

# CONSCIOUSNESS IN PLANTS

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*(Received 2 January 1973; after revision, 17 February 1974)*

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.

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 *Manusmṛti* (c. 200 B.C.–200 A.D.)<sup>1</sup>, *Mahābhārata*<sup>2</sup> (c. 400 B.C.–400 A.D.), Schopenhauer (1788–1860), Fechner (1848), De Candolle (1778–1841, all quoted in Hartman 1950)<sup>3</sup>, Bose (1917)<sup>4</sup>, and others, have put forth numerous experimental and deductional evidences to hold their point. Apart from the authorities of *Manusmṛti* and *Mahābhārata* 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'<sup>5</sup>, 'extremely dull'<sup>6</sup>, and 'stupified'<sup>7</sup>. The *Rṅveda* and the *Atharvaveda*<sup>8</sup> 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<sup>9</sup> (pre-Buddhist period), the Ajivika philosopher, mentioned plants as capable of feeling the touch of others. Umāsvāti in his *Tattvārthādhiḡama Sūtra* (first century A.D.) referred to the sense of touch as the common sense organ in all worldly beings<sup>10</sup>. The suggestion was further corroborated by the instance of *lajjālu* (*lajjāvatilatā*, *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<sup>11</sup>. The concept of consciousness in plants were elaborately discussed in a logical way by Udayanācārya (tenth century A.D.)<sup>12</sup> and Śankaramiśra<sup>13</sup> (fifteenth century A.D.) who sought to prove the identity of plants with human beings through deductional 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 'consciousnists' 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)<sup>14</sup>, 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)<sup>15</sup>, the first human personage, whose sayings were compiled later says :

*Tamasā bahūrupēṇa veṣṭitāḥ karmaheturā  
Antahsamjñā bhavantyete sukhadukha samanvitā*

(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)<sup>16</sup> through the discourses of Bhṛgu and Bharadvāja, has analysed this aspect of plant life in the following way (Kamati 1972)<sup>17</sup>

*Pañcbhīryadi bhūtaistu yuktāḥ sthāvar jaṅgamāḥ  
Sthāvaranām na drīṣyante śarīre pañca dhātavaḥ*

(Bharadvāja asks : Sir you say, all *sthāvara* (fixed, plants) and *jaṅgama* (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 !)

*Anusmṛṇāmaceṣṭānām ghanānām caiva tattvataḥ  
Vṛkṣānām nopalabhyante śarīre pañcadhātavaḥ*

(Plants do not possess body heat, don't move their parts, remain fixed and do not seem to have the five elements.)

*Na śṛṇvanti na paśyanti na gandharasavedināḥ  
Na ca sparśam 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 ?)

*Adravatvādanagnitvādbhaumatvadvāyutaḥ  
Ākāśasyāprameyatvād vṛkṣānamnāsti 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 vṛkṣā nāmākāśobhik na sambayaḥ  
Teṣāṃ puṣpaphal ivyaktirnityam 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 tvak phalam puṣpameva ca  
Mlāyate śīryate cāpi sparṣastenatra 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.)

*Vāyavagnnyāśaninirghosaḥ phalapuṣpaṃ viśīryate  
Srotreṇa gr̥hyate śabdestasnaeēhrvanti pādṛpāḥ*

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

*Vallī veśṭayate vṛkṣam sarvataścāiva guchchati  
Na hyadr̥stesca mārgo 'sti tasmāt paśyanti pādṛpāḥ*

(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.)

*Punyāpunyaistathā gandhairdhūpaiśca vividhairapi  
Arogāḥ puspitāḥ santi tasmājjighranti pādṛpāḥ*

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

*Pādaiḥ salilpanācca vyādhinām capi darśanāt  
Vyādhipratikriyātvācca 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.)

*Vaktreṇotpalnālena yathordhvaṃ jalmadadet  
Tathā pavansamyuktāḥ pādūḥ pibati pādṛpāḥ*

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

*Sukhadukhayaśca grahanāchchhinnasyu ca virohṇāt  
Jīvam paśyami vṛkṣāṇāmcaityanyām na vidyate*

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

*Tena tajjalmadattam jarayātyagnimārutau  
Āhāraparinamācca sneho vridhhiśca 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 deductional evidences, presented before the experimental method was introduced in science.

Schopenhauer published 'Über die 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)<sup>18</sup>, 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 carnivorous 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 less distinct in plants. Sleep of leaves, climbing movement of vines, insect attraction for pollination with coloured 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 *Mahābhārata* 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 *vedānta*, life as one universal consciousness.

Lie-detector, used to measure psychological state of the mind has been used by Vaxter (Anonymous 1972)<sup>19</sup> 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 Saṅkar Mīra 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)<sup>20</sup>. Lastly, the experiments of Russian scientists to hypnotize plants, as we do for human beings (Anonymous 1973)<sup>21</sup>, 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?

#### ACKNOWLEDGEMENTS

The author is grateful to Dr. Laksman Jha, Darbhanga; Pandit Yogesvar Misra, Udai; Dr. Lakshminaryan Sinha, Muzaffarpur; Dr. B. V. Subbarayappa, Delhi; Pandit Sripati Jha, Panichobh; Prof. Anantlal Thakur, Patna; Dr. S. S. Upadhyaya, Muzaffarpur; Prof. M. Amanullah, Darbhanga; Prof. M. Z. Haque, Darbhanga; and Sri. Jayasri Misra, Mahathour who provided me with materials on the topic. The paper is dedicated to my parents : Sri Chadresvar Misra, and Sri Srimati Devi.

#### REFERENCES AND BIBLIOGRAPHY

- 1 Kane, P. V., *History of Dharmasastra* 1, p. 148–156, 1968, Poona.
- Winternitz, M., *History of Indian Literature*, 3, Pt. II, p. 548, 1967, Calcutta.
- 2 Winternitz, M., *History of Indian Literature*, 1, Pt. II, p. 417, 1963, Calcutta.
- 3 Hartman, E. V., *Philosophy of the unconscious*, Routledge and Kegan Paul Ltd., 1950, London.
- 4 Bose, J. C., Inaugural address, Bose Institute, 1917, Calcutta.
- 5 *Manusmṛti* 1 : 49, *Kīraṇāvālī* of Udayanācārya, *Bib. Ind.*, New Series, (1342), Fasc. III, pp. 238–244, 1912.
- 6 *Bhāgavat Purāṇa* Ed. with Sridhara Swami's commentary. Bangavasi Edition 1294 (BS), 3rd Skanda, 10th Chap., Vss 19–20.
- 7 Seal, B. N., *Positive Sciences of the Ancient Hindus* (Reprint), Motilal Banarasidas, p. 175, 1958.

- <sup>8</sup> *R̥gveda* X.97.21 (Vide also *Vanaspati* by G. P. Majumdar, 1917, p. 54, Calcutta).  
*Atharvaveda* XI,6.10.
- <sup>9</sup> Barua, B. M., *A History of the Pre-Buddhistic Indian Philosophy* (Reprint), p. 308, 1970.
- <sup>10</sup> *Tattvārthādhigama Sūtra*, Ed. with Umāsvāti's own commentary, *Bib. Ind.* (159), Chap. 2.  
*Sūtra* 23, Asiatic Society, 1905, Calcutta.
- <sup>11</sup> *Śuddhārśana Samuccaya* with Gunaratna's commentary, *Bib. Ind.*, New Series (1151), p. 158,  
Asiatic Society, Calcutta.
- <sup>12</sup> *Kiraṇāvali* (see Ref. No. 5).
- <sup>13</sup> *Vaiśeṣika Sūtra* of Kaṇāda, Ed. with commentary of Śankara Miśra, SBH Series (5) 1911,  
iv.s.5, Allahabad.
- <sup>14</sup> Bose, J. C., *Plant Autographs and their revelations*, 1927, Reprinted 1955, Bose Institute,  
Calcutta.  
———, *Responses in the living and the non-living*, 1902, Reprinted 1962, Bose Institute,  
Calcutta.
- <sup>15</sup> Sastri, Hargovind *Manusmṛti* with commentary, Chowkhamba, 1965, Varanasi.
- <sup>16</sup> Sastri, Ramnarayandatta, *Mahābhārata* with Hindi translation, Part V, pp. 4893-4894, Gita  
Press, 1965, Gorakhpur.
- <sup>17</sup> Kamati, R., *Vanaspati-sastra men vedanta*, *Vanaspati* 1(1) : 8-12, 1972.
- <sup>18</sup> Huxley, T. H., *Natur. Nature*, Nov. 4 : 1 (Goethe's translation), 1973.
- <sup>19</sup> Anonymous 1972, "Per paudhon men anubhūti," *Dinman* 22 Oct., 35, Delhi.
- <sup>20</sup> Radhakrishnan, S., *Indian Philosophy*, Vols. 1 & 2, George Allen and Unwin, 1948, London.
- <sup>21</sup> Anonymous, 1973, "Paudhon ki bhavanayen," *Navabharat Times*, 4 March : 4, Delhi.