CONSCIOUSNESS IN PLANTS

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Critical examination of existing literature about sensitivity in plants has been made in relation to the modern developments in biology. Nature of life, experimental and deductive data from physiology, psychology and philosophy about consciousness in plants, and molecular approaches to the problem correlated to impress upon the similarity of all life.

INTRODUCTION

The question of consciousness in plants is often dismissed as absurd. But this neglect has deeper roots. Botanists, biologists consider it a subject of psychology, philosophy and metaphysics. Philosophers are busy with human consciousness, and psychologists and zoologists with those of animals, in addition to man's. Yet there have been numerous people, many philosophers and psychologists, since time immemorial, making analysis of points from wide angles.

But with all this we reach to no decision. The fundamental existence of indecision in all matters of learning is already there. In addition, non-availability of a clear cut definition of 'consciousness', 'reflex-action' and 'instinct' is a great bar. 'Personal element' of scientists is also a major factor in continuing this stagnation. The workers must shed their many theories and make a working hypothesis, in the present state of human knowledge of the subject, for smooth development of science.

Instinct, reflex action and consciousness are interrelated. Definition of these concepts vary. Instinct is inherited, not developed by deliberate practice. It is a function of the body and executed spontaneously without being thought of or planned. Reflex action is also spontaneous, but not inherited. It is learnt by experiences or executed out of assumptions by the unconscious mind. Consciousness is most refined, controlled by the organ brain, the seat of mind, situated in the head of animals. Consciousness is displayed with great co-ordination of body and mind. It brings another concept into picture, the intelligence, ability to correlate and take decisions, modify life and behaviour with change of circumstances, and environment. Consciousness is a trait of life. The nature and sphere of life's activities are still ill-defined. The problem remains to be abstract even with spectacular developments in modern biology.

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We consider both plants and animals as living. We call all animals conscious, but hesitate to label consciousness in plants. Life can not be realized without consciousness. Everybody feels consciousness in plants, but hesitates to admit so because physical manifestations of consciousness, through movement of organs and production of sound in animals has no parallel in plants. But all do agree that plants possess sensitivity.

Right from the days of Veda (Laksaman Jha 1973, personal communication) to the present, all who talk of consciousness in plants accept very definitely that plants are sensitive, conscious. These are Manusmrti (c. 200 B.C.—200 A.D.), Mahabhārata (c. 400 B.C.—400 A.D.), Schopenhauer (1788–1860), Fechner (1848), De Candolle (1778–1841), all quoted in Hartman 1950, Bose (1917), and others, have put forth numerous experimental and deduction evidences to hold their point. Apart from the authorities of Manusmrti and Mahabhārata whose ideas about the consciousness in plants will be discussed later, mention may be made here of the significant contributions of eminent ancient Indian philosophers who lived in the period between first century A.D.—fifteenth century A.D. Plants according to these Indian philosophers, are endowed with the faculty of consciousness which, however, is 'dormant', 'extremely dull', and 'stupified'. The Rgveda and the Atharvaveda though in a poetic way, describe the attribute of sense of hearing in plants. With the emergence of the philosophical schools, there began the tendency to prove plants as conscious and sensitive like human beings. Maskarin Gosāla (pre-Buddhistic period), the Ajivika philosopher, mentioned plants as capable of feeling the touch of others. Umāsvāti in his Tattvārthadīghaṇa Sūtra (first century A.D.) referred to the sense of touch as the common sense organ in all worldly beings. The suggestion was further corroborated by the instance of lajjiḷu (lajjaṃvātiṣṭa, Mimosa pudica), brought into notice by Gunaratna (c. fourteenth century A.D.) who was also of the opinion that plants are conscious like human beings. The concept of consciousness in plants were elaborately discussed in a logical way by Udayanācārya (tenth century A.D.) and Śākaraśāstra (fifteenth century A.D.) who sought to prove the identity of plants with human beings through deduction hypothesis.

Those who treat plants as not conscious have hardly said anything in favour of their own ideas or against the opposite. Those who look to the words of 'consciousists' with pleasure, agree to the most that plants are sensitive. Plants have the feeling of sensations, because they have the living protoplasm. The modern experimental basis of science would ask biologists to find out whether there is anything like the brain of animals within the vegetable body. Consciousness is a function of the brain. Absence of brain in plants, would dismiss consciousness in plants as non-existent. Yet certain fundamental discoveries of biology in the last fifteen years or so give us a hope to hear something very definite, and unusual in the matter.
Sensitivity in Plants

The idea of plant as a living entity was conceived early (since Vedas) from the easily perceptible growth and reproduction in them. Sensitivity and feelings of pleasure and pain in plants though realized much later through experimentation (works of Bose 1902, 1927)\(^4\), its early recognition by the ancient Indian sages, though based on observation is proved from the following statements that occur in the works between c. 400 B.C.-400 A.D.

Thus Manu (Sastri 1965)\(^5\), the first human personage, whose sayings were compiled later says:

*Tamasā bahūrupena veṣṭitah karmaheṭunā
Antahsamajña bhavantyate sukhadukha samanvita*  
(Because of the level of evolution and peculiar method of development, plants are unable to express. But they are possessed with internal sensitivity, feel pleasure and pain: Manusmṛti 1 : 49).

The Mahābhārata (Śānti Parva 184 6–18, Sastri 1965)\(^6\) through the discourses of Bṛgu and Bharadvāja, has analysed this aspect of plant life in the following way (Kamat 1972)\(^7\)

*Pañchbhīrṇ<i>adi bhūtaistu yuktāḥ sthāvar jaṅganaḥ
Sthāvaranām na driṣṭyante karīre pañca dhātavaḥ*  
(Bharadvāja asks: Sir you say, all sthāvara (fixed, plants) and jaṅgana (moving, animals) are guided by the same five primal elements (.the five senses hearing, smell, taste, touch, and sight are associates of these primal elements). But I do not see any of these in plants!)

*Anusmanāmaceṣṭāṇāṁ ghanānāṁ caiva tatvataḥ
Vyṛṣṇāṁ nopalabhyaṁte karīre pañcadhātavaḥ*  
(Plants do not possess body heat, don't move their parts, remain fixed and do not seem to have the five elements.)

*Na bṛṅvanti na paśyanti na gandharasavedinah
Na ca sparham vijānanti te katham pañcabhautikāḥ*  
(Plants neither hear, nor see, nor smell or taste. They can't feel the touch of others. Why then you call them a component of five elements?)

*Aḍravatvādādunagnitvād bhauṃmatvadadvāyutāḥ
Ākāśasyāprameyatvād vyṛṣṇānāmnāsti bhautikam*  
(They do not seem to possess any liquid material in them, heat of body, any earth, any wind, and any empty space. How do then plants. could be said a compound of five elements?)

*Ghanānāmapi vyṛṣṇā nāmākāśoḥk na samśayaḥ
Teṣām pūrṇapāhal iyaktirṇityam samupapadyate*
(Though trees are fixed and solid, they possess space within them. The putting forth of the fruits and flowers takes place regularly in them.)

_Uṣmato mlāyate parṇam tevak phalam puṣpamera ca_
_Mlāyate kīrṇate cāpi sarkastenatra vidyate_

(Body heat of plants is responsible for the dropping up of flower, fruit, bark, leaves from them. They sicken and dry up. This proves sense of touch in plants.)

_Vāyavagnyakanimirghosaih phulapuṣpam vidyayate_
_Srotreṇa gṛhyate kabdestasmaechnitsantī pāḍpāḥ_

(It has been seen that sound of fast wind, fire, lightning affect plants. Plants must have a sense of hearing, therefore.)

_Vallī vekṣayate vrkṣam savaśakāvam yuchchati_
_Na kyāstesca mārgo 'sti tasmāt pahyanti pāḍpāḥ_

(Climbers twine the tree from all sides and grows to the top of it. How can one proceed ahead unless it has sight. Plants, therefore, have vision.)

_Punyāpunyajistathā gandhairdhāpaikā vividhairāpi_
_Arogāḥ puspitāh santi tasmājīghranti pāḍpāḥ_

(Diseased plants may be cured by special types of fumigation. This proves that plants possess sense of smell, and breathe.)

_Pādaicah salitpanacca vyādhinām capi darbanāt_
_Vyādhipratikriyātavacca vidyate rasanām drume_

(The trees drink water by their roots. They catch diseases of diverse kind from water (not suitable to plant body). These diseases are again cured by suitable water. From this it is evident that trees have perception of taste.)

_Vaktrenotpalnālena yathordhraṃ jalmādādel_
_Tathā pavamsamyuktāḥ pādaicah pibati pāḍpāḥ_

(As we suck water through a tube, so the plants take water through their roots under the action of air in the atmosphere.)

_Sukhadukhayosāca grahanāchchhinnasya ca virohyāt_
_Jīvam paśyami vrkṣānāmcaityanyāṁ na vidyate_

(Trees when cut produce fresh, new shoots, they are favoured or troubled by certain factors. So they are sensitive, and living.)

_Tena tajjalmādattam jaraṇyātyagnimarutau_
_Āhārapariṇamāccca satho vṛddhiśca jāyate_

(Trees take in water through roots. Air and heat within their bodies combine with water to form various food materials. Digestion of food allows them to grow, whereas some food is stored also.)
All these are deducational evidences, presented before the experimental method was introduced in science.

Schopenhauer published 'Uber de willen in der natur' in 1836 (the English translation 'Will in nature' in 1889), and discussed consciousness in plant-kingdom in detail. Fechner (1848) has supported the point in his 'Physical life of plants'. These philosophers have tried to demonstrate sensitivity of plants from features of plants that could be compared with animals. Huxley (1869), and then Hartman (1950) have discussed the matter afresh, with enthusiasm. Consciousness and animation of vegetable-kingdom has been proved with numerous examples. Plants may not be said to have mental capacity or psyche, but they act in ways similar to animals. Methods of propagation, cellular division, internal organization, circulatory system, growth, organ differentiation, food assimilation, contrivances for sexual conjugation, adaptation to water and desert, seed dispersal, power of regeneration, reflex movement of contractile tissues, insect trapping of canablistic plants, and detailed biochemistry could be used to emphasize basic unity of animal and plant lives. The inseparability of instinct, reflex-movement, and organic formation in animals are still distinct in plants. Sleep of leaves, climbing movement of vines, insect attraction for pollination with colored petals including mimicry exhibit higher level of life. Hartman (1950), has found consciousness in plants to be diffuse. Unity of consciousness is not there, the definite co-ordination of animal nervous system, sensation in the whole body at a time is lacking.

Jagadish Chandra Bose (1858–1937) was the champion in the field. In numerous papers, books and addresses he supported the fact with experimental evidences and physical equipments. Bose (1917) worked out points of contact not only between plants and animals but also between living and non-living. He is said to have been inspired by the passage of Mahâbhârata quoted above (S. S. Upadhyaya 1968 Personal communication). In developing an entirely new bio-philosophy of his own he went further ahead to establish the ancient Indian philosophy of the vedânta, life as one universal consciousness.

Lie-detector, used to measure psychological state of the mind has been used by Vaxter (Anonymous 1972) to test sensitivity in plant life. Vaxter during the course of his experiments at New York, has verified something sensational. He has proved that plants have sensitivity, memory of past experiences, and can predict coming troubles. Vaxter’s machine detected that plants get fearful if someone thinks either to cut or burn them.

This could be compared to somewhat identical views of Śaṅkar Miśra of fourteenth century A.D. who recognized 'Plants as the seat of experiences of the consciousness of their acts in previous births due to which they have so many kinds of body, and having the mental capacity to approach towards favourable and to avoid which is disfavourable to them'.

Truth of the theory has to be rigorously tested, but this could be used as an evidence to the existence of consciousness in plants, unless disproved. Psyche
and consciousness of plants as held by Bergson (1859–1941) and Kant (1724–1804) is in affinity with the ideas of Indian philosophers (Radhakrishnan 1948)²⁰. Lastly, the experiments of Russian scientists to hypnotize plants, as we do for human beings (Anonymous 1973)²¹, could be taken to be a proof of this fact.

**DISCUSSION**

The idea of consciousness and unity of all life that emerged in religion and mythology, through the works of the ancient sages, intuition of laymen and the poets—Shelly (1792–1822)’s ‘every flower enjoys the air it breathes’ (Yogesvar Misra 1973 Personal communication), and later in the writings of philosophers, gradually penetrated into experimental biology. Newer evidences are being collected everyday and the problem has now become a subject of serious study. Discovery of DNA and RNA in basic biology, mechanism of virus replication, the genetic-code of organisms, the enzyme action—all point out what marvel could be achieved with the minutest possible entities in the realm of life.

Of course, plants do not have a brain, the complex nervous mechanism associated with it. But the electrical, chemical impulses of transmission of stimulus is already there. Who could say, it is impossible to discover a plant-brain either diffuse or localised as in animals, in coming years, particularly when SCIENCE is making break-throughs everyday?

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