

‘Smart Paper’ in Neal Stephenson’s ‘*The Diamond Age: Or, A Young Lady's Illustrated Primer*’

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Abstract: Literature facilitates man to break out of the existence of everyday life and to overlook for a while the grim realities of life. It prepares man to face the odds of life cheerfully and with courage. With the rapid development of science and technology, science fiction has become popular in the modern era. It deals with the conflicts that arise out of the impact of scientific discoveries on the future life of humankind. It is an inoculation against ignorance; a new beginning in the creation of research, and the depersonalizing threat of technological change.

Neal Town Stephenson is an American writer known for his works of spectacular scientific fiction. He has worked part-time as an advisor for Blue Origin, a privately funded aerospace company set up by Jeff Bezos, founder of Amazon.com. As Neal Stephenson came from a family of engineers and biochemistry scientists, he has been interested in scientific fictional writings. Not only that but also his profession related to science made him to bring out new innovative thoughts.

The Diamond Age: or, a Young Lady's Illustrated Primer is a scientific fictional novel by Neal Stephenson, focused on a young girl named Nell, and set in a future world in which Nanotechnology affects all aspects of life. *The Diamond Age* depicts near-future revolutionized advances in Nanotechnology such as the chevaline (a mechanical horse that can fold up and is light enough to be carried one-handed), and smart paper. This paper brings out the description of **smart paper** through the character Nell in the novel *The Diamond Age* to drive the scientists to move beyond the future technological change.

Key Words: Nano-Technology, NanoTics, Nano-Probes, Chevaline, Smart Paper, mediatrons

I. Introduction:

Literature facilitates man to break out of the existence of everyday life and to overlook for a while the grim realities of life. It prepares man to face the odds of life cheerfully and with courage. With the rapid development of science and technology, science fiction has become popular in the modern era. It deals with the conflicts that arise out of the impact of scientific discoveries on the future life of humankind. It is an inoculation against ignorance; a new beginning in the creation of research, and the depersonalizing threat of technological change. As Isaac Asimov, father of scientific fiction said "Modern science fiction is the only form of literature that constantly considers the nature of the changes that face us, the possible consequences, and the possible solutions".

Two Facets of Science Fiction

Science Fiction has two dimensions --- one pointing to the world of fantasy and other to reality. The glory of man is that he is not bounded by reality. Man travels in fantastic world. Neal Town Stephenson's Science Fiction portrays those fantastic worlds where man finds it difficult to be human and longs for regenerations and enlightenment. Neal Stephenson in his words with Asaro Catherine presents the same as "The science fiction approach doesn't mean it's always about the future; it's an awareness that this is different."

II. Neal Town Stephenson



Neal Town Stephenson is an American writer known for his works of spectacular scientific fiction. He has worked part-time as an advisor for Blue Origin, a privately funded aerospace company set up by Jeff Bezos, founder of Amazon.com. As Neal Stephenson came from a family of engineers and biochemistry scientists, he has been interested in scientific fictional writings. He is a 'Hardcore' writer in the sense that basically and professionally he is a scientist, which made him to bring out new innovative thoughts committed to the values of the disciplines of Science.

As a free thinker, Neal Town Stephenson treats Science Fiction as a pool where ideas are expressed with unrestricted intellectual freedom. In the hands of Neal Town Stephenson, Science Fiction has acquired a very significant form in the extrapolation of human reality. In its use of narrative resources and elements, he is unique in employing techniques, idiosyncratic to the genre. He has created positive and highly readable books such as *Snow Crash*, *The Diamond Age* and *Anathem*. The novel, *The Diamond Age: or, a Young Lady's Illustrated Primer* takes place in a future Shanghai. Many different stories are woven together in this novel; the plot centers on a stolen supercomputer in the form of a small book, or Primer, created for a patron's daughter.

The Diamond Age: or, a Young Lady's Illustrated Primer:

The Diamond Age: or, a Young Lady's Illustrated Primer is a scientific fictional novel by Neal Stephenson, focused on a young girl named Nell. Nell is a little girl who lives in a dirt poor neighborhood with terrible parents, and her brother Harv lives with her too. Harv is her parent figure in this uncertain world; he teaches her things, and takes care of her. One day he brings her *A Young Lady's Illustrated Primer*, which he stole from a Vicky (Victorian). The thing is, it's a very special book, and it teaches her to read and so on.

Nell, the Princess dwells in a steampunk sort of world, where Neo-Victorians ride on robotic horses and build huge buildings in the sky made out of diamond that is from a matter compiler. A lot of the action is in Shanghai, and in the Leased Territories, and towards the end it takes place underwater. **Neal Town Stephenson** depicts the things through a character named Miranda, who slowly begins to think of herself as Nell's mom. She witnesses, through what Nell says, horrible things in Nell's life. It messes with poor Miranda's head, Carl Hollywood, sort of her agent, feels compelled to help her. Meanwhile, a nanotech scientist, a neo-Victorian himself, John Percival Hackworth is assigned the task, and he creates a unique copy of the *A Young Lady's Illustrated Primer*. He was supposed to make only one copy of the book for his granddaughter, but he also secretly made two. One was supposed to be for his daughter, Fiona. The primer is actually a super computer built with nanotechnology that was designed to educate Lord Finkle-McGraw's daughter and to teach her how to think for herself in the stifling neo-Victorian society. But Hackworth loses the primer before he can give it to Fiona, and the "book" has fallen into the hands of young Nell, an underprivileged girl whose life is about to change.

Nell struggles and overcomes the demons, rises in society, and she becomes the real heroine because of the book *A Young Lady's Illustrated Primer* in her hands. One thing I really like about Neal Stephenson's female characters -- they are strong women with information on nanotechnology i.e. **NanoTics**. I find it quite fascinating that such a macho man as Neal Stephenson seems to be could consist in creating strong women characters. Neal Stephenson is a very Dickensian writer, too, in the level of details he gives about people and scenery, and Nell's story, rising from the depths of society to the very top, is like something out of Dickens, too.

Highlights of the world in the relatively near future as Neal Stephenson imagines is included in manufacturing a product with minimum standard of living for all mankind, and the spread of nanotechnology. This technology at the smallest imaginable scale makes for many fun clouds of mites -- engineered nano-probes that fly (swarm!) about, gathering information or doing things. The mites are examined people from the inside and do all sorts of fancy things. Viruses affecting humans have also now become, in a sense, technological ones as people has been infected by the **mites**, very small machine helpers.

Smart Paper:

Neal Stephenson holds onto technological innovation and dominated the field of **NanoTics** in literature. In *The Diamond Age: or, a Young Lady's Illustrated Primer* the nature and principles of nano-probes are examined in detail probably for the first time. This book sets a future world in which Nanotechnology affects all aspects of life. It depicts near-future revolutionized advances in Nanotechnology such as the chevaline (a mechanical robotic horse that can fold up and is light enough to be carried one-handed), Lidar (radar with visible light) and smart paper (thin film transistor display). The description of **smart paper** through the character Nell in the novel *The Diamond Age: or, a Young Lady's Illustrated Primer* drives the scientists to move beyond the future technological change.



Fig: 1 Mediatrons

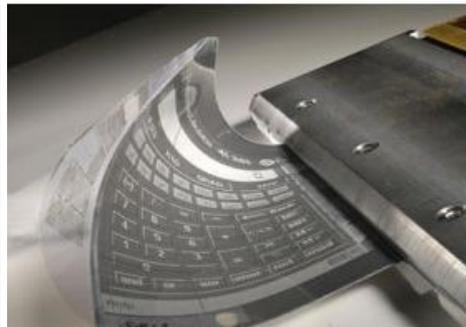


Fig: 2 Smart Paper

Smart Paper is a very slim thin film transistor display. It looks just exactly like a piece of paper. Smart paper consisted of a network of infinitesimal computers sandwiched between mediatrons. . And it consists of a thin plastic film on which millions of mediatrons, tiny microcapsules are deposited. The same is depicted earlier in the novel *The Diamond Age: or, a Young Lady's Illustrated Primer* as

..... thousand nanometers thick; a third of a million atoms could fit into this span. Smart Paper consisted of a network of infinitesimal computers sandwiched between mediatrons. (Pg : 64)

The microcapsules are filled with dark and light particles which carry opposite electric charges. This sheet is, in turn, bonded to steel foil. Depending on the direction of an electric field from the steel foil transistor substrate, either the dark or the light particles are drawn to the surface, generating a pixel of that color. In this way a mediatron is a thing that could change its color from place to place. Along with its description, its memory power too is mentioned by Neal Stephenson in his book *The Diamond Age: or, a Young Lady's Illustrated Primer* –

... his name stamped out in rather severe capitals. Like most cards, it was made of smart paper and had lots of memory space left over to store digitized information. (Pg: 228)

At present accessible Smart paper film is a prototype of "electronic paper" display screen just 0.3 millimeters i.e. about half the thickness of a credit card.

Invention of LCDs from Smart Paper:

Scientific element introduced in fiction describes real-world events that relate to the ideas and inventions. Science fiction fans have already gotten a nice visual foretaste of how the early, small versions of these papers might be used in future. Later on the technology makes it possible to put moving images directly onto paper ... at a cost that would make it economical to use on everything from magazines to cigarette packets ... where the moving images would give more detailed instructions than any photo could ever do. The key lines for this nanotechnological element of mediatron is --- "Bud took a seat and skimmed a mediatron from the coffee table; it looked exactly like a dirty, wrinkled, blank sheet of paper." Further the idea of 'smart paper' leads to develop 'newspad', 'digital wallpaper' and Liquid Crystal Displays.

"The prototype of the reversible LCD panel module displays different images on each side. The images for its surface and rear are displayed on one LCD panel alternately, and the back light is turned on and off according to which side of the panel displays the images. The frame rate of the panel is sixty frames per second for each side of the panel, or one hundred and twenty frames in total." This is the first step to having a runcible, an "electronic book" that really is a book with multiple pages from *The Diamond Age: or, a Young Lady's Illustrated Primer* by Neal Stephenson. The "pages" are LCD displays; the spine of the book contains the electronics.

Reconfiguration of Reality:

The greatness of Neal Stephenson's books does not derive from their chemistry or physics or genetic engineering, but in the writer's visionary reconfiguration of our conceptions of the real. Reality and fantasy are intertwined. The world of fantasy is relived in the world of reality as it once before may be restoring the earth to its original state. Nano-Probes were a part of our fantasy world long before we had the technology to actually produce them. Each thing bring up in the novel is easily digestible as it provides a variety of plots and

characters. It explores different aspects of the philosophical ramifications of the rise of Nano-probes like Chevaline, Fabricules, immunocules, Lidar, Mediatron, Runcible and Smart Paper. The stories in *The Diamond Age: or, a Young Lady's Illustrated Primer* is connected thematically and chronologically by detailing the development of Nanotechnology.

Contrary to Reality, But Making the Characters Real:

The settings for Science Fiction are often contrary to known reality. The setting is in the future, so it is interesting for readers to see what the future is like. Neal Stephenson made the story so that readers feel the things going on in the book are happening anytime now, **NanoTics** in Neal Stephenson's *The Diamond Age: or, a Young Lady's Illustrated Primer* because of the modern setting.

The cast of characters in *The Diamond Age: or, a Young Lady's Illustrated Primer* is remarkable, with lots of protagonists, all of them having their own qualities. In the delineation of characters, Neal Stephenson endows them with the qualities to see things clearly and consistently and connectedly in a scientific manner. There are also a variety of nano-probes with different features that Neal Stephenson created, such as Aerostat Monitor, Chevaline, Fabricules, immunocules, Lidar, Mediatron, Runcible and Smart Paper. Neal Stephenson's did a brilliant job in creating the characters and making them extremely realistic. Each character is full of his / her quirks and agendas. From the exceptionally rich Victorian technology tycoon to the Neil's thug-like yet compassionate older brother, the characters all manage to be completely original and completely realistic. Through the realistic characterization Neal Stephenson provides a familiar point that the people don't get lost in the futuristic world. With simple directives, Neal Stephenson's changed Victorians' perception of nano-materials forever when he formulated Nano-Probes.

He mainly concentrates on the reality of the situation to provide the obstacles. On the whole, *The Diamond Age: or, a Young Lady's Illustrated Primer* changes our vision of the future and the overall outlook on nano-materials.

III. Conclusion:

Finally, I conclude that *The Diamond Age: or, a Young Lady's Illustrated Primer* is a most interesting science fiction book published in 1995. Neal Stephenson's vision of how things would be different in daily life through the use of nanotechnology, and also in the scary application of nano-scale machines interacting with people brains is demonstrated excellently. It is truly woven into the fabric of society. Everything in the story just makes sense-it is true science fiction that takes everything that is happening in society and science today and projects it hundred years into the future. The excellent execution of hard science technology is truly thought-provoking.

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Electronic Resources:

http://en.wikipedia.org/wiki/The_Diamond_Age