Future Trends

Spotlight on the Exponential Growth of Medical Utopias including Jewish Reflections on Stem Cell Research, Nanotechnology, Biogenetic Engineering and Radical Life Extension

Lesson 3: Nanotechnology

Overview:

- Another of the most exciting technological revolutions that is starting to gain traction today is that of nanotechnology. This relatively new field of science is bursting at the seams as it engineers tiny little machines that operate at the scale of a nanometer (1 billionth of a meter) or some 100,000 times smaller in size that the width of a human hair. Taken at its fullest potential, nanotechnology may someday literally enable us to make anything out of anything by first breaking down any material at the atomic scale and then re-sequencing it into an atomically precise replica of the new desired object. This upstart technology is one of the most salient examples of the description of Maimonides (Rambam) of the ultimate age of abundance in the future. After all, if super cheap nanotech devices become widely available, the dust and dirt of the earth will be converted into all of the delicacies one could ever imagine. Trash into fine food and diamonds is the wave of the future.

- Often we assume that the tools and materials of the past will continue to be the only options in the future. Today the preponderance of evidence is to the contrary. Steel, once the revolutionary material of industrialization, has given way to a new excitement with plastics, which are now also *passé*. Carbon nano-tubes are the current king in the spot light. At 250-500 times the strength of steel and yet weighting as much as plastic, they once again demonstrate what's possible if we keep an open mind and are not limited by past accomplishments. Other applications include nano-coated advanced solar cells which have the ability to power the entire world solely from the light of the sun. New batteries, new cars, faster and smaller computers are just the tip of the iceberg.

- In this flood of knowledge that is covering the earth as water covers the seas, we are rapidly approaching a time (in the next couple of years) when it may become common place to walk around with the sum-total of all human knowledge on one's physical person. Looking further ahead, we can speculate that, if we are already implanting computer chips in the human brain today, that someday, computers shrunk to the nano-scale will offer us the possibility of implanting large volumes of searchable on-demand knowledge directly into the brain. Having the entirely of the Torah or Talmud 'online' would thus acquire a radically new meaning. Cybernetic interfaces—a human-machine blending—have reached the point where numerous people are using their thoughts to control either their computer or robotic equipment. These advances are redefining education and expanding human potential.

In Summation:

- It is part of the basic meaning, according to the Torah, of being human, that we strive to exceed our limitations. This is itself a redemptive quality. To be human is to be trans-human. Looking at the current technological growth rates that are breaking one barrier after another, many experts are beginning to acknowledge a time in the near future when knowledge will become so ubiquitous that it will saturate every part of the earth. Will we one day be able to buy computer power equivalent to all of the brains on the planet for under a thousand dollars? Will we reach a point when the price of what today would be one billion dollars becomes affordable to everyone for pennies? Will robots do all of our mundane work for us? Serious reflection on these questions in light of the tech trends of today starts to crystallize in the mind's eye an age that is entirely like Shabbat [Sabbath]. In various depictions of the Messianic age, the world is said to resemble one great Shabbat where there are new rules for a new economy.