China especially, clepsydra water clocks advanced timekeeping technology, including the development of striking mechanisms that allowed for time to become audible.⁹

While these early clocks are well known, what we particularly drew from the history of these timekeepers is that they had a natural and organic element involved to make them function. The movement of the sun, moon and stars are easy to observe and people are very conscious of them. Similarly, in nature, there are countless other cycles and rhythms that are going on all of the time. Timekeepers have the ability to regulate these cycles and present them to us in an understandable way. Hence, we were very inspired by organic and surprising timekeeping technology.



Perranzabuloe sundial



clepsydra

⁷ McDougall, Bonnie. *Jantar Mantar: Architecture, Astronomy and Solar Kingship in Princely India* in *Cornell Journal of Architecture* (Ithaca, NY: Cornell Journal of Architecture, 1996) 24.

⁸ Jespersen, James, et al. *From Sundials to Atomic Clocks: Understanding time and frequency*. (Toronto: General Publishing Company, 1982). 15.

⁹ *Ibid*, 12.

When looking at natural timekeeping devices, Carolus Linnaeus's flower clock, *Horologium Florae*, is definitely one of the most inspiring organic timekeepers ever hypothesized. He recognized that many plants have their own biological clock, which regulates the time of day that their flowers open and close. He described three different groups of flowers: *meteorici* – flowers which change their opening and closing times according to weather conditions; *tropici* – flowers which change their times for opening and closing with the length of the day; *aequinoctales* – flowers which have fixed times for opening and closing. Linnaeus carefully recorded and documented his observations of when these plants would open and close and conceived of making particular arrangements of these plants to tell the time. Only the *aequinoctales* are acceptable for use in a proper clock – for example, the flowers of catnip plants open between 6 and 7 am; orange hawkweed opens between 7 and 8 am; marigolds open at 9 am, and so on.¹⁰ While it is thought that Linnaeus never physically realized this clock, many botanical gardens and universities have actually planted their own flower clocks, with some being able to tell the time correctly within a half hour.



Linnaeus flower clock

When beginning to design this project, we originally wanted to use the growth of the bamboo plant to be the timekeeper itself. However, we found that we were unable to accurately measure the rate of growth of the plant itself without resorting to using 'lucky bamboo' – a species that is not actually of bamboo origins, but has mistakenly come to represent it in most interior homes. We also entertained the idea of making an outdoor clock that could measure how quickly the bamboo reproduced within a garden; however, the kinds of bamboo species that would be suitable for a design such as this would be so invasive that they might completely take over an individual's yard, as well as his neighbours. Hence, we decided to use the bamboo stalk as the container of the plant, knowing that perhaps a particular species of flower, as one in Linnaeus' chart, could be grown within them to add one more layer to the timekeeping technology we were trying to develop.

Spanish designer Oscar Diaz's ink calendar was a wonderfully inspiring precedent that we looked at to formulate our own design of TimePeace. Diaz's calendar uses the capillary action of ink seeping across and being absorbed by heavyweight paper to display the month and date of the

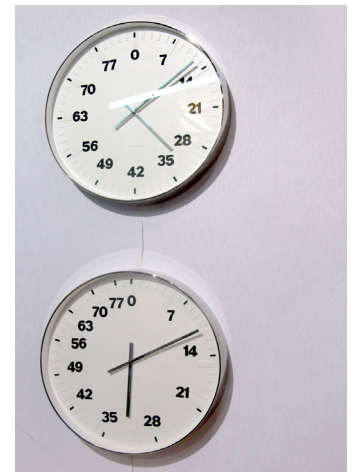
¹⁰ BBC H2G2. *A Flower Clock Garden*. <<http://www.bbc.co.uk/dna/h2g2/A5170024>> Accessed: 16 Nov. 2010.

year. Each month, a new piece of paper embossed with the days of the month and a new bottle of ink must be mounted on the wall together; the rate of the spread of the ink has been calibrated so that each day, the embossed number on the paper becomes coloured with the ink. Hence, the numbers are literally printed daily. The ink colours were chosen according to a colour temperature scale, with each month having a colour spectrum that related to the perception of the corresponding weather – for example, winter months utilize a range of blues, spring uses greens, summer and fall span from orange to red. From this project, we knew that we also wanted to mark the passage of time in both a visual and symbolic way. Inspired by Diaz’s description, we too wanted the project to ‘address our senses, rather than the logical and conscious brain.’¹¹ With TimePeace, the battery that operates the clock appeals is the element that appeals most to the senses; using a plant itself as power provides both visual and fragrant representations of time itself.



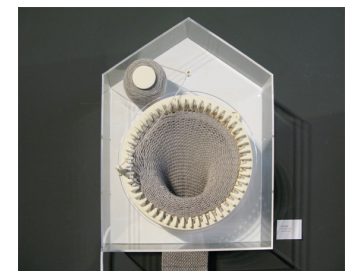
Ink Calendar
Oscar Diaz

Artist Bertrand Planes ‘Life Clock’ is also an extremely interesting timekeeper; by slowing down the typical time keeping mechanisms, a minute on this clock actually represents the passage of a year. Instead of numbers one to twelve, the clock is divided into multiples of seven, which also corresponds to the number of years it takes for the cells in our bodies to completely regenerate. By taking a standard clock mechanism, Planes has slowed it down to 1/61320th of the speed; it takes a period of eighty four years in order for the hand to make one entire 260 degree revolution around the clock. Pieces like this were incredibly interesting because they began to measure something different than normal conceptions of time. As mentioned, one of our main positions is that today, our common conceptions of time controls us; by measuring time in alternative ways, we begin to take back this control, realizing that there are other important things to measure besides the twenty four hour period of the day.



Life Clock
Bertrand Planes

Another inspiring example was ‘365,’ a knitting clock designed by Siren Elise Wilhelmsen. According to her, ‘time is a concept which unites us all, making it the lowest common denominator.’¹² Her clock design attempts to address the passing of time through a physical manifestation. Like the human body grows and develops hair, the same concept is translated through her knitting clock, which houses a circular knitting machine

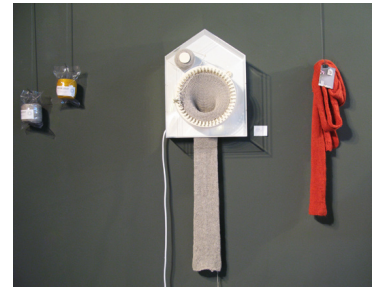


365, knitting clock
Siren Elise Wilhelmsen

11 Diaz, Oscar. *Oscar Diaz Studio – Ink Calendar* <<http://www.oscar-diaz.net/?p=1>> Accessed: 15 Nov. 2010.

12 *Siren Elise Wilhelmsen*, <<http://www.designboom.com/weblog/cat/8/view/10606/siren-elise-wilhelmsen-365.html>> Accessed: Nov 16. 2010.

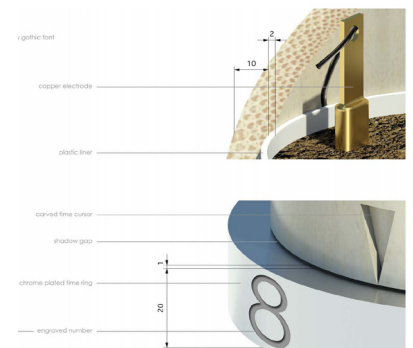
with 48 needles, a thread spool, thread holder and a roll of yarn. The machine produces a circular tube of knitted material; one day allows for one round to be completed, one year produces a tube that is two metres long and then can be used as a scarf. Drawing from this investigation, we knew that we wanted to also try and make the passage of time become visible. In Wilhelmsen's design, this is addressed through a manufactured scarf; with ours, time is physically represented in several ways: by the growth of a plant, which thus provides energy to physically rotate the time wheel and display the time.



365, knitting clock
Siren Elise Wilhelmsen



TimePeace elements



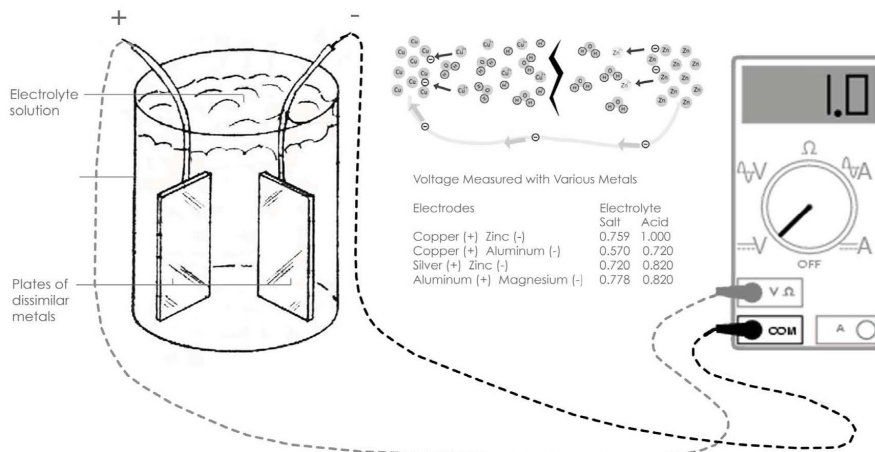
TimePeace details

TECHNOLOGY AND TIME

TimePeace is dependent upon an earth battery in order for it to function. In 1841, inventor Alexander Bain demonstrated the ability of the earth to generate alternative types of energy. By placing two pieces of metal in the ground, one copper and one zinc, about one metre apart with a wire circuit connecting them, an electric charge was produced and transmitted through the wire.

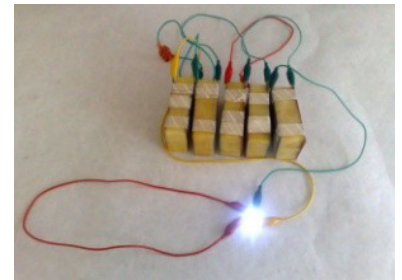
Electrolytes facilitate the exchange of electrons between the zinc and the copper, first generating and then channeling an electrical current. When a copper electrode and a zinc electrode is placed in an electrolyte solution, like moist dirt, the two metals start reacting. If the electrodes were touching, they would create a lot of heat while they react. However because they are separated by soil, electrons are exchanged between the unequally charged metals travel across the wire that connect the two metals. The current charge that the wire holds can thus be channeled into low voltage electrical power.

In order for the charge to be generated, the copper plate releases one positively charged ion and the zinc loses two negatively charged electrons. If these negative electrons cannot escape, the zinc plate will become so negatively charged, it will attract as many positively charged ions back so that the reaction will cease. The copper plate releases positively charged electrons and are attached to the negative zinc electrons. When they meet, they neutralize each other. Because zinc is more reactive than copper, the whole process releases energy – about one joule of energy for every coulomb of charged that is moved; this is equivalent to about 1 volt. This voltage is related to the difference in reactivity between the two metals, so changing the metals and the electrolyte solution impacts the voltage produced.



earth battery diagram

For example, the Yissum Research Development Company, part of the Hebrew University of Jerusalem, developed a 'solid organic electric battery based upon treated potatoes that is five to fifty times cheaper than commercial 1.5 volt D cells and Energizer e91 cell batteries.'¹³ According to researchers using the same technology as described above – zinc and copper electrodes with potatoes acting as the electrolyte solution – to create a working battery. They also found that boiling the potato prior to using it enabled it to generate ten times the power of an untreated potato. In their particular project, they connected the potatoes to a simple LED light, which is said to be six times more economical than kerosene lamps. One of their missions was to construct efficient vegetative batteries to exploit bio-energy sources which are primarily used as fuel: 'the ability to provide electrical power with such simple and natural means could benefit millions of people in the developing world, literally bringing light and telecommunication to their life in areas currently lacking electrical infrastructure.'¹⁴



potato battery
Yissum Research Development

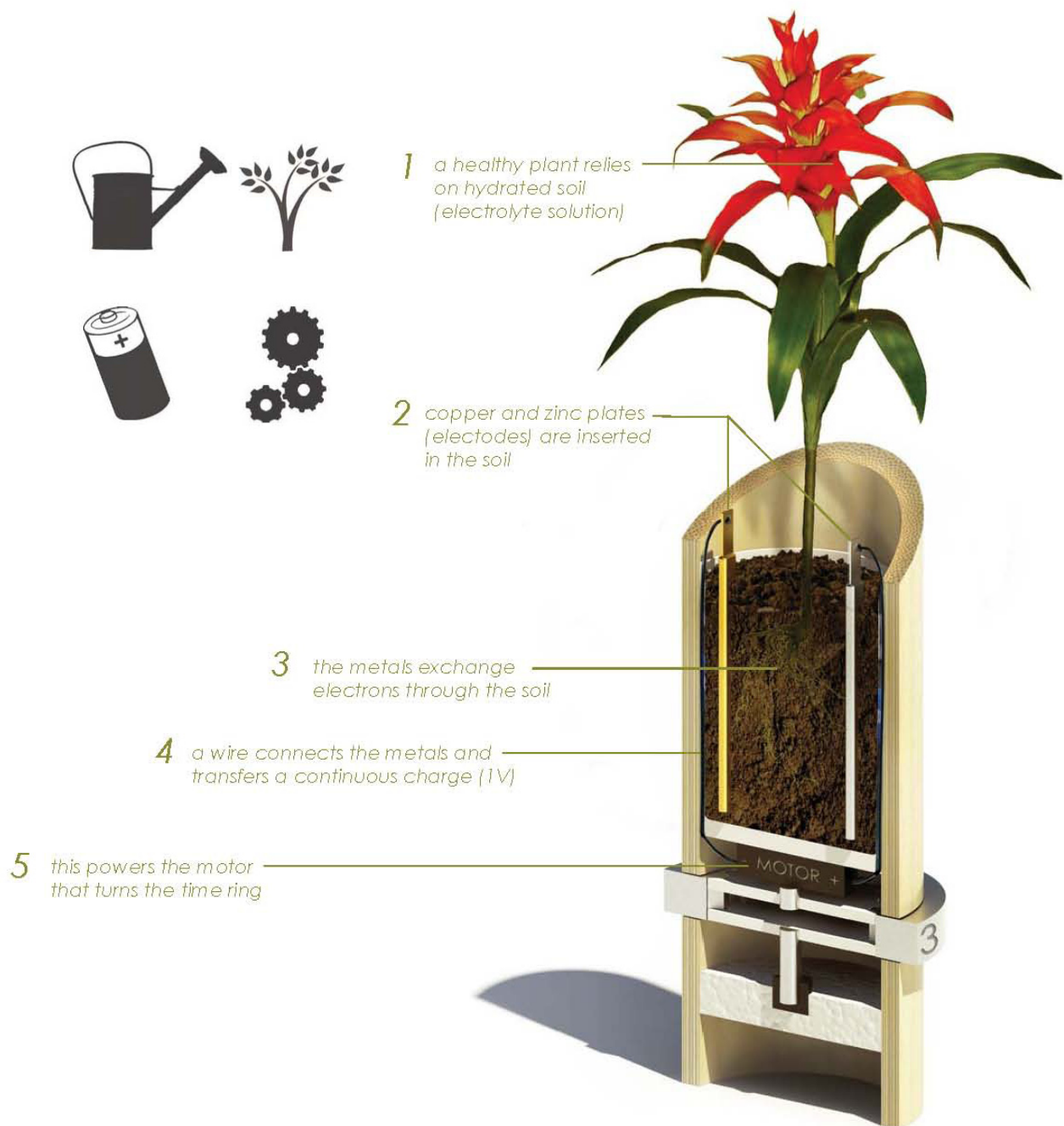
Designers such as Marieka Staps have utilized the earth battery technology successfully in products such as the Soil Lamp.¹⁵ Microbial fuel cells and conducive metals are able to convert the electrolytes in the soil into usable energy. Staps's lamp uses a series of thin conductive copper and zinc plates that are submerged within a small container of soil. The wire that links the plates is connected to an LED bulb and provides a nearly constant light. As the power is obtained by naturally occurring conductivity, the energy produced will allow the bulb to glow far beyond the lifetime of an incandescent bulb. Maintaining the light requires keeping the soil moist to maintain the ability of the electron exchange.



Soil Lamp
Marieka Staps

13 Schwartz, Ariel. *Researchers Develop Potato Powered Batteries* <<http://inhabitat.com/2010/06/23/researchers-develop-potato-powered-batteries/>> Accessed: 16 Nov. 2010.
14 June, Laura. *Yissum develops potato-powered batteries for the developing world.* <<http://www.engadget.com/2010/06/20/yissum-develops-potato-powered-batteries-for-the-developing-worl/>> Accessed: 16 Nov. 2010.
15 Cooper Hewitt, *Soil Lamp* < <http://exhibitions.cooperhewitt.org/Why-Design-Now/project/soil-lamp>> Accessed: 16 Nov. 2010.

TimePeace utilizes the same green technology in order to for it to function correctly. The growing plant supplies green energy to the mechanical clock, established harmony between the natural cycles of growth and the artificial measures of time.



TimePeace earth battery diagram

Similarly, the electrolyte solution in TimePeace also requires maintenance of the plant it contains in order to keep the timekeeper functional. As there is a mild current that passes through the soil, research suggests that many hardy tropical indoor plant species would be unaffected by the presence of the zinc and copper plates.¹⁶



suggested plant species

While the flowering of planted bamboo is typically a signifier of the end of its life, the blooming flower within TimePeace renders the bamboo stalk as eternal as time itself. By supplying green energy to a mechanical clock, harmony is established between the natural cycles of growth and the synthetic measures of time.

¹⁶ *Philodendron*, <<http://wn.com/Philodendron>> Accessed 16 Nov. 2010.

SUSTAINABLE CONSTRUCTION

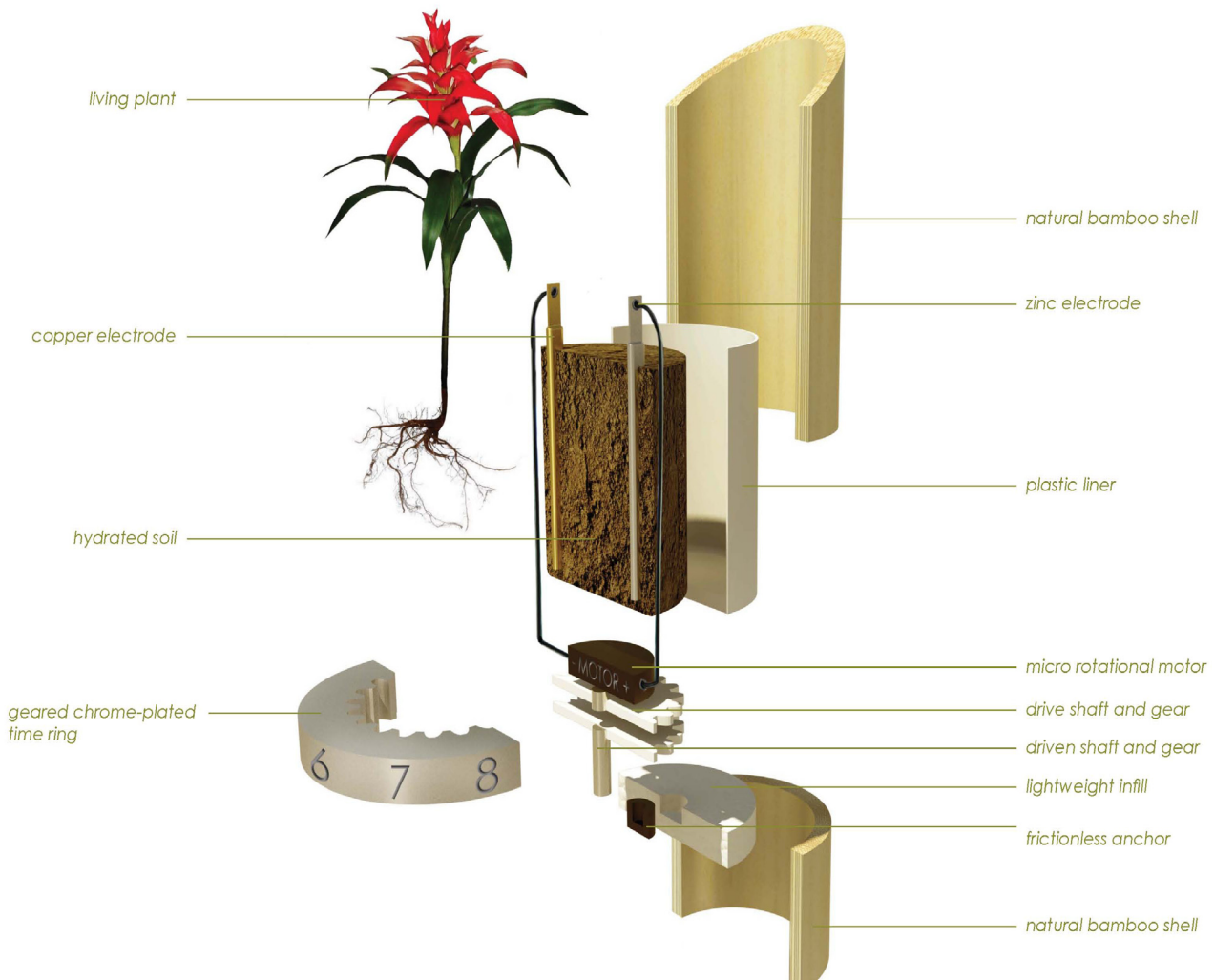
Besides being a factor within the competition brief, integrating sustainable design measures was an important feature within the design intentions. In recent years, bamboo has gained considerable attention and praise as a sustainable design product because it is hardy, durable and renewable, helping to deter the harvesting of old-growth forests for wood products.¹⁷ Bamboo is said to regenerate at least eight times faster than hardwood.¹⁸ Besides renewing so rapidly, harvesting the bamboo grasses does not actually kill the plant. Additionally, bamboo grows in various climates all over the world, so transport of material products can be lessened if particular species are specified appropriately.

The bamboo used in TimePeace does not call for refining nor treatment, ensuring a more efficient and environmentally conscious manufacturing process while celebrating the bamboo's natural beauty. As bamboo stalks



17 MacKenna, Elle. *Is Bamboo a Sustainable Building Material?* <http://hubpages.com/hub/Is_Bamboo_a_Sustainable_Building_Material> Accessed: 17 Nov. 2010

Inside of the natural bamboo shell lies a plastic container that actually holds the living plant within the stalk. The energy harvested from the earth battery is processed by a micro rotational motor which move a pair of drive shafts and gears to turn the chrome plated time ring with the inscribed hours of the day. The motor is a simple plastic rotating torsional clock movement and is a model of low speed, only requiring approximately one volt of energy to operate it.



TimePeace diagram of parts

CONCEPTIONS OF TIME

The well known riddle of time is that it is present everywhere but occupies no space; we can measure it, but we can't see it, touch it, get rid of it, or put it in a container; everyone knows what it is and uses it every day, but no one has been able to define it; we can spend it, save it, waste it, or kill it, but we can't destroy it or even change it, and there is never any more or less of it.

In our world, we imagine time as an order that governs all things, beings and action.¹⁹ A year is measured by the earth's revolution around the sun, a month according to the lunar cycle, a week according to the number of celestial bodies visible to the naked eye, and a day by the rotation of the earth on its axis. Time has been used to orient, navigate, and predict one's place in the world, physically and spiritually. Today, we take our sense of time for granted, not always recognizing that it flows at different rates, according to different factors, and is interpreted at different speeds. Time is not absolute – it is a relative, elastic, arbitrary construct that is always in a state of transition.

The appearance of modern time resulted in an inversion of traditional values. As Paz describes, in the modern era, progress ceases to be an idea and rather, becomes a faith: 'It did not redeem us from our contingency; it exalted as an adventure that was always beginning anew. Man was no longer a creature of time but its creator.'²⁰ Modern time is a permanent 'beyond,' a future that is forever unreachable and unrealizable, and as the future drifts farther away, so does the past. As the future drifts farther away, so does the past.²¹ Paz describes the following:

Science and technology, our power over the material world and the freedom that power gives us: this is the secret of the fascination the West held for the elites of the ancient East. It was a true vertigo: time mattered less, men were not the slaves of either the revolutions of the stars or of karmic law. The moment could take the form that our knowledge and will imposed upon it. The world had become malleable.²²

19 S. Hatano, *Time and Eternity* (Tokyo: Greenwood Press, 1963) 7.

20 Paz, Octavio. *In Light of India*, (New York: Harbourn Brace & Company, 1995) 193.

21 *Ibid*, 194.

22 *Ibid*, 193.

While designing TimePeace, we wanted to emphasize that it is important that we control our time, rather than letting it control us, celebrating a return to these lost traditional values. The time ring moves slowly and silently – the individual must trust in their care of the plant to make sure that it is functioning correctly. Furthermore, TimePeace is deliberately ambiguous about its reading, lacking intermediary markings on the time ring and only suggesting an approximation of the actual time of day. This timekeeper is designed not only to suggest the time of the day, but also to remind us to slow down. As things around us move so quickly, perhaps our timekeepers can subtly remind us to reprioritize and reorganize our control of our time.

TimePeace celebrates the symbolic story of bamboo, its potential use in sustainable design and its representation of strength, flexibility and integrity through transformation. Just as bamboo inherently represents balance, the simple and thoughtful construction of TimePeace symbolizes the balance needed for a better life in a better city.



TimePeace at night



TimePeace at day

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