

## THE COMMON SENSE OF FANTASY -1

**Introduction:** The key to creative thinking is advanced imagination. The history of science, technology, engineering, arts and culture is history of human imagination. One of the researchers into creativity mechanism quotes the words of Joseph Priestley (scientist who discovered oxygen): ‘The most inventive and sophisticated experimenters are those who gave free rein to imagination and established connections between remotest concepts. Even though the parallels drawn by them are rough and chimerical, they may be a golden opportunity for great and important discoveries, unattainable by reasonable, sluggish and coward minds.’”

Truly, a person with well-trained imagination will generate ideas that never occur to those whose imagination is uncultivated. However, in the realm of the unknown and the unrevealed, freely ranging imagination is of no use. What you need is *guided* imagination. Fantasy management is a trait of well-organized thinking.

*Test your fantasy:* Imagine a new fantastic biological plant. The plant should be entirely new. The time for daydreaming is unlimited, but normally 20-30 minutes are enough.

Imagination is the ability to create new images, of both real and fictional objects (systems, processes, concepts).

Three levels of imagination are distinguished:

1. creating a new (modified) image of an object experienced earlier e.g. a tree with different fruits and vegetables;
2. creating a new (developed) image of an object that the person has not encountered earlier but has some initial information about e.g. weightless cat, magnetic corn, glass rain);
3. creating (synthesizing) a new image of a non-existent object of which no initial information is given e.g. extra terrestrials, gaseous plants, solid echo, living smell, change of seasons inside the person

The highest level, level 3 above is called fantasy, the most complex kind of imagination. Fictional ideas are the product of fantasy. People with advanced fantasy skills are hard to find. Usually they are science fiction fans. As a rule, beginners in creativity enhancement courses show poor level of imagination, regardless of their age and background. In the course of several years of teaching creativity development, we have collected extensive statistical data on solutions typically offered to program tasks. Below are representative examples of fantasies acted out by a group of engineers: the pump-plant, hydro-electric-station plant, furniture-plant, moon cabbage, transparent plant, the sea water-melon with fresh water inside, ‘the plant that has the shape of a convex-concave pyramid, with plasma pulsating inside, dumb-bells of the color of

over-ripe cucumber suspended from above; the chiming of bells heard...’, ‘the plant sensitive to malicious thoughts, if someone breaks off a branch, it turns blue with indignation and stings the intruder if someone caresses the plant, it turns green...’ and so forth. There is little fun about it.

It appears that the level of imagination of beginners is rather moderate and usually confined to levels 1 and 2 & conforms to two forms:

- a. mechanical amalgamation of homogeneous systems - examples above, as well as fairy-tales and myths, mermaids, centaurs, sphinxes;
- b. wild, uncontrolled fantasy - ‘dumb-bells of the color of over-ripe cucumber suspended from above’, nondescript fabulous monsters with enigmatic properties and unclear functions.

One more test: Think of a fantastic beast, not known from fables or science fiction.

Our training is based on the deliberate assumption that all trainees possess poor imagination level. Even people with poor fantasy can use creativity tools to generate fantastic ideas of high rank.

Analyzing substantial bank of science fiction is alike cataloging ‘patent file’ of fantastic ideas. *By and large, science fiction writers do not employ fantasy tools consciously, but a major part of fantastic ideas in their works conform to these tools.*

### **Ten Tools to write science fiction & invent**

1. Enlargement – reduction: modified parameter - size of the object. Seems to be the most popular method in science fiction. Once it gave life to giants, dwarfs and Gulliver’s travels. Men grow enormously tall e.g. *The Food of the Gods*, Herbert Wells, or shrink to dwarves e.g. *Battleground*, Stephen King, *Uncle Julian’s Meteorite*, Jan Weiss. Tiny aliens appear e.g. *The Invisibles, I*, Kopylov and a planet is a children’s clockwork toy e.g. *Restricted Area*, Robert Sheckley.
2. Acceleration – deceleration: modified parameter - time or speed. The pace of life speeds up e.g. *The New Accelerator*, Herbert Wells or slows down like five years on Earth are just one second in aliens’ life e.g. *Meeting In the Desert*. Writers imagine acceleration of Earth’s rotation or deceleration of the velocity of light.
3. Dynamics – statics: unchangeable object becomes changeable and vice versa. Person’s appearance gets transformed or the person changes it purposefully. In Robert Sheckley’s story ‘*Shall We Have a Little Talk?*’ the language of aboriginal population on a planet changes so quickly that it is impossible to establish a contact with them.
4. Omnipotence – limitation of functions. The object’s functions cover a large class of phenomena or, conversely, a universal fact has a restricted effect. Robots with unlimited capabilities e.g. *I, robot, I*, Asimov and a robot meant exclusively for opening cans e.g.

The Proud Robot, H. Kuttner.

5. Fragmentation – unification: splitting into components or integration of components. A plant is decomposed into atoms and then re-assembled, ball-shaped extra-terrestrials can join together and acquire any shape e.g. They walked like men, C. Simak, sea-animal can decompose into separate one-cell organisms that unite for hunting.
6. Quantization – continuity: continuous effect of an object becomes intermittent and vice versa. Quantization of aging: a person may be young through all his life but in the end grows old instantly, human being gets food from the air saturated with nutritious substances.
7. Modification of properties: modifying the least changeable property of an object or medium. Reverting rotation of the Earth (Jules Verne), changing the direction of magnetic field of the Earth, changing the spectrum e.g. Time in Advance, W. Tenn.
8. Inversion: do it the other way round. The most common function, property or the entire object is changed to its opposite. Instead of growing old, the person grows young e.g. Star Diaries, S. Lem, Anti-gravitation e.g. The First Men in the Moon, Herbert Wells. A person may serve a sentence and then get the right to commit a crime e.g. Time in Advance, W. Tenn.
9. Extraction: taking out a property. Any function or property of object (fact) is transferred to completely another object (fact) or another class of the phenomena.
10. Omnipotence – limitation of functions. Changing parameter to degree of universality. It is necessary to make the fact (object) universal so that its action is spread to the greater class of the phenomena. And on the contrary, limit the action of the universal fact.

The tools can be used separately, but it is advisable to combine them, i.e. the object is processed using one tool & the result is later processed by another tool, etc. Consecutive application of 3-5 random tools to the object may lead too far from the initial image – if your mentality is bold enough! A few recommendations should be given here. Firstly, *do not reject the tool you chose*, only because it cannot be applied to the given object (“this makes no sense at all!”). Look for bold, bizarre solutions, because absurdity, impossibility of the contradiction is what you expect from the exercise. Secondly, *build the chain of tools until quantitative changes evolve into a new quality of the initial object*, which is interesting, unusual and unforeseen.

Problem: Think of a fictional natural phenomenon. For the initial object, take any natural phenomenon, rain, rainbow, earthquake, aurora borealis, etc.

## Special stories:

How to deceive a synthesizer

In one science fiction story the characters decide not to take thousands of necessary spare parts with them during the flight and instead start out with a synthesizer – a machine that can make everything. Landing on an alien planet, their spacecraft gets damaged. 10 identical spare parts are needed for repair works. As it turns out, the synthesizer can make one copy of any part. What can be done?

There should be a way out

In a story, the characters examine the planet in a boat they purchased by chance. On the way, the boat keeps the temperature above  $30^{\circ}\text{C}$ , cooks lunches from machine oil and clay and considers water to be a poison. The former owners of the boat for whom these conditions were quite normal had set such parameters. The boat cannot be re-programmed. Sailing along seashore, boat does not allow the crew to disembark because water is supposed to be a poison. What can be done?

The last will

The hero rescues Jan, a super-robot, from confinement in a bottle. Tired of waiting for rescue, the robot has sworn to kill the one who would rescue him. He now is firmly resolved to fulfill his oath and keeps chasing the hero, and saying “No one but me shall kill you!” And though he is prepared to realize the hero’s last will, the will should not go contrary to Jan’s oath. Is there a way out of this situation?

Answers to all these in next part 2 of paper.

## Pair principles:

Enlargement – reduction: Changeable parameter is changing size of system. This principal is the most popular in fairy tales and fantastic literature. How to change the parameter? It is necessary to change up to 2, 5, 10, 100, 1000, 10000 times ... up to infinity. If there are two objects, then change in their sizes is to be directed in parallel or consistently, simultaneously or in different time, in both sides (enlargement or reduction) or in the different sides. Up to what limit it is necessary to change parameters? To change until new quality or new unusual property appears. On the basis of this new property (quality) it is necessary to formulate new idea.

Acceleration – deceleration

Changed parameter is a speed. It is necessary to accelerate or decelerate for the new quality to appear. Choose a physical process. Increase the speed of process by 2 times. Check whether new

quality or new unusual property, circumstance, application has appeared? If not, then increase speed by 5, 10, 100, 1000 times and so on up to the indefinitely. Processes for experiment: process of heating, spread of light in the environment, free falling of bodies, spread of a sound in the environment, moving of an electric current through the wire, etc. Make reduction of speed of process by the above-stated technique. Answer on the same questions.

Dynamics – statics

It is a particular case of the previous principle. If object is static, then we should make its dynamic and on the contrary.

### **Case Study - a cup:**

Object: glass cup for tea.

Parts: Almost all cups also made of integral material (no separable material). On occasion, the cup can consist of the handle and the cup.

Properties: Static - the form, color, a material, transparency. Dynamic - ability to be heated up, ability to change the form at impact (to be broken).

Let's apply dynamic principle to a normally unchangeable property, transparency. We shall make its changeable. Let the glass cup change the transparency randomly or at heating (when have filled tea). We have received new unusual quality. These are sold goods.

Let's apply dynamic principal to another property of a cup, color. Let now color change differently, under the action of temperature (a cup becomes red when tea is hot, green when it is warm, dark blue when tea is cold) and under the action of a chemical compound of poured liquid (vinegar - giving "sign of danger"). Firm "Microlab" has issued kitchen noggins with latent inscription of firm's name. Under the action of hot liquid, inscription is shown.

Let's apply dynamic principle form to another property of cup, form. Let cup change form depending on time (on hours), of poured liquid, on temperature of liquid. We have received new quality. Such cup is convenient for transporting, it takes smaller place, and it is possible to be guided in time by such cup.

Let's take the changeable property - ability to be heated up. We apply principal of imagination "statics". We shall receive a cup which is not conducting heat. Certainly, such cup is necessary for all in kitchen.

Another property is ability to be broken (glass cup). We finally receive an eternal cup. The number of sale and let out utensils is lowered.

### **General technique of application of principle:**

1. To choose inanimate object or the technical system
2. To apply principal of imagination in 2 or more steps.
3. To receive new ideas, quality. Briefly write down solution.

#### Example 1

The technical system is a kitchen knife. The adjacent technical systems are: glass cutter, scalpel, a saw on metal, gas welding, scissors, etc. Let's apply principal, Omnipotence. Thus, kitchen knife will carry out all functions of the adjacent technical system. Necessity of other adjacent technical systems' disappears. Universal cutter which cuts any material, metal, glass, tree, etc. quickly and accurately is created. It has the size of penknife. The new problem on how to cut bread without table arises here.

#### Example 2

An electric bulb is taken. The adjacent technical systems are a lantern, an underwater lantern, a projector, a luster and a sconce. The Universal lighter, now developed, is the technical system which can create light in a wide range of brightness, any wavelength. It has dimensions as usual pocket lantern.

#### Example 3

A photograph is taken. Function is to store the information of objects. Let us have thought of such a photo which can store the information only about one object; more than one object is impossible to attach to a photo. Now by this photo is possible to define age of the person, his first name, a post, a place of work, hobbies, a place and so on.

#### Example 4

A bottle-opener is taken. Function is to open bottles. Let us have thought of such a bottle-opener, which opens only one kind of bottles, for example, juice. It does not open other bottles. But now, bottle-opener informs us about the quality of contents: data of manufacturing, name of the manufacturer, presence of infections in a product etc.

### **Tasks:**

1. Object is light. Apply principal "inversion". Describe action of anti-lamps, anti-light, etc.
2. Object is fuel for a spacecraft. Apply omnipotence. Give the description of a spacecraft.
3. Object is a broadcast, principle - dynamics. Try to imagine the development of systems of wireless communication at spontaneously varying broadcasts.
4. The most short-lived and most massive part of a spacecraft is fuel. Apply principle of inversion. Describe the fantastic rocket system. In what cases can such a system be necessary?
5. The radio receiver, will transform radio-waves to electric signals, and then into a sound. Apply principle of modification of properties. Offer idea of the receiver.
6. Function of a space-suit consists in the maximal isolation of the person from an environment. Apply the principle of inversion. What does the space-suit of the astronaut become? For the fireman? For the diver? For repairing of nuclear reactors?
7. At driving on the automobile there is a danger of so-called infrasonic self-hypnosis that reduces acuteness of reaction etc. Think up a way to eliminate of this danger. What does the automobile become? The automobile or an environment also (roads) may change too.
8. The airplane has a set of properties, time-dependent. For example, engines wear, fuel is burnt, metal gets tired. Change dependence of these properties on time with the help of principle of dynamics. Describe the fantastic flying device ideated.

### **Solutions to Tasks:**

Task 1: Instead of a luminous body that emits light by definition, we apply principle of Inversion. In optics we have luminous bodies that give radiation & non-luminous which do not give but absorb/reflect/refract/transmit radiation. Former give radiation, latter don't give it. So inversion of luminous body physically is a non-luminous one. Inverting torch we get a piece of cloth. Inverting Sun, we get a solar cell, Moon, etc. Ordinary non-luminous bodies work strongly on some parts of spectrum while they don't work differently on other parts of spectrum. For example, a solar cell is designed to absorb maximum of infra-red only. Green colored cloth absorbs all but reflects green (that is why we see it green). Human eye likes visible but gets damaged by Ultra Violet. That is why we have UV protection sun glasses. Quantitatively, there are percentages. For example, a solar cell would absorb 75% of infra red. Not apply principle of Enlargement / reduction. The imagined non-luminous body absorbs/reflects/refracts every possible frequency of electromagnetic spectrum. If it absorbs 100% of full spectrum, we have a black hole. It already exists in astronomy. It sucks all radiation plus even matter. Nobody returns from black hole, atom or radiation. But we have to create. So we think of a non-luminous body that 100% (principle of enlargement) reflects ALL radiation. Some kind of super-reflector! I have yet to think of use of this instrument. We can call it ideal anti-

luminous super reflector.

Task 2: Object – Fuel for spacecraft : Technical system is: fuel (combustible substance) for spacecraft. It can be liquid hydrogen or other well known propellant known to rocket scientists. Oxidizer is also included for burning in separate tank as air is not there in space. Principle of omniscience applied. Similar technical systems are: gravitational forces from other stellar bodies cause spacecraft to accelerate; possible solar electromagnetic fields in galaxies that can be used as power source; solar energy from Sun, etc. We invent a universal machine that can burn when required as normal fuel, absorb sunlight to generate electricity where Sun rays are strong, act as a gravitational attractor and compute forces from planets and stars nearby (can attract & manage forces & torques on spacecraft) & can exploit electromagnetic disturbances like solar winds to produce energy. All in one. Final object: Universal rocket fuel.

Task 3: Object – Broadcasting: Functions of object:

1. Transmission of information. Transmission of energy is must. But sometimes transmission of information is more important than transmission of energy. Like in TV, Radio, Mobile network. Main concern is transfer of info. Of course energy is required for good quality reception, far-off range, clear voice, etc.

2. Transmission of energy. If transmission of energy becomes MORE important, it becomes MUF or Much Useful Function of technical system. Like shouting on mobile phone to rattle or disturb listener's ears or broadcasting such powerful signals on TV (it happens at times) that TV speakers boom. We need to bring down volume suddenly. Auto-volume function in TV comes these days to protect audio of TV sets.

Principle of Dynamics applied: By varying sound in broadcast over Radio, secret messages can be given by leader to his people. Like speaking loudly, softly, loudly, softly periodically can signify the message 'All is well. Be calm'. A boy can speak softly for 10 seconds, then very loudly for 5 seconds (he can speak anything – content unimportant) on his cell to his friend. Message can be 'please meet me 5pm'. In some periodic dynamic modulation can transfer information.

Task 4: Object : Rocket or spacecraft fuel: Ratio of payload/fuel at take-off and at different times of journey is a measure of efficiency of spaceship. Useless is a spaceship that takes one man of 65kg to Moon with initial fuel of 650000kg! Principle of Inversion: The fuel is miniscule to total spaceship in volume and mass. New Object: We have a spaceship with 10gms of pocket fuel powder stored in its mini-tank. The spaceship carries 100 cosmonauts to Mars and returns safely. Still 2gms of powder is remaining. It was emergency fuel that was unused.



Task 5: Object: Normal Radio Receiver: Function of TS: Catch electromagnetic waves from all sources in its range, tune into one source, decipher the 'coded' info as amplitude or frequency modulation (AM or FM Radio) into electric signals, convert electrical messages into audible sound output. Principle of Modification applied:

1. Detect all possible sources of radiation, compare their strengths (amplitudes, frequencies, powers), clarities (signal/noise ratio), distance from itself.
2. Compare them graphically by digitally measuring the parameters.
3. Prepare a report on Word Excel and fax it to laboratories involved in research.

Final object: A study of strengths of various radio sources in one localized area where receiver is installed.

Task 6: Object: Spacesuit: Function of TS: Isolation from material & energy exchange with environment: Principle of inversion applied: Complete exchange of matter & energy with surroundings. Ordinary inverse is no-spacesuit at all. But we go in for a intense inversion wherein created spacesuit maximizes transfer.

Spacesuit for astronaut becomes: Kind of jacket that gives high thermal and electromagnetic conductivity. Any temperature and electromagnetic change is felt instantly. Feel of touch, sight, smell is 'original' in space without gravity of Earth, without air. Spacesuit for firemen: Suit is made that gives a feeling of warmth near fire more than normal feeling of warmth to spectators not wearing this suit. In other words temperature of 'inner fire' is brought as perception to fireman even when he is far away thinking of extinguishing fire. Ashes etc from flames would be attracted, concentrated and be made to touch fireman's skin. We can't make his spacesuit melt or burn as it would make spacesuit disappear completely. Spacesuit for diver: Feel of water on skin intensified. Over moisturized skin. Water with even higher pressure (developed by pumps) made on diver. Fish and other aquatic creatures can touch him. Rather by some technique they are made to pass as closely as possible to him. Spacesuit for engineers inside nuclear power plants: Spacesuits gather places of nuclear radiation leakage and force the engineer go near it. The nuclear radiation is concentrated and forced in the engineer.

Task 7: Object: Driver +Road +Vehicle  
Function (undesired): infrasonic self-hypnosis

Principle of modification: Fundamental properties of components of system change. A step beyond so-called intelligent transportation. The vehicle by a inside surveillance camera examining body movements of driver detects this self hypnosis. This information is instantly displayed on above of windscreen like a display board of a bus. It says 'driver sluggish'. It gives signal to other drivers on roads like a 'learner's driving licensed driver' driving a car with L sign. It makes all others cautious of this slightly unpredictable or dangerous car. The car also gives antidote to subsonic signals to driver inside like playing

particular sonic band music or stopping the engine for ten minutes and so on. Even then if driver doesn't come out from this hypnosis, his car can be jammed by brakes emerging out of roads. Last step. Final TS: Super smart alert vehicle system.

Task 8: Object : Airplane with normal reducing fuel in tank while in travel & normal wear & tear. Principle applied: Dynamics. Final Airplane:

1. Runs on solar batteries; fuel never finishes. Rather at times batteries are overcharged in flight on sunny days. Also manufacturing facility of batteries and solar cells available on board to replace worn ones.
2. Fuselage made of layered metals. After few months, outer layer wears out. Oxidation of next exposed layer brings thickness back and makes fuselage even lighter & stronger.
3. Engines : Not there at all.
4. With time as fuselage lightens and strengthens, flight safety factor increases. Payload carriage goes up. Airplane becomes more efficient.