

IV-22 Flowers in the Garden of Eden?

The flowers are easy to paint; The leaves difficult.

- A Haiku

Denying the flower nips the promise of fruit and leaves. Humans have an almost universal admiration of blossoms and blooms. Relationship between man and nature can be compared to relationship of flowers and fruit with leaves. Deserts of Middle East bloom for months. Ancient Egyptians used flowers and fruit for a variety of rituals. Yet the Biblical tribes purged such pagan practices.

Flowers and fruits have evolved rather recently on the evolutionary time scale - about 200 million years ago. In the innovation of trading nutrition for transport of genetic material, flowers have evolved to communicate with their own kind through other species. It has created more interdependence and room for more variability by appealing to sensory gratification and much more. Such emotive elements are the bases of the symbiotic relationships of flowers, bees, and birds. All benefit from the relationship evolved to carry out pollination - a critical step in the perpetuation of the all.

It is no surprise that plants use multiple signals to communicate. At right time of year a patch in bloom buzzes with social activities as insects amicably fly, flit, flirt, dart, and visit in search of nourishment as they are going about their business of collecting food and preparing for fruits and healthier plants. Insects are lured by odor. Sexual mimicry is accentuated with colors spread over a wide range of the spectrum that extends well

into the ultraviolet and infrared regions not visible to human. The form, shapes and patterns of flowers, and size of blooms, facilitate transfer of the genetic material to insects. Architecture of bloom avoids self-pollination. Whether or not there is any sexual gratification for the insects, their interaction with flowers often gives them food in return for taking pollen to distant blooms. One botanist has compared insects to *flying penises*.

Appreciation of flowers encourages reflection of potential consequences. Evolutionary rationale for a predisposition of foragers for liking, recognizing and distinguishing blooms lies in the fact that flowers represent promise of fruit in the future. The knowledge provides an immediate competitive advantage for getting food in the future. Beauty is advertisement of good health that comes with genes for resistance to parasite and a lack of stress. Time to reflect on beauty also indicates leisure time away from the struggles of immediate existence. Predilection for the appreciation of bloom also leads to the realization of their more distant significance that a flower matures into a fruit only when conditions are ripe.

As flowers brighten the space while soothing the glum mood, they invite observation, gaze, and contemplation of the meaning of the relationship with the environments past and present. Possibly as analogs to play acts they titillate human senses to astonish and evoke desires and dreams. Just as jasmine evokes the sense of thousand-and-one nights, chrysanthemums and cherry blossom have become symbols of aesthetics. While evoking passion, love for flowers always entail a sense of fleeting moment, mortality, with a sense of purpose. As turned into a game by hobbyists and businesses, forests are plundered and decimated for rare orchids and other forms of genetic materials perfected by nature for certain attributes.

Cultures have plunged into mania for that perfect tulip. Tulip has been elevated as *a thing of beauty* by human intervention. Its origins lie in oases of Middle East where its modern journey began about 500 years ago with a search for desirable attributes. The name is corruption for the word turban in Turkish. Virtue of tulip is in its perceived beauty - without scent or a medicinal or food value. Its only recorded use is that bulbs were used as food during famine. For the seventeenth century Europeans, made newly-rich from the Colonial trade, the criteria for beauty included brighter colors, more perfect symmetry, and the length of the stem.

Tulips are not as amenable to propagation by seeds aided by insects. Therefore the criteria and technologies have become the bases for artificial selection of bulbs by humans. Practices developed during the search for desirable tulip over the last four centuries are precursor to genetic selection and engineering. As a precursor to globalization, this includes hollow promises, as well as the theft and cunning to establish claims. In both cases one learns from and selects from a library of natural mutations for adaptations to niches created by human desire for whatever reason. Rarity also inculcates a sense of unachievable beauty - that may well be beyond the insect sense of ideality.

This upheaval of capitalism created a *bubble*. In *tulipomania* of 16th and 17th centuries many Europeans and at least one Turkish Sultan lost everything they had - all for the show. Some have called it the atonement of the Calvinist Dutch in terms of Ponzi schemes of greater fool theory. In accord with *easy come easy go*, it is understandable that the Dutch traders, returning with the loot from the colonies, were gripped by the dream of putting some color in their monotonous and inhospitable landscape which they had controlled through human efforts - that is by making canals

and dikes, and by erecting windmills. Possibly the sense of place and light, so celebrated by Dutch painters, also emerged from such an interaction of the culture with splashes of colors and the perspective literally enhanced with lenses and mirrors. After all, as an art form tulips do represent near perfection of contrast, pattern and variation.

With all its intrigues and cunning to put some color in drab lives, the search went on for that perfect tulip – a black tulip. If it was achieved, it has never been seen again after its only appearance in the eighteenth century. The search has led to an appreciation of the genetic traits and the selection and development of the technology of controlled propagation of desired traits. As we understand now, the color of tulip comes from a base color - shades of yellow, overlaid with a darker anthocyanin pigment. A virus partially and irregularly suppresses the pigment. Thus depending on the degree of infection in broken-tulips the darker color appears in patches. Element of environmental variability in the whole search is introduced by the fact that the virus is spread from tulip to tulip by the peach-potato aphid.

Migration of Stunted-Wheat

The story of transfer of certain genes in developing a stunted variety of wheat is an interesting example of transfer of genetic material (germ-plasm). The parent strain of Norin 10 was the winter hardy variety called Turkey Red brought to US by the Mennonites who visited Ukraine in 1874 at the invitation of the Russian Czar. This strain was taken from Lancaster, Pennsylvania to Japan in 1892. The Japanese farmers perfected a dwarf strain Norin 10 by crossing Turkey Red with a local variety Daruma - *no leg* - because it does not tumble down. On its return as a part of

the World War II loot, short-straw Norin 10 covered 60% of the wheat acreage in US in 1984. Norman Borlaug recognized the desirability of short-straw wheat: Short-straw plant uses less nutrients for the formation of straw and are less likely to roll over under physical stress. Several stunted varieties of wheat were perfected through the 100,000 tons of seed stock shipped during the 1960s by Borlaug to India, Pakistan and Turkey. These genes are now part of the nearly 75% of the wheat crop throughout the world.

This and several other articles later are inspired in parts by Botany of Desires by Pollan.

Room for Doubt

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