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# UNIT 4    ACT AND POTENCY

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## 4.0    OBJECTIVES

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Is everything changing? If everything changes, then change is the unchanging reality. Along with change, we also experience stability. Change seems to be guaranteeing stability. For instance, planets are kept in stable orbits because of their motion. In this Unit we explore the metaphysical meaning of:

- Act
- Potency
- Act and potency
- Potency and possibility
- Potency and evolution

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## 4.1    INTRODUCTION

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The concepts of act and potency have historically delineated the dramatic antinomy felt by Greek thought with Heraclitus and Parmenides. Heraclitus held that everything is fleeting, transient, ephemeral, becoming; whereas Parmenides was of the opinion that the sensible, mutable, contingent, and phenomenal world is pure illusion, which requires of critical intelligence a judgment in favour of the unique, absolutely immutable Being, absolute perfection and fullness. The efforts of Plato succeeded only in fragmenting the Being of Parmenides, multiplying it as many times as there are Ideas in his World of Ideas. The multiple and becoming were reduced to mere appearance, to a shadow of the true and single Being of the Ideas. The Aristotelian proposal of *act and potency* finally offered a solution, taking a middle position between the Parmenidean rigid immobilism and the fluent becoming of Heraclitus. The proposal has saved the *permanence* of reality and its uninterrupted *flux and becoming, giving and receiving*. Later on, Christian philosophers accepted the same proposal on account of its conformity to biblical realism which is both static and dynamic.

## 4.2 ACT

The term ‘Act’ comes from the Latin root ‘Actus’ which means *an entity of whatever kind which perfects and determines a thing in its being or perfection itself*. It includes the power or faculty, operations of the faculty, accidents, essence, substance, form, and act of existing. Whatever a being *has* or *is* in a positive manner is an act. It is perfection itself. There are as many kinds of acts as there are kinds of ‘being’; for every being as such is a perfection. The acts are distinguished as the following: *Act of essence*: The act of essence is the act which perfects and determines a being in its species. It is that constitutive principle of a being which makes a being just this particular kind of being and nothing else. *Act of existing* is the act of Being. It is unlimited perfection. *Act of property* is the act of perfecting and determining an essence in which the entity of property flows necessarily from its essence. *Act of accident* is the act of perfection and determination of a being in which the entity of the accident does not flow necessarily from the essence of the being, e.g., dark hair, dark skin, one’s weight, height, etc. *Pure act* is subsisting perfection without any limit. It lacks no entity, nor can it receive an increase of entity as it possesses all possible actuality. There are pure acts both in the *order of existence* and *essence*. *The order of existence* implies the act of existing of all beings and the exercise or occurrence or happening of all operations. *The order of essence* implies all the determinations of beings, which make them be such or such. The *pure act* in the order of existence is God; the pure acts in the order of essence are angels, whose substantial forms are not restricted. *Mixed act* is a composition of perfection and potentiality, e.g., all corporal beings. *Mixed act in the order of existence proper*: It includes every finite being insofar it is composed of *the act of existing* and *complete essence*. *Mixed act in the order of complete essence*: Complete essence is a composition of substance and accidents. *Mixed act in the order of substance*: Every corporal substance is composed of prime matter and substantial form. *Mixed act in the order of operation*: Every operation of a finite being is composed of exercise and determination.

## 4.3 POTENCY

Potency comes from the Latin root ‘*potentia*’ which means power. *Potency is the capacity for act*. It is the capacity or aptitude in reference to something which a being is not or has not, but which it can be or can receive. For example, hydrogen has the ‘act’ of hydrogen; Oxygen has the ‘act’ of oxygen; but both have the ‘potency’ of water. They are actually hydrogen and oxygen but ‘potentially’ water. Water on the other hand is actually water; but it is potentially hydrogen and oxygen, since the water has the aptitude to be resolved into them.

There are two main kinds of potency: Active Potency and Passive Potency. *Active Potency* is the capacity to communicate act or perfection to another. It is a power of action, such as the power of hearing. Since such a power in itself already confers certain perfection upon its subject, it is an act with respect to its subject. Hence it may also be called first act. *Passive Potency* is the capacity to receive act or perfection from another, e.g., a child has the capacity for acquiring knowledge from parents and teachers. There are two kinds of Passive Potency: Determinate Passive Potency and Indeterminate Passive Potency. *Determinate passive potency* is that which contains an act and is in potency to some further

act. e.g., substance for accidents; the complete essence for the act of existing. *Indeterminate passive potency* is the principle of an act, but which itself contains no act. It is pure potency, e.g., prime matter.

**Act is Limited only by Potency:** The notion of act does not include any limitation. For, act is perfection and potency is limitation and hence imperfection. But if act as act is limitation, a pure act would be a contradiction in terms. For, pure act excludes the possibility of any limitation and imperfection. Hence a pure act limited of itself would be a contradiction in terms. However, it does not mean that any act which exists in reality is without any limitation. It is true that it does not include limitation; nevertheless, it does not *exclude* it either. Hence if an act is found to be limited, it is not limited by itself but by the limiting principle in which it is received, i.e., by potency.

**Potency is Limited of Itself:** By its very nature, potency is a limited receptive principle of perfection. It is a capacity for perfection. All the same, in a certain sense, potency may be said to be limited by the act to which it is ordered and which it receives. For instance, the potency of water to be heated is a potency to be heated, and therefore limited by the act of heat. It is not a potency to be a human person. For this reason potencies are distinguished and diversified according to the act to which they refer. The following conclusions can be drawn from the fact that act is limited only by potency: a) If there is an act not limited by potency, it is *infinite*. For whatever is not limited is unlimited or infinite. b) If there is an act not limited by potency, it is *unique*. For two or more infinite acts in the same order are impossible, since such acts would either be different or not. If they are not different, then they are not two but one and the same. If they are different, one would have to have a perfection which is lacking in the other. Hence, this other would not be infinite but finite. Hence, of necessity, an infinite act is to be unique.

**Potency and Act are Really Distinct:** Potency and act are really distinct; for that which perfects cannot be really the same as the perfectible. Otherwise the perfectible would give itself an act which it does not have, so that Being would come from non-Being. Besides, if potency and act were not really distinct, that which limits and that which is limited would be really the same so that act would limit itself. From the real distinction of potency and act, it follows that nothing can be potency and act in the same respect; for this would imply that that which perfects is really the same as that which is perfected or perfectible.

**Act and Potency Enter into a Real Composition:** Act and potency are merely principles which by their union form a complete whole. Hence, the real distinction between an act and its potency is not a distinction between two separate entities or beings, but a distinction between two principles of one and the same reality, namely, a *metaphysical* distinction.

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## 4.4 POTENCY AND POSSIBILITY

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*Possibility* is objective potency. It is the capacity or aptitude of a being for receiving existence. A 'possible' passes from a state of relative non-existence to existence. "*What is not yet, but can be.*" There are two kinds of possibility: subjective possibility (logical possibility) and objective possibility. *Subjective possibility* is the conceivability in which we do not see any contradiction. A

being of subjective possibility is a being which was not, is not, and will not be, but conceivable. It has existence only in the mind. e.g., a human with a hundred eyes. *Objective possibility* (ontological possibility) is the real possibility of an object which in fact is not contradictory. For example, when we derive the concepts of 'gold' and 'mountain', our intellect perceives that these concepts are compatible, and can be united into one concept whose component parts do not contradict each other. Hence, we can base the possible 'golden mountain' upon the contingent realities from which we have abstracted the concepts of 'mountain' and 'gold.' Possibility also differs from potency. For, every possibility implies a certain act (actuality), hence it is always an objective potency; whereas potency need not always contain an act, as in the case of pure potency (prime matter). *Possibility and Impossibility*: A thing is *possible* inasmuch as it is *existible*, inasmuch as it *can be*. A thing is possible *in itself* (intrinsically) when the concept of it involves no contradiction. For, that which involves contradiction in its very concept is not a thing, but the absence of being. It is self-cancelling and amounts to zero. A 'square circle' is a contradiction in itself. It is simply *no-thing*. Such a thing lacks intrinsic possibility. It is called a *thing* merely by figure, analogy, and by reason of the want of words for the expression of sheer negation. It is *intrinsically* (*absolutely or metaphysically*) impossible. What is intrinsically impossible simply cannot be even by a miracle of God. This does not mean that God's power is limited. God cannot produce what is intrinsically impossible, because this is not a thing at all. It is *no-thing or nothing*. What is producible is always some particular thing.

The first point to establish, when there is the question of the possibility of anything, is the fact of its intrinsic possibility. When a thing is intrinsically possible it is existible. It is *absolutely* or *metaphysically* possible by the power of God, though it may not be possible by the power of creatures. It may be intrinsically possible, and yet lack the *extrinsic* and *relative* possibility of creature-causes to produce it. Thus a mountain of gold or a human with a hundred eyes is intrinsically possible. It involves no contradiction in itself.

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## 4.5 POTENCY AND CHANGE (MOTION)

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Change is the transition or passage from potency to act or from act to potency. There are three conditions required for change: *Starting-point* (*Terminus a quo* = term from which); it should have a definite starting point. *Ending-point* (*Terminus ad quem* = term towards which); it should have a definite point to end up. *A Real transition* from one point or state to another. *Kinds of change*: *Positive change and negative change*. *Positive change* is the transition or passage from potency to act. There are four kinds of positive change: creation, generation, accidental change, and local change. *Creation* is a passage from mere possibility to actuality, that is, from non-existence to existence, e.g., creation of the cosmos. *Generation* is a passage or transition from one substantial form to another in which a new substantial form is acquired, e.g., generation of a plant. *Accidental change* is the passage from one accident to another, e.g., water vaporizes to steam at 212 F (Fahrenheit = 100 C). *Local change* is the passage from one place to another. *Negative change* is the passage from actuality to potentiality. There are three kinds of negative change: corruption, privation, and annihilation. *Corruption* is passage from one substantial form to another in which there is a loss of the previous substantial form, e.g., the life and death of plants and animals. *Privation*

is the loss of the previous accidental form, e.g., becoming blind. *Annihilation* is the passage from existence to non-existence, e.g., soul of animal in death.

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## 4.6 POTENCY AND EVOLUTION

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**Evolution of the Cosmos through The Big Bang:** Albert Einstein in 1905 proposed the special theory of relativity in which he conveyed the effects of a body accelerating with a velocity almost equivalent to that of light. Based on the relativity field equations, many scientists described the beginning and the possible end of the universe. It was Alexander Friedmann, who tried to solve the field equations and suggested the possible beginning and end of the universe mathematically. The greatness of Friedmann was that he made his prediction when there was no observational evidence for a Universe that would expand and evolve with time. Expansion of the universe became a widely accepted concept towards the middle of the twentieth century and the forerunners of this theory were the Belgian priest George Lemaître and Edwin Powell Hubble. Lemaître was one of the pioneers who applied Albert Einstein’s theory of General Relativity to cosmology and proposed that the cosmos was confined to a tiny atom, and that an explosion expanded this universe. He envisioned all the heavenly bodies squeezed into a super, compact, primordial matter called the ‘primeval atom.’ Then all at once there was this moment of the Big Bang. The theoretical musings of Lemaître and Friedmann were brought to the forefront by the investigations of Edwin Powel Hubble, an American astronomer, who established on his observational evidences that the galaxies are not at rest in space. He developed the theory of the Big Bang to its full stature; he is also noted for the discovery of the Andromeda galaxy, the Hubble Constant, Hubble’s Law, and for his numerous other observations from his famous Mount Wilson Observatory. He also observed the red-shift of a number of galaxies and found that the farther the distance of the galaxy, the greater is the red-shift. This showed that the farthest galaxies are moving at a greater speed than the closer ones.

**Evolution of Life Through Cells:** The bodies of animals and plants are made up of separate units called cells. The human body, for example, consists approximately of 100 trillion cells but most are too small to see unless highly magnified. All cells consist of a very complex living material called *protoplasm*, and are made up of three basic parts. They have a thin skin called the *cell membrane*; this membrane encloses a jelly-like substance called *cytoplasm* and a small object called a *nucleus* (Most cells have a single nucleus bounded by a nuclear envelope, or membrane, with pores. Pores provide continuity between the nucleus and the cytoplasm. The nucleus contains one or more discrete structures, known as nucleoli, which are sites of ribosomal ribonucleic acid (RNA) synthesis. Hereditary information is in the DNA contained within the chromosomes in the nucleus. This information is transcribed into RNA in the nucleus, which then serves as a messenger. The messenger moves outside the nucleus to the ribosomes, where it guides the synthesis of proteins. Thus, the nucleus directs the activity of the cell. There are many tiny living objects in the cytoplasm called *organelles*. All cells contain round or sausage-shaped organelles known as *mitochondria*. These are the power plants of a cell. Mitochondria contain enzymes which release energy from food. This process is called respiration. Tiny organelles, *ribosomes*, float in the cytoplasm. Ribosomes contain a chemical known as *ribonucleic acid* (RNA). They take part in the manufacture of proteins.



Organelles called *lysosomes* contain enzymes which are released when cells are injured. Cytoplasm also contains a number of flattened spaces known as *Golgi Body*. This stores useful substances before they are secreted from the cell. All cells contain a nucleus which contains one or more discrete structures known as nucleoli, which are sites of ribosomal RNA synthesis. The nucleus has a membrane with holes through which chemicals move to and from the cytoplasm, and it is rich in a chemical called *deoxyribonucleic acid* (DNA). This chemical is a part of the *chromosomes*, which only become visible in a nucleus when a cell divides. DNA is concerned with protein manufacture, and plays an essential part in cell division. It is a long, thread-like molecule, similar in shape to a rope ladder twisted into a spiral. The upright sides of the ladder are made of alternate sugar and phosphate molecules joined into a chain. The rungs of the ladder are made of chemical bases, of which there are four types: *adenine*, *guanine*, *cytosine*, and *thymine*. They are often referred to by their initial letters A, G, C, and T. The genetic code is formed by the sequence in which these four chemical bases are arranged along the length of a DNA molecule. Most of a cell's DNA is contained in the chromosomes in its nucleus, but proteins are made in the cytoplasm of a cell. Somehow the coded instructions for protein manufacture must pass from the nucleus to the cytoplasm and then be transcribed. This task is carried out by two types of substance, such as ribonucleic acid (RNA) which works in conjunction with microscopic granules in the cytoplasm, *ribosomes*. The two types are called messenger RNA and transfer RNA. In the nucleus, a part of the DNA molecule opens up, exposing the gene for a particular protein. The messenger RNA copies the sequence of bases which make up the gene. The transfer RNA picks up amino acid molecules and carries them to the ribosome where the amino acids are linked together, forming a protein molecule. The sequence of amino acids in the protein molecule depends upon the way the transfer RNA molecules fit into the messenger RNA, and this depends upon the sequence of bases in the gene.

It has now been revealed that in terms of the number of genes in our cells, we humans are only a little better than the lowly roundworm which has just over 19,000 genes and the fruit fly that has some 13,600. Results published by two teams of scientists, in February, 2001, put the number of genes in the human genome at around 30,000, that is, less than a third of what was estimated earlier (c.100,000). However, humans being very thrifty with their genes are able to do more with their genes than other species. For instance, instead of producing only one protein per gene, as believed earlier, the average human gene has been found to produce three different proteins. Moreover, each gene directly interacts with four or five on an average, and thus functions in a collective manner. It is also surprising to know that in the 75 % of repetitive DNA sequences, which are known as junk DNA and were considered to be useless, there are sequences that are still active and may be coding for proteins. The genome sequence also shows that every person on Earth shares 99.99 % of the same genetic code with all other people, a fact that should help settle the question of racial or ethnic superiority.

**History of Human Evolution:** Scientists agree that life did not always exist on earth. They estimate that it began about four billion years ago. About four billion years ago, *Aries*, the first prokaryotic cells, appeared on earth. On account of the balance of Earth's own internal dynamics and its position in the structure of the solar system, matter existed as solid, liquid, and gas, and flowed from one form

into another to provide an incessantly creative chemical womb from which arose *Aries*, the first prokaryotic living cell. The primal prokaryotic cells had the power to organize themselves, as did the stars and galaxies. The cells could also remember significant information, even the patterns necessary to knit together another living cell. The cells also possessed a new order of creativity to catch the pockets of energy hurled by the Sun at the speed of light, and to use these quanta as food. *Aries* and the prokaryotes hydrogen from the ocean had released oxygen into Earth's system, which saturated the land and the seas. However, the prokaryotes unknowingly pushed Earth's system into an extremely unstable condition by altering earth's chemistry with this element of explosive power. Consequently, the prokaryote communities perished as their interiors were set ablaze by the oxygen. But out of this crisis arose *Vikengla*, a new and radically advanced being. *Vikengla* was the first eukaryotic cell which was capable of shaping oxygen's dangerous energy for its own purposes. The eukaryotes invented meiotic sex by which the universe's diversity expanded a hundredfold, through sexual union. Finally, the eukaryotes took that daring step of submerging themselves into a larger mind as a trillion of them gathered together and evoked Argos, the first multicellular animal. About 600 million years ago, there arose the multicellular organisms. They included the corals, worms, insects, clams, starfish, sponges, spiders, vertebrates, leeches, and other forms of life. The animals followed the plants onto land, heaved with amphibians, reptiles, insects, and dinosaurs. About 67 million years ago there was an astronomical collision that changed Earth's atmosphere and climate, which nearly destroyed all forms of animal life on Earth, including the dinosaurs. But such destructions opened up new possibilities seized upon by the birds and the mammals. The mammals entered Earth's life about 200 million years ago. They developed emotional sensitivity, a new capacity within their nervous systems for feeling the universe. This mammalian emotional sensitivity was deepened with the human nerval capability, the self-consciousness. Four million years ago in Africa, humans stood up on just two limbs; and by two million years ago they began to use tools. Beginning around thirty-five thousand years ago, they began a new form of celebration that displayed itself in cave paintings deep within Earth. About 12 thousand years ago, the first Neolithic villages were formed in Jericho, Catal Hiiyiik and Hassuna. It was the most radical social transformation ever to occur in the human venture. In this period, the decisive developments in language, religion, cosmology, arts, music, and dance took their primordial form. The urban civilization began to shape itself about five thousand years ago, giving rise to new power centres: Babylon, Paris, Persopolis, Banaras, Rome, Jerusalem Constantinople, Sion, Athens, Baghdad, Tikal of the Maya, Cairo, Mecca, Delhi, Tenochtitlan of the Aztec, London, Cuzeo, the Inca City of the Sun. Europeans initiated the third of humanity's great wandering about five hundred years ago. The first had brought *Homo erectus* out of Africa to spread throughout Eurasia. The second was that of the *Homo Sapiens* who wandered until they reached the Americas and Australia. The principal difference of the third wandering was that now the Europeans encountered humans wherever they went and they colonized them.

From the above-mentioned it is true that today all scientists admit that there has been some evolution at least within the confines of a definite species, resulting in the production of new races and varieties. This is a fact of observation. The most extreme fundamentalists admit that all present human races are descended

from one original couple, and this supposes a certain amount of evolution. But there are fewer facts and more hypotheses as we pass from species to genus, to family, to order, to class, and to phylum. A considerable number of observations point towards an evolution of very wide extent; many facts can be easily explained on the basis of those hypotheses which are difficult to interpret ‘scientifically’ in any other way. Yet, universal evolution (from amoeba to ape) cannot be considered to be an established fact, and will most probably always remain a hypothesis, although the great majority of scientists favour that view.

As for the way of explaining the evolutionary process, there has been, until rather recently, considerable disagreement between the proponents of evolution. The five most important explanations are: (1) Lamarck’s explanation through adaptation and the inherited transmission of acquired characteristics; (2) Darwin’s explanation through natural selection; (3) De Vries’ explanation through mutations; (4) Teilhard de Chardin’s inclusive or integrative evolution; and (5) Stephen Hawking’s view on increase in complexity.

**Lamarck** (1744-1829), a French naturalist, posited the two following laws: (a) In every animal which has not passed the limit of its development, the frequent use of any organ gradually strengthens and develops that organ, while constant disuse gradually weakens it until it disappears; (b) when such modifications have been acquired by both sexes in a species, they are transmitted to their offspring.

**Darwin** (1809-1882), the great British naturalist, postulated three facts to explain evolution: (a) *The accidental variations occurring continually in nature*: In every litter some of the offspring are stronger, faster, etc., than the others; (b) *The struggle for life*: The food supply is limited, and each animal has to fight to get its share of it; (c) *Natural selection*: In this struggle the stronger and faster individuals will survive, while the weaker and slower are eliminated. The fittest survive, and since they tend to mate with the fittest, the generations of offspring gradually improve.

**De Vries** (1848-1925), a Dutch botanist, discovered the phenomenon called ‘mutation’, which consists in a sudden change in one or several of the genes of a new born individual, producing more or less considerable changes in the animal’s specific features. Such mutations have been studied extensively and even produced artificially in laboratory-bred organisms, especially in the fruit-fly. They also occur spontaneously in nature, where they are known as ‘sports’.

**Teilhard de Chardin** (1881-1955): When Teilhard started his career, evolution was held in suspicion if not in condemnation. However, he accepted evolution as an undeniable fact. The basic, generalized, idea of evolution is that the universe and the material realities within it did not come into existence as finished products. Rather, they appeared in the course of a gradual, continuous, and progressive process. He holds that the early earth had latent germinal powers. Everything that was to appear, even humans, was already there in the initial ‘stuff of the universe’ in some extremely attenuated form. The evolutionary movement starting from the primordial atoms, proceeds until the universe arrives at the centre of centres which he calls the Omega Point. At a certain point of the evolutionary



movement, life shows up; at another, the power of self-reflection. From the cell to the thinking animal, as from the atom to the cell, a single process (a psychical kindling or concentration) goes on without interruption and always in the same direction. Evolution is Orthogenetic; Evolution is the Development of the Spiritual; Evolution is Continuous; Evolution is Creative Transformation; it is Theistic. Teilhard explained that the motive force needed for evolutionary process comes from the upward striving consciousness, the 'within' of cosmic matter. Other elements like struggle for survival, natural selection, mutation, and sudden changes of hereditary factors also play a part. But the development of life, which clearly strives after increasingly complex forms, can only be explained by this inner movement of the 'within.' The 'within' includes, integrates, and guides all the other factors. We may verbalize this Teilhardian vision of evolution as 'Inclusive or Integrative Evolution'.

**Stephen Hawking** (1942- ), a Lucasian Professor of Mathematics at Cambridge University, holds the view that in the process of evolution, the most important change has been the change in the level of information contained in DNA. An increase in the level of information relates directly to the increase in the level of complexity. As complexity increases, at certain stages, better forms with more intelligence appear. This is how we have evolved from apes. In future too, there will be a steady increase in the level of complexity in the DNA. This rate could be increased to a great extent if we could design DNAs. Thus we will have designer DNAs and scientists will design plants, animals, and may be, even human beings. In the next 100 years we will be able to grow babies outside the womb. Presently, human intelligence is restricted by the size of the brain that can pass through the birth canal. If the babies are grown outside the womb, there will be no such restrictions. These babies will have designed DNA structure and hence, would be close to being the advanced forms of human beings. The present millennium will be dominated by two advanced forms: One form will result from the increase in level of the complexity of our DNA molecule, the advanced human forms; and the other advanced form will result from the increase in the level of the complexity of the electronic circuits, namely, computers. We are today more complex than the computers, but then, the rate of increase in complexity of computers is considerably faster than the rate of increase in complexity of our brain. If both forms do not indulge in wars, they would be able to have better control over natural factors and hence could gain control over the universe. The future will bring about major changes in the human race and lead to the formation of advanced forms, which probably would not look like the present-day humans.

It can be concluded that neither the adaptations emphasized by Lamarck, nor the natural selection of Darwin, nor the mutations of De Vries, nor the increase in complexity of Stephen Hawking can *of themselves alone* explain evolution. These factors have been most certainly at work in evolution, yet the over-all progress of evolution is not explained by the blind influence of these mechanical factors. Some kind of *finality* seems to be required if we want to present a complete explanation of evolution. Finalism holds that evolution does not result from the blind interaction of the forces of nature, but is informed by a purpose; it strives towards an end under the guidance of a directing mind as illustrated by Teilhard de Chardin.

Check Your Progress

Note: use the space provided for your Answers

1) Explain the relation between act and potency.

2) How is potency related to evolution?

4.7 LET US SUM UP

The concepts of act and potency have historically delineated the dramatic antinomy felt by Greek thought with Being (Parmenides) and becoming (Heraclitus). The term ‘Act’ means *perfection itself*. Whatever a being *has* or *is* in a positive manner is an act. Potency means power. It is the capacity for act. The notion of act does not include any limitation. For, act is perfection and potency is limitation and hence imperfection. *Possibility* is objective potency. It is the capacity of a being for receiving existence. Change is the transition or passage from potency to act or from act to potency. Evolution implies and manifests potency. It is the change, over time, in one or more inherited traits passed on from one generation to the next, including anatomical, biochemical, or behavioural characteristics. Generally, scientists speak of two kinds of evolution: evolution of the cosmos and evolution of life. The concept of the evolution of the cosmos has its basis in the theory of the Big Bang. The evolution of life began with the origin and development cells, the basic unit of life and life-processes. The scientists agree that life did not always exist on earth. They estimate that it began about four billion years ago. About four billion years ago, *Aries*, the first prokaryotic cells appeared on earth. On account of the balance of Earth’s own internal dynamics and its position in the structure of the solar system, matter existed as solid, liquid, and gas and flowed from one form into another to provide an incessantly creative chemical womb from which arose *Aries*, the first prokaryotic living cell.

As for the way of explaining the evolutionary process, there has been, until rather recently, considerable disagreement between the proponents of evolution. It can be concluded that neither Lamarck, nor Darwin, nor De Vries, nor Stephen Hawking can satisfactorily explain evolution, since *finality* is lacking in their conjectures. The over-all progress of evolution is not explained by the blind

influence of mechanical factors. Some kind of *finality* seems to be required if we want to present a convincing explanation of evolution. Evolution, in fact, does not result from the blind interaction of the forces of nature but is informed by a purpose; it strives towards an end under the guidance of a directing mind as illustrated by Teilhard de Chardin.

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# Student Satisfaction Survey

Student Satisfaction Survey of IGNOU Students

Enrollment No.	
Mobile No.	
Name	
Programme of Study	
Year of Enrolment	
Age Group	<input type="checkbox"/> Below 30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51 and above
Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
Regional Centre	
States	
Study Center Code	

Please indicate how much you are satisfied or dissatisfied with the following statements

Sl. No.	Questions	Very Satisfied	Satisfied	Average	Dissati-sfied	Very Dissati-sfied
1.	Concepts are clearly explained in the printed learning material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	The learning materials were received in time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Supplementary study materials (like video/audio) available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Academic counselors explain the concepts clearly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	The counseling sessions were interactive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Changes in the counseling schedule were communicated to you on time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Examination procedures were clearly given to you	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Personnel in the study centers are helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Academic counseling sessions are well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Studying the programme/course provide the knowledge of the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Assignments are returned in time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Feedbacks on the assignments helped in clarifying the concepts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Project proposals are clearly marked and discussed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Results and grade card of the examination were provided on time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Overall, I am satisfied with the programme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Guidance from the programme coordinator and teachers from the school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

After filling this questionnaires send it to:  
Programme Coordinator, 115, G Block, IGNOU, Maidan Garhi, New Delhi-110068