CHAPTER IV
THE SENSE ORGANS AND THE SENSES

The soul gets embodied due to the accumulation of 'karma'. Then starts the wheel of 'saüsæra'. The embodied soul comes into contact with the objects of the world and tries to grasp the nature of the things through the specialised sources of the body. They are the sense organs.

The Jaina thinkers, like other ancient philosophers in India, recognised two varieties of comprehension - sensory and extra-sensory. Sensory comprehension is conditioned by the senses and the mind, whereas extra-sensory comprehension is directly apprehended by the self due to the pure consciousness. Sensory comprehension is possible through the sense organs. The sense organs are very often considered as windows through which the soul cognises the external world. In Ganadhara yeda we get a description of the process of cognition as coming out through the senses as Devadatta looks through the five windows of the palace. Pancaastikâya-sâra describes the function of the sense in a similar way. The sense organs are denoted by the word 'indriya', and 'indriya' refers to the instrumental nature of the source of knowledge. There are two ways in which the word 'indriya' can be looked at. 'Indriya' is

*1 'Ganadhara veda' Discussion with the third Ganadhara - Vayubhyti. Also refer to 'Sûtra-Krtângâ' 33. Commentary.
referred to as the capacity of experience. It is 'paramaisvarya upabhoga samartha', it is also referred to as that through which experience is possible as 'idyato iti indriyam'.

The Jaina philosophers had called such cognition as 'parokṣa jñāna', indirect knowledge, because it comes through the sense organs which are different from the soul. Later it began to be called 'saṃvyavahāra pratyakṣa'. The Jainas considered that the 'indriyas' are impediments to the attainment of pure consciousness and also to the purification of the soul. 'Indriyas' are the source through which 'karma' can flow in and they are the source of empirical cognition. In the Upanisad, the nature and function of the sense organs have been described. The 'Ātman' was first alone. He knew it. He was self-conscious. Then he got embodied. The sense organs became instruments through which experience is possible. Regarding the number of sense organs, Prajāpati is said to have described sixteen parts of the body.

In the Prasna Upanisad the parts are enumerated. The 'indriyas' are also considered as one. The Śvetāsvatara Upanisad also gives such a classification. The distinction between the sense organs, 'jñāṇendriyas' and motor organs 'karmendriyas' was made later. The name of 'indriya' as an organ of sense was first mentioned in the 'Kausitaki Upanisad'. In the 'Prasna Upanisad'

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*2 'Abhidhana Rajendra' Vol.II. P. 548.
*3 'Visesāsvasyaka Bhāṣya' 95.
*4 'The Prasna Upanisad' 6 as quoted in 'Philosophy of the Upanisad' by Deussen. P. 268.
the ten 'indriyas' were subordinated to the 'manas' as the central organ. In the Maitri Upanisad 'Jñānendriyas' are described as the five reins. The motor organs, 'karmendriyas' are the horses. 'Manas' is the driver. 'Prakṛti' is the whip. The vocal organ, the prehensive organ, the locomotive organ, the evacuative organ and the generative organ are the five 'karmendriyas'.

The Buddhists recognise six varieties of consciousness as the visual, olfactory, gustatory, tactile and purely mental. Then there are six 'āsrayas', the repositories of the function of the senses. They are the sense organs. They are the visual, auditory, olfactory, gustatory and tactual organs, and also the mind. The five sense organs are made up of the five elements.

But following the tradition of the Upaniṣadic thought as in the 'Praśna' and 'Maitri', the Śaṅkhya philosophers mentioned the organs and 'manas' which are instruments of the soul for experience and activity. They have mentioned five sense organs, five motor organs and 'manas'. Some times thirteen organs are mentioned including 'ahaṁkāra' and 'buddhi'. In that case, mind 'ahaṁkāra' and 'buddhi' are the internal organs called 'antankarana' and the other ten are the external.

*5 'Maitri Upanisad' 2.6.
*6 'śaṅkhya-pravacana-bhasya of Vijnānabhiksu'
The sense organs are not the products of gross matter but of 'ahamkāra'. 'Ahamkāra' is psycho-physical in nature. The functions of the sense organs are sensory in nature. They are concerned with getting experience. They are therefore called 'jñānendriyas'. The functions of the motor organs are bodily activity. They are therefore called 'karmendriyas'. The functions of the two can be compared to the afferent and the efferent nervous systems. In the evolution of life from 'ahamkāra', the 'manas', the sense organs and the motor organs are developed out of the preponderance of 'sattva'. The Tanmāt-rās are due to 'tamas'. 'Rajas' is the force which gives impetus to 'sattva' and 'tamas'. But Vijnānabhikṣu said that mind alone is due to 'sattva' while the sense organs and the motor organs have evolved out of 'Rajas'. The internal organs are described as the main gate-keepers while external sense organs are the subordinate gate-keepers.

Saṁkara accepts the view that there are eleven organs, 'indriyas' - five sense organs - 'jñānendriyas', five motor organs - 'karmendriyas' and one internal organ, the 'antahkarana'. The 'antahkarana' assumes different forms according to the diverse functions it takes. For instance, the function of 'manas' is doubt, the function of 'buddhi' is determination. 'Ahāmikāra' is ego consciousness and 'citta' is concerned with recollection. The five sense organs are made of elements like the earth, water, air, fire and 'ākāśa'. The 'sattvic' part is predominant in 'jñānendriyas'. The 'Rajas' part predominates
in 'karmendriyas'. The internal organs are made up of the 'sattvic' part and the five elements combined.

The Jainas have accepted the five sense organs alone, although mind is considered as a quasi-sense organ, a 'noindriya'. The motor organs are recognised as instruments of experience and behaviour. The Jainas argue that if motor organs were to be recognised as 'indriyas' only because they are the instruments of special types of physical function, then the number of 'indriyas' will have to be extended indefinitely.*7 The Jainas treat only those which arc the conditions of specific cognition as 'indriyas'.*8

Prof. Zimmer says that according to the Jainas the life monads enjoying the highest states of being, human or divine, are possessed of five sense faculties as well as of a thinking faculty 'manas' and the span of life 'āyus' physical strength 'kāya bala' power of speech, 'vācā bala' and the power of respiration 'śvāsokhyā bala'. In the 'sākhya Yoga' and the Vedānta systems five faculties of action, 'karmendriyas' are added to the five sense faculties. The 'karmendriyas' are analogous to the Jaina idea of 'bala'. Apparently the Jaina categories represent a comparatively primitive archaic analysis and description of human nature, many of the details of which

*7 Commentary on 'Pramāṇa-mīmāṃsā' I. 1.21. 79. line 20
'Cestavisegagamanantattvat'.

*8 Op. cit. 79. line 19. 'Jñānaviseṣahotūma-vehendriyat-
venadhikrtattvat.'
underlie and remain incorporated in the later classic Indian view. *9

The Nyāya system has similar arguments against the recognition of motor organs as 'indriyas'. Jayanta maintains that if tongue, hands and feet etc. are regarded as 'indriyas' many other organs should also be admitted as such. The function of swallowing food is discharged by the throat. The breast performs the function of embracing. The shoulders carry the burden. All these should then be recognised as organs or 'indriyas'. *10 Again, the function of one sense organ cannot be discharged by another. For instance, visual cognition is not possible without eyes. But that is not the case with motor organs. A person can grasp things with the hands and also walk a little even with the hands. If the different parts of the body doing different functions are included among motor organs, the throat, the breast and the shoulders would all be motor organs. The Jainas pointed out the same thing. In fact, the Jainas say that all motor organs can be included in the tactual sense organ. *11

Even in the West, the problem regarding the classification of the sense organs has been very old. It very often depends on the view regarding the sensations originating in

*9 'Philosophies of India' by Zimmer. P. 228.
*10 Nyāya Māṇiṣari P. 482-83.
*11 'Tattvārtha sloka vārtika' P. 326.
The skin and the internal organs of the body. Traditionally there are five special senses: vision, audition, smell, taste and touch or feeling. Aristotle mentioned the five senses, although he expressed some doubt about touch as a single sense. Current popular usage is in the Aristotelian tradition. However, at different times, especially of recent years, the list has been expanded. The 'extra' senses have come out of the sense of feeling by the process of subdivision. Boring, listing the sense qualities of feeling, includes pressure and other factors in the sense of feeling.\textsuperscript{12} In the history of classification of senses there have been in general three logically distinct approaches. They may be grouped together as (i) qualitatively on the basis of observational similarity, (ii) stimulus-wise classification with respect to the objects or forms of physical energy, that logically set them off and (iii) anatomically in accordance with system of sense organs. Geldard says that anatomical basis seems to provide the best organisational principle. For instance, we could talk of the sense of green and the sense of grey but since we know that the production of these qualities is to be the work of a single anatomical unit, the eye, we are accustomed to group the two classes of sense experiences together as visual.\textsuperscript{13}

\textsuperscript{12} 'Human senses' by Frank A. Geldard. P. 159.

\textsuperscript{13} Op. cit. P. 159.
Modern physiology maintains that all movement is due to the activity of the muscles. Muscles are made of bundles of contractile fibres by which movements are effected. There are three types of muscles as (i) skeletal muscles (ii) smooth muscles (iii) cardiac muscles. Cardiac muscles are controlled by the nervous system. Cardiac muscles are in the heart. Skeletal muscles have a much wider distribution. They are attached to the bones of the skeleton making bodily movement possible. Smooth muscles are found in many of the internal organs, as in the stomach walls and in the iris of the eye. The reflex and the voluntary movements are possible due to the muscles. In man the muscles are controlled by the nervous system. The nervous system consists of a mechanism for perceiving change in the environment and another for reacting to the environment. Thus all physiological functions are possible due to the stimulation of the efferent nervous system which gives the reaction through efferent nerves by using the muscles and tendons in its activity. In this sense, it can aptly be said that all physical functions may arise out of the sense of touch. In the invertebrate animals like the protozoa the chemical sense seems to be the only sense for all experience and activity. Scientists are not agreed on the question whether these animals show reactions due to the chemical sense or due to the mechanical stimulation. Schaeffer thinks that

*14 Physiology of Man by Langly and Cherskin (Mc Graw Hill) Ch. 3.

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it is due to mechanical stimulation. Metalnikow believes that
the discrimination is a chemical one.*15 The same problem
continues to vex scientists in the case of animals like the
coeleterates, flat worms, annelids, molluscs even up to the
insect level. Thus, we find that in the case of the lower
animals, especially the invertebrates, the sense of touch appears
to be predominant and it is the source of all experience and
activity.

The Jaina philosophers, as pointed out early showed
that all motor organs can be reduced to the experiences due to
the sense of touch.*16 However, it does not mean that the
ancient Jaina philosophers scientifically analysed the physiolo­
gical processes of motor responses. Knowledge of physiology
had not developed to the stage required for such analysis. But
their insight showed them that all bodily functions including
those of speech, excretion and reproduction are reducible to the
muscular movement due to the nervous stimulation and response.

It is for this reason that the senses were regarded as
mutually identical when looked at from the standpoint of unity
of substance. They had all of them fundamental identity. All
of them involved neural responses. But this identity is not

*15 'The Animal Mind' by Margaret F. Washburn. P. 60.
*16 'Tattvārtha Sloka Vārttika'
absolute. They are regarded numerically different from another point of view. Their specific functions were different. This attitude is due to the catholic outlook of the Jainas in which they were ready to accept the different points of view, if they were correct. This is due to the 'anekānta vāda' of the Jainas. If the sense organs were identical, then the organ of touch would experience taste and the rest also. In that case, other organs would be superfluous. Further, the perfection or partial injury to one organ would result in a similar consequence to the other sense organs. Similarly, if the difference between the sense organs were absolute they could not possibly cooperate in giving a synthetic judgement as 'I see what I touch.' For instance, we very often get the experience like 'I see the ice cold'.

But we cannot attribute to the ancient Jainā philosophers the experimental acumen expressed in the physiological and psychological analyses of the nature of sense organs. This analysis was more from the metaphysical point of view. It was due to their unerring insight into the problems of life. The Jainas accepted the identity and also the diversity of the sense organs because of their logical outlook. As we pointed out, their non-absolutist 'anekānta' attitudes to the problems of life gave them their insight into finding the truth. i.e. the different views presented. Thus, the analysis of the sense organs presented by the Jainā philosophers was more a philosophic

*17 Commentary on Pramāṇa-mīmāṃsā I. 1. 21. 80
insight than a scientific analysis. However, it cannot be denied that the analysis comes nearer to the description of the senses and their distinctions given by the modern physiologists, although the Jainas were not aware of the experimental and the analytic basis required for such a description.

The unerring insight of the Jaina philosophers is revealed when we analyse their views on the structure and the functions of the sense organs. Their analysis of the structure and the functions of the sense organs is unique and it deserves study with reference to the problems of modern physiology. It is not possible for us to go into the details of the analysis of the sense organs in the light of the discoveries of modern physiology, as it would be out of scope for the present work. However, a brief survey of such comparative analysis is necessary.

The senses are called 'indriyas' because they have been produced by 'indra' which means 'karma'. They are the manifestations of 'nāma-karma' which is the 'karma' which determines the nature and the composition of our organism. The 'nāma-karma' determines what body we will get, as whether we get human body or the body of a lower animal is determined by the 'karma'. Similarly, the physiological defects of our individuals are due to this 'karma'. The nature and the functions of the sense organs are determined by the 'nāma-karma'. The sense organs serve as the organs of perception of objects for a soul which is polluted
with 'karma'. The soul in the state of such pollution would not be able to get direct knowledge due to its own nature and pure consciousness. It is obscured by the knowledge-obscuring 'jñānāvaraṇīya' and intuition-obscuring 'darsanāvaraṇīya' karma.' In such an embodied state of the soul, experience and knowledge are possible only through the instruments of sense organs. Therefore, sense organs are the means through which empirical knowledge is possible.

According to the Jains there are five sense organs like the tactual, the gustatory, the olfactory, the visual and auditory. Each of these has its own characteristic capacity of experiencing touch, taste, smell, colour and sound. Each of these organs is structurally of two parts as the physical and psychical. The physical part of the sense organ is called 'dravyendriya'. And the psychical part is called the 'bhāven- driya'. The physical part of the sense organs is caused by the rise of the corresponding 'nāma-karma'. The psychical part of the sense organs is caused by the destruction and subsidence of the knowledge-obscuring 'karma', 'jñānāvaraṇīya karma'. Each of these two parts is again subdivided in two parts as: 'dravyendriya' is divided into (i) 'nivṛtti' and (ii) 'upakaraṇa'. Nivṛtti is the organ itself and 'upakaraṇa' is the protective physical cover like the eye-lid in the case of the eyes. Each of these two again is sub-divided in two parts as 'antaranga'.

*18 'Pramāṇa-mīmāṃsā' I, and 21.
and 'bahirāṅga', internal and external. The internal part
the 'bahirāṅga' is very often talked of as the soul itself. It
is to be identified with the psychic element which is necessary
for any experience. It permeates the whole sense organ.
'Bahirāṅga' or the external sense part is the material which is
permeated by the psychic element. In the case of 'upakāraṇa',
the protective cover like the eye-lin is the 'bahirāṅga'. The
matter immediately surrounding the eye may be identified with
the 'antarāṅga' of the physical part of the sense organ, although
it is possible to say that in all cases the 'antarāṅga' refers
the psychic element present in the sense organs and which is
necessary for sense experience. However, it would be more
appropriate to speak of the 'antarāṅga' of the material sense
organ in terms of the material only; and in that sense, it
would be apter to say that the 'antarāṅga' of the 'dravyendriya'
refers to the matter that is inside the sense organ and which is
permeated by the psychic element. For instance, we compare
this to the cornea of the eye. In fact, we may also include
the vitreous humour in the eye.

The 'bhāvendriya', the psychic part of the sense organ
is also divided into two parts as (i) 'labdhi' and (ii) 'upayoga'.
'Labdhi' is the manifestation of the specific sense experience

*19 'Labdhi Upayoga Bhāvendiyam'.

*19 'Labdhi' - Scu. 2.a and 'Prajñāpāna'
due to the destruction and subsidence of the knowledge obscuring 'karma'. In fact, it may be said to refer to the removal of the psychic impediments which have to be eliminated if the sense experience is to be possible. These impediments refer not to the physical impediments, like insufficiency of light in the case of vision, but to the psychic impediments in the case of the sense experience itself. ‘Upayoga’ is the psychic force determining the specific sense experience coming out of contact of the specific sense organ with the object of stimulation. It is the force of 'homa' operating in all psychic life and especially operating in the specific way in the determination of the sense experience. The word 'homa' has been used earlier, and as mentioned then, it is the psychic force which determines our experience and behaviour. This force operates in the specific sense experience, like sight, hearing, smell, taste and touch. Although 'upayoga' is the common force necessary for all these experiences, it gives rise to different experiences in the different senses, because it gets specific expressions due to the physiological and psychic conditions differently presented.

A general table of the distinction of the structure of the sense organs is given in table 2. It is based on the analysis of the structure of the sense organs as given by the 'ainas. The details of the structure are worked on the basis of the description given by Umasvati in 'Tattvārtha sūtra' Chapter II. Sutras 16,17 and 18.

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(a) Tattvārtha-sūtra. Ch.II. Sūtras, 16,17 and 18.
(b) Also refer to Abhidhāna Rālandra. Vol.2. P. 445.
(c) Tarkasamgraha edited by Athalye. Bombay Sanskrit Series.
(d) Praśnāgrāmāmāsā. I. 21,22,23.
Thus, the Jainas make a distinction between the physical structure and the psychic element involved in the sense organs. The physical part is the organ itself. It is the physiological instrument through which the individual receives the sense impressions. The outer part of the structure is the protective organ. It also facilitates the reception of the external stimulation. The internal part of the structure refers to the sensory nerves and the humours as in the case of the eyes. It is the 'antaranga'. 'Nivṛtti' is the internal physiological composition of the sense organ. In the sense experience 'Upayoga' is the hormic force which is responsible for the sense experience. The 'labdhi' is the manifestation of the horme in order to produce the specific sense experience under suitable psychic and physiological conditions.

The Jainas have given a detailed analysis regarding the structure of the different sense organs. For instance, the internal part of the sense of hearing is like the 'kadambari' flower or like a ball of flesh, 'mūsa-golā-kāra'. The internal eye is the size of a grain of corn, 'daṁnya māṣūra-kāra'. The sense organ of smell is like the closed flower, 'mukta kusuma candra'. The organ of taste is like the edge of a knife. While the sense of touch is of various forms. Similar descriptions can be given regarding the 'upsakara' or the protective cover of the organ. For instance, the external part of the organ of taste consists of the collection of the clear particles of matter,
The spread-outness of the sense organs is another problem mentioned by the Jainas. The eye is the smallest. The organ of hearing is also small, but it is bigger than the eye. Sometimes it expands when it hears loud sounds. The organ of smell occupies the largest space. However, it is limited in extent. If it were unlimited in extent, experience of smell would be possible even when the object touches any part of the body. But this is not a fact. The organ of taste has greater extent, although it is still limited, 'angula mita'. However, the sense organ of touch is unlimited in extent. It pervades the whole body. It is 'sarīra vyāpaka'. Thus the sense of touch is considered by the Jainas as primary in another sense. It pervades the whole body and as such the experience of touch is possible in any part of the body.

Modern psychologists point out that the sense organ of touch is really unlimited in extent because it gives rise to various sense experiences like pressure, temperature and organic pain. In fact, even the internal parts of the organism give us experiences which are reducible to the experience due to the tactile stimulation. Organic pains like stomach-ache are, in fact, species of the experiences of touch. In this sense, all sense experiences...

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*21 'Abhidhēṣaṇa-Rājendra' Vol. 2 'Indriya'
*22 'Prajināpana-sūtra' 15.
can be reduced to the tactile sense experience. The Jains can be said to be justified in giving primacy to the sense of touch.

The Jaina description of the different parts of the organs may well be compared to the description of the sense organs given by modern physiologists, although modern physiologists have given an accurate and detailed analysis of the structure of sense organs based on experimental investigations. We may, however, note that experimental investigation was not possible in those days. Modern physiologists say that the vision is far more complex than any other sense organ. We may take the example of the anatomy of the human eye for comparison. Fig. 1 shows the comparative picture of the anatomy of the human eye with reference to the modern physiological and the Jaina view. The outer layer of the material sense organ of the eye consists of a tough resistant material which is termed as sclera. This material gives substance to the eye-ball. The most forward part of the sclera is transparent. It is called cornea. It is a tough resistant material which permits the passage of light rays and which protects the eye. The eye-lids and the sclera may together be compared to the outer protective cover of the structure of the 'dravyandriya'. It is the 'upsakarana' of the eye. In fact, eye-lids are outer part

*23 'The Physiology of Man' by Langley and Cheraskin. P. 97. and 'Human senses' by Geldard. II - 160.
Fig. 1.

BAHIRANGA
Upakaranya includes protective cover. Includes eyelids & sclerotic coat.

Niuytti of DRAYENDRIYA is compared to the matter that surrounds the internal part. Iris may be included in this.

ANTARANGA
Includes aqueous humour & Choroid coat.

Shows the physiological internal composition of the sense-organ.

It includes Retina, vitreous humour & lens.
and the cornea is the inner part. On the inside of the back is retina which is most important. It is a system of highly specialised nerve cells. The cells are the receptors sensitive to light. The image is focussed upon this layer. The retina consists of two types of nerve cells, rods and cones.

Then we have the lense which is transparent consisting of semi-solid substance enveloped by a thin capsule. Just in front of the lense is the thin muscular layer of the iris. It has an opening at the centre through which the light rays may pass. This circular aperture is the pupil of the eye. The lense, the iris and the pupil can be compared to the 'nirrtti' and specially the external part of the 'nirrtti'. The retina and the vitreous humour may be compared to the internal part of the 'nirrtti'. Similarly, the aqueous humour between the cornea and the lense may also be included in this.

The physiologists do not account for the psychical part of the sense organ which has been called 'bhavendriya'. It refers to the psychical factors which are necessary conditions of the sense organs for giving the sense experience. The basic psychological factor required for the sense experience of the specific sense organ is the psychic force, the hroma, which has been called the 'upayoga'. This force is operating in all experience and behaviour and it is responsible for the specific sense experience. But, before we get the sense experience...
experience, like sight, certain psychological impediments have to be removed. For instance, diversion of attention and the subjective conditions, like prejudice and bias, have to be minimised if we have to get a correct sense experience. For instance, as Munn says, for every sense experience we have a mental set which determines a type of the specific sense experience that we get. This set may be inherited or acquired. This psychological factor may be compared to 'labdhi' of the 'bhāvendriya' which is the expression of the hormic force in the specific form due to the partial destruction and subsidence of the knowledge-obscuring 'karmas' relating to that sense.

The problem of the contact of the sense organs with the object of stimulation is an important problem in the Indian thought. It has a great psychological significance. Almost all the systems of Indian thought were aware of this problem and they have expressed themselves in one form or the other. The Nyāya Vaiśeṣika, the Śāṁkhya, the Mīmāṁsaka and the vedaṇa schools of thought believe that all the sense organs get the sensory experience due to the direct contact of the object of stimulation with the sense organ. This refers to the physical

*24 'Psychology' by Munn. *24

Drever defines set as a temporary condition of the organism facilitating a certain more or less specific type of activity or response, as in mental set or neural set. - Dictionary of Psychology.
contact of the object of stimulation with the sense organ and the sense organs having such contact are called 'prāpyakāri'. The sense organs in which there is no such physical contact with the external stimulations are called 'aprāpyakāri'. According to the orthodox systems of Indian philosophy mentioned above, the sense organs are 'prāpyakāri' because there is physical contact with the stimulation. In fact, it is maintained by them that the sense organs move out to the object in the form of 'vṛtti' or modification and take in their form and apprehend them. The Buddhists believe that the visual sense organ and the auditory sense organ cognise their objects without coming into direct contact with them. They are 'aprāpyakāri'. For all of them, however, the mind is 'aprāpyakāri', because it does not come in direct contact with the object. The Jains maintain that the visual organ, like the mind, is 'aprāpyakāri', because it does not come in contact with the object. For instance, we get visual experience of the moon and the mountains alike. According to the Jains, the eye does not go round to the mountain and then fix a point to form the 'vṛtti', nor does it go round the stars and then fix on the moon to get the experience. Such a sojourn of the eye round the objects of stimulation is absurd, and it contradicts our experience. The Jains say that the light and darkness do not involve the eye going out to see light. Moreover, the eye is not an external organ, 'bāνyendriya'.*25

*25 'Abhidhāna-Pāññāna.' Vol. II. P. 555
The Jainas maintain that it is not true to say that there is a physical contact either of the nature of 'anugraha' or 'upaghāta' for the eye. Seeing the blazing sun is not 'upaghāta' because the eye is the organ of light, 'tejasendriya'; and the matter of the same nature does not bring 'anugraha' and 'upaghāta'. But the eye does not work while seeing the sun after the clouds go, because there is the deficiency of light. The rays in the eyes are few compared to the abounding rays of the sun. However, when we see the blazing sun our eyes do not ache.

The Sāmkhāyikas object to maintaining that the eye alone, like the mind is 'aprāpyakāri', and other four sense organs are 'aprāpyakāri'. If that were the case, we may as well argue, they say, that all the sense organs are 'aprāpyakāri', because we, for instance, hear distant sounds and we smell the fragrance of the flower from a distance. But the Jainas say that this objection is not convincing.*26 They point out that even those sense organs which are 'aprāpyakāri' do not go out to meet the objects for getting experience; but, the objects themselves come in contact with the sense organs and the sense organs remain in the same state as they are situated in their site. It means that the external stimulations, like the sound waves affect the ears and as a result we hear.

The Buddhists say that even the ear may be called 'aprāpyakāri', because we hear from a distance, and as there is no direct contact of the object and the sense organ. It is 'aprāpyakāri', because in any type of auditory experience there is no physical contact. For instance, a new-born infant will give the same type of response to a stimulation of a loud sound or a melodious sound. Similarly, even if there is some thunder, auditory experience may not be possible. But the Jainas say this is not a correct explanation, because in the case of the infant the sense organs are not as yet well adapted and well developed. They have not sufficient capacity for grasping the sound. They say that the appropriateness of stimulation is one of the conditions of sensory experience. In the case of hearing, the sound waves are received only when the sense organ is suitably developed and also when other conditions are favourable. That is why it is said that they go to the appropriate places, 'yogya deśavasthita'. For instance, a low tone is not generally heard, but if the beloved speaks in a low tone the lover quickly hears. This refers to the psychological factor of interest which is a condition of specific sense experience. We may include this in the 'labdhi' of the 'bhāvandriya'.

In the case of the auditory sense the Jainas point out that, although the ear is a 'prāpyakāri' and although some form of physical contact is necessary for the auditory experience, it is not the direct physical contact with the stimulation
as in the case of smell or in the case of the sense of taste. In the case of taste specially the stimulation is directly physical. The particles of food for instance come actually in contact with the tongue. Such direct physical contact is called 'baddha aprsta' *27. The Jainas say that in the case of the auditory sense organ the contact is there but it is indirect. The stimulation like the sound waves coming from the object come in touch with the sense organ of hearing and we get the auditory experience.

Modern physiologists describe the process of audition in these terms. The sound waves are transmitted through the external auditory meatus to beat against the tympanic membrane. As a result, the tympanic membrane is caused to vibrate in harmony with frequency of sound waves. The movement of tympanic membrane in response to sound waves causes an auditory ossicles to move with it. Under normal conditions, sound waves pass through the external auditory meatus and strike the ear-drum. This energy is transmitted to the fluid of the inner ear and the hair cells in the organ of corti are caused to move and initiate auditory impulse. There are two theories concerning the mechanism by which the movement of the hair cells gives rise to impulses in the auditory nerve: (i) through the microphonic effect, and (ii) through a chemical mediator. At present evidence is not conclusive for either

*27 'Abhidhammaśāhendra.' Vol. II. P. 557.
Thus the Jainas believe that auditory, gustatory, olfactory and tactual sense organs are 'prāpyakāri' because the contact of the object with the sense organs is due to 'upaghāta', gross and subtle physical contact. For instance, the touch of a blanket gives the experience of roughness and the contact with the sandle gives the sense of coolness. The particles of camphor come in contact with the olfactory sense organs and we experience the sense of smell. Similarly, soft sounds give the pleasant experience of melodics. But in the case of the eye there is no contact between the sense organ and the object.

On the basis of the analysis of perception given in modern science it is not possible to say that the Jaina view of the 'aprāpyakāri' of the visual sense organ is understandable because some kind of contact of the external object with the sense organ is necessary even in this experience. Such a contact is through the medium of light.

However, the problem of the contact of the sense organ was viewed differently by the ancient Indian philosophers. Their

*28 'Physiology of Man' by Langley and Cheraskin Chapter on Hearing.

For a detailed description of the theory refer to 'Comparative Animal Physiology' edited by C. Ladd Professor Ch. 13. Phono Reception.

*29 'Karkasa kambala sparga' 'Karpūmpudgala ghrāne'.
problem was to explain the possibility of cognition to the sense organ. The Jainas had a realistic approach, and they refused to believe that the sense organ goes out to meet the object.

C.D. Broad says that hearing is projective in its epistemological aspect, and is emanative in its physical aspect. We may say that sight is ostensibly prehensive and not projective in its epistemological aspect, but is emanative in its physical aspect. And we may say that touch is ostensibly prehensive in its epistemological aspect, and is non-emanative in its physical aspect.*30

The Jaina analysis of the 'prāpyakāritva' of the sense organ of hearing and the 'aprāpyakāritva' of the sense organ of sight may be compared to the analysis given by Broad, although the epistemological and physical aspects of the problem were not clear to the Jainas in that early stage of knowledge.

Considering the capacity of the sense organs, the Jainas believe that the capacity of the eyes is greater. The eye perceives the things like the mountains which are at a distance and things which are very near like the parts of the body. But it does not mean that it can see the dust in the eye-lids. The capacity is limited because it cannot see things which are beyond the particular limit like the farthest and the

nearest. The Vaiśeśikas say that it is the defect of the eye. But the Jainas maintain that it is the nature, the 'svabhāva' of the sense organ. The auditory organ is of a similar nature. But in the case of the ear there is a special power. It grasps the sound waves coming from twelve 'yojana' if the wind brings them and if they are not obstructed. It grasps the sound waves even inside the ear. It is subtler than the sense organ of smell. It receives sound waves of various types, but it grasps only those which are relevant like the bird taking up milk from the mixture of milk and water, like the 'kamsakṣira'.

Modern science recognises that vision is the most important of all senses. Blind people do learn to depend on other senses to a remarkable degree. But for the loss of vision there is never anything like complete compensation. We rely on vision for protection, for equilibration, for co-ordination and for creation and pleasure. Next comes audition. Then we have olfaction and other sense organs. Audition ranks perhaps almost with vision. In the case of man olfactory acuity has been allowed to be atrophied. Lower animals are far more dependent on the acute sense of smell than we are dependent. Actual survival hinges on the animal's ability to find food and to avoid enemies. To some extent this was also a case in the case of primitive man. But as man advanced the olfactory sense began to get restricted in its use. And modern men use olfactory sense for the enjoyment of pleasure. Audition, like vision, is important for protection, because this sense gives
us the sense of danger in the environment. It also adds to the enjoyment of pleasure. Therefore, it is considered as a vital sense.*31

We may refer to the functions of senses in the different animal levels. According to the Jainas there are gradations of animal life. At the lowest level, there are the one-sensed organisms called 'ekendriyas'. They may be earth-bodied, water-bodied, air-bodied and fire-bodied. It includes the vegetable kingdom. Many of the organisms are minute and microscopic. They pervade the whole world. They are described as 'sakala loka vyapinah'. Some of them may be gross-bodied, visible to the eyes. These organisms possess only the sense of touch. No other sensory discrimination has been developed in them. Amoeba, paramaecium and other protozoan animals, similarly coelenterates and even flat worms may be included in this list, although the Jainas have not mentioned any specific animal species in this category. Modern comparative psychologists are not agreed on the question of the sensory experience of lower animals. Some maintain that they have chemical sense. But some scientists like Schaeffer think that the reaction of these animals may be due to mechanical stimulation. Even in food-seeking the sense of touch is predominant.

*31 Also refer to Physiology of Man by Langley and Cheraskin (McGraw Hill) Chapter - Special Functions.
Romanes described a certain amount of discrimination among the mechanical stimuli to the sea-anemones. In the case of planaria maculata, a species in the flat worms, Bardeen has suggested that 'auricular appendages' on the animals' back near the head end which are specifically sensitive to touch may be delicate organs capable of stimulation by slight currents in the water set up by the minute organisms that prey on the animal's food, so that the primitive reaction when given to food may be really a response to mechanical stimulation.  

Next in stage are the two sensed organisms called the 'dvendriyas'. They have the sense of touch and taste, which is like the chemical sense, although the chemical sense signifies a combined sense of both touch and taste. Comparative psychologists maintain that first animals, especially the water dwelling animals, have the smell and taste combined. They call it the chemical sense. For in the aquatic animals smell and taste are actually the same. Lloyd Morgan has proposed the term 'talaesthetic taste' for the chemical sense of the aquatic animals. But it is said that touch gives mechanical stimulation and it is present in all animals. The Jains say that touch is the basic sense. They describe the animals possessing the two senses in detail. They give examples of the animal species possessing the two senses. For instance, the conch

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'candanska', 'kapardaka', 'jelukhi', 'golakha' and 'puttaraka' are the insects of this class. These are the molluscan species. Among the comparative psychologists there is general agreement regarding the presence of chemical sense in the molluscan animals. Nagel regarded the horn of the marine snails as the most sensitive region. Pieron found that there are three modes of chemical excitability in these animals, (i) an aerial distance excitability on all parts of the body with predominence of the mouth, the anterior edge of the foot and the siphon (ii) a contact sensibility in both air and water in the horns in the mouth and (iii) a delicate distance sensibility in water located in the regions of the mouth, the horns, the anterior edge of the foot and the osphradial region.

Three-sensed organisms possess a sense of touch, taste and smell. Many examples have been quoted. For instance, ants have three senses. The four-sensed organisms possess the sense of touch, smell, taste and sight in addition to the three. For instance, 'bhramara', the bee has four senses. Many of these belong to the species of the insects. But comparative psychologists are not agreed on the place of the sense of sight in the insects. The homing of the bees and recognition of the nest-mates were the two interesting problems which the psychologists were faced with. Some scientists

thought that vision is the guiding factor in these cases. However, Bethe thought that they were not guided by sight. He said there was some unknown force which guided them to their hives. Many scientists believe that smell played an important part in this case. Modern scientists have observed that even simple animals like amoeba give reaction to light stimulation. Schaeffer reports a curious fact that the amoeba can 'sense' a beam of light 20 microns to 120 microns distant moving towards it. Many Jellyfish react to light. Romanes says that they possess a visual sense. But there is no positive evidence. Some of the molluscan species possess eyes of some degree of development, although their reaction to light is very slow. The crustacea are provided with a peculiar visual organ, the compound eye; and the chief function of this eye seems to be that of responding to shadows and movements. As we go higher up in the animal scale, we find that the structure of the eye becomes more complex, and the compound eyes give rise to simple eyes with cones and rods. The vertebrates, like the fish 'matsya', the crocodiles 'makan', and man are the five-sensed organisms. Those possessing the five senses are divided into two groups as : those possessing mind and intelligence. They are called 'samjñīnah'. Those who do not possess mind and intelligence are 'asamjñīnah'. It is not possible to say whether the Jainas showed a qualitative distinction between sense and reason. However, they maintained that among the five-sensed animals only some of them are 'samjñīns'. Human
beings belong to this class. They possess specific mental states like memory, imagination and intellection.\textsuperscript{34} 'Asaṁjnins' do not possess such mental qualities. A further psychological analysis of this group is made by the Jainas. They say that the 'saṁjnins' are further divided into those which are incomplete and those which are complete. Incomplete species are those species in which sense capacities do not work freely and they are deficient in expression. Such a deficiency may be due to the deficiency of the structure in the sense organ or the deficiency in the mental capacity of grasping the sense experience. This, in brief, is the classification of animals having the sense organs. Going higher in the scale of life, there are those beings who are not fettered with the sense organs. They are called 'anindriyas'. They get pure and unalloyed experience because sense experience according to the Jainas is an experience at the lower level. It is not direct experience of the soul. It comes through the sense organs which are a limitation. The beings without the sense organs come nearer to the realization of the highest experience. Some of them are complete in the mental equipment and capacity. They are perfect beings. They are 'siddhas'. Thus from the psychological analysis of the development of animal life we go to the metaphysical nature of the soul found in the disembodied.

\textsuperscript{34} 'Abhidhāna-Rājendra' Vol. II. P. 568.

'Saṁjñino saṁjñinascata tatra saṁjñanam saṁjñāna saṁjñac-
cetanaśvadbhāvināvasyambhāvaparyālocanam sa vidyate saṁjñinah
visiṣṭasmaranādirūpa manovijñānabhāja ityarthā'.

\textsuperscript{34} 'Abhidhāna-Rājendra' Vol. II. P. 568.
being. The embodiment of the soul is a nindramoc to the attainment of pure experience. Pure experience is possible by removing the barrier of the senses. The present stage of psychology is not in a position to explain such a phenomenon of super-sensible experience, although it is possible to approach this problem, if we go in the direction of the studies in parapsychology and extra-sensory experience. Research in this direction is possible and necessary. This problem will be referred to in a later chapter in which extra-sensory perception will be discussed.

**Sense qualities:**

Sense organs are the instruments by means of which sense experience is possible. The senses are the capacities of experience and the sensible qualities which exist outside are the objects of experience. For instance, the common element between the eye and the object is colour and the common element in the case of hearing is sound. They are stimulations. The given Jaina have a psychological analysis of the sense qualities of the sense experience coming from the various sense organs. As Radhakrishnan says, a good deal of psychological analysis is discernible in the division of sense qualities.*35 According to the Jaina the visual sense quality of colour is classed into five types, like black 'krṣṇa', blue 'nīla', yellow 'pīta' and white 'sukla' and pink 'padma'.*36

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*35 'Indian Philosophy' Vol. I. P. 309.
*36 'Tattvārthādhyāga-sūtra' Ch. II. Sūtra 20.
that there exist three distinct sets of nerve fibres, one set sensitive to red, one to the green and the other to the violet. This theory has been expounded by Helmholtz. There are three primary colour excitations, and the mixture of these three gives different colour experiences. All fibres are responsive, in some way, to all waves, though the red fibres are excited by the long waves. Green fibres respond to those of medium length. Violet fibres are maximally stimulated by short waves. All colour experience result from these three simultaneous excitations based on the relative strength of the components in the stimulus of light. This is the Tri-chromatic theory. But Herring and Franklin have objected to this theory. They maintain that yellow and white are as primary as the three colour qualities mentioned by Helmholtz. Herring supposed that the primaries are to be arranged in pairs. There are three complex substances, one mediating white-black, another red-green, and the third responsible for yellow-blue. The white-black material is more plentifully supplied, and is more readily excited than others. When activated, it gives purely achromatic brilliance and it can be depressed in the direction by black only through light adaptation and contrast. The other two substances behave differently having their activity either depressed or augmented. The red-green substance yields red when 'torn down' by light and green when built up. In the yellow-blue substance depression produces blue whereas augmentation results in yellow. The Ladd-Franklin theory represents in a
sense a compromise being the tri-chromatic combination for mixture and tetra-chromatic combination in its existence, it points out that there are five primary colour qualities. In fact, Newton presented his celebrated triangle for explaining the natural phenomenon of the spectrum and for explaining the scope of the sense of sight. The triangle mentions green at the apex and red and violet at the points. Grey and purple in the centre. The figure is given in Table III. Instead of this triangle Wundt proposed a circle. Titchner gives us the pyramid in which every possible chromatic or achromatic variation finds its due place. Whatever may be the difference in the views of the Jainas and modern scientists, it may be said to the credit of the Jainas that they were aware that the five sense qualities are responsible for giving the variation in colour experience. Modern scientists like Ladd and Franklin and even Newton have mentioned five primary qualities. According to Ladd-Franklin theory, there is a white-black whole and yellow-blue substance similarly it mentions the red-green substance. The Jainas did not mention red-green as a specific sense quality.

Regarding the sense qualities like touch, taste and smell, the Jainas give a detailed analysis of the different

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*37 'Psychology down the ages' by Spearman. P. 199-200

*38 Ibid.
TABLE III.

Newton's triangle of spectrum.

RED.  PURPLE.  VIOLET.

GREY.

GREEN.
types of sense qualities. Touch is of eight kinds, like hot 'uṣṇa' and cold 'sīta', rough 'ruksa' and smooth, 'snigdha' soft 'komala' and hard, 'kathora' and light 'laghu' and heavy 'guru'.

Modern scientists have realised that the skin has the potentiality of yielding a greater diversity of sensations because the skin proves to be responsive to a wide range of stimuli, like mechanical, thermal, electrical and chemical. Mechanical stimulation gives rise to sensations of touch, contact and pressure. Thermal stimulation produces the sense experience of warm and cold in various degrees. Chemical stimuli have been worked to give rise to pain. Chemicals and drugs have been of much interest for their quality in reducing pain. Electrical stimulation of the skin seems capable of arousing all systems of sensibility. Kinaesthetic and organic sensibilities of various types including hunger and organic pain belong to the sense of touch.

The Jainas say that there are five types of taste as pungent 'tikta', bitter 'katu', acid 'āmla', sweet 'madhura' and astringent 'kaśaya'. Many scientists have accepted salt, sweet, bitter and sour as the primary taste qualities. However, there is no complete agreement on this problem.

At the end of the 16th century in Western thought, there were nine basic taste qualities like sweet, sour, sharp, pungent, harsh, fatty, bitter, incipient and salty. By the middle of the 18th century, some of them were gradually dropped, because it

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*39 'Tattvārthādiṣṭhikā sūtra. Ch. II. Sūtra 20, with commentary.*

*40 'Human senses' by Geldard. P. 313.*
was found that they were merely mixtures of different taste qualities. Later, four qualities were accepted as primary. Herring's 'taste tetra-hydron' presents the relation between the four primary taste qualities like saline, sweet, sour and bitter. Various other taste qualities arise out of the interaction of the primary qualities. However, Herring views taste as one and not as four senses. Herring's tetra-hydron is shown in Table IV.

The Jainas classify smell in only two types as good 'sugandha' and bad 'durgandha'. No further distinction has been made. In the 18th century an odour system was devised. Herring has given a scheme of odour classification represented by 'the smell-prism'. Herring's odour prism is shown in Table 7.

The Crocker Henderson system posits four fundamental odours like fragrant, acid, burnt, and caprylic. All these classifications are partly based on experimental investigation and partly on rational insight. But there are difficulties in the grouping of odours, because, as Woodworth points out, that in the analysis of Herring's classification some odour qualities are not purely odour. They are mixed up with taste qualities. Zwaardemaker mentioned the smell qualities as ethereal (as fruit), aromatic (as spice), fragrant (as flowers), ambrosial (as musk), allinceous (as onion), ampyromatric (as tur),

*41 'Human senses' by Geldard. P. 313.
TABLE IV.

**Hennings' Taste-tetrahedron.**

TABLE IV.

**Hennings' Smell-prism.**
hircine (as cheese), repulsive (as laudanum), and nauseous (as decaying flesh). This is very elaborate and uneasy classification. It does not mention the primary sense qualities alone. The Jainas gave the analysis of the odour qualities and in fact all sense qualities on the bases of rational insight. They thought it safer to analyse the sense qualities into two major distinctions as good and bad.

The traditional exposition of the seven fundamental sounds (svara) mixing into various ways to form the melodic of various types has been accepted by the Jainas. The seven sounds are: 'sadja', 'sabha', 'sambhat', 'madhya', 'prarana', 'dhaiyata', and 'nisadha'. In Western sound system, we get the following: 'Do', 're', 'me', 'fa', 'sol', 'la', and 'si'. In all there are twenty seven main kinds which can be combined in innumerable combinations. There are two varieties of combinations of tones, difference tones and summation tones. The difference tones were discovered by the celebrated Italian violinist Tartini. Summation tones were discovered after Helmholtz researches in 1856 A.D. A difference tone has a pitch determined by the difference between the frequencies of the two other tones. A pitch of the summation tones results from the addition of frequencies. The study of the combination of the tones and beats has led to the research in the auditory harmony. In the case of the sound researches, Spearman says 

"A2 'Human senses' by Geldard. P. 315."
that a distinction has been drawn between noise and tone. A detailed classification of the Jaina view of the sense qualities is shown in Table VI.

Thus, the analysis of the sense qualities given by the ancient Jains has not been arbitrary. It has a great psychological significance, although it has no basis of scientific and experimental research. However, it can be said with confidence that the Jaina analysis of sense qualities shows a good deal of psychological significance, and it has presented a very clear and deeper rational insight. The conclusions drawn by these philosophers may not be adequate and may not agree with the modern views of the scientists who have worked out the problems through experimental research in laboratories. It may be noted that there is not much agreement among the modern scientists as to the detailed analysis of the sense qualities like colour, sound, smell and taste, although there is a fair agreement on the fundamentals. The same agreements may be found in the views of the Jaina philosophers. In fact, the views presented by the Jaina philosophers on the problem of the sense qualities very much agree with the views of other Indian philosophers of ancient times. We find this in a description of the sense qualities given by the Naiyāyikas.

It is needless to say that the psychological significance of

Table VI

1. 'Sparsa' - Touch - 8 kinds: (1) 'Uṣṇa', hot; (2) 'Īta', cold; (3) 'Rukṣa', rough; (4) 'Snigdha', smooth; (5) 'Komala', soft; (6) 'Kathora', hard; (7) 'Laghu', light; (8) 'Guru', heavy.

2. 'Rasa' - Taste - 5 kinds: (1) 'Tikta', pungent; (2) 'Āmala', acid; (3) 'Asta', bitter; (4) 'Madhura', sweet; (5) 'Aasāya', astringent.

3. 'Varṇa' - Colour - 5 kinds: (1) 'Kṛṣṇa', black; (2) 'BĪla', blue; (3) 'Pīta', yellow; (4) 'Sukla', white; (5) 'Pada', pink.

4. 'Gandha' - Smell - 2 kinds: (1) 'Śrīgandha', sweet smelling; (2) 'Durgandha', bad-smelling.

5. 'Śabda' - Sound - 7 kinds: (1) 'Baddja'; (2) 'Gaśa'; (3) 'Gandhāra'; (4) 'Adhyama'; (5) 'Pañcama'; (6) 'Chāvata'; (7) 'Niśāda'; i.e., the: 'Do', 'Re', 'Me', 'Fa', 'Sol', 'La', 'Si'.

Note:

In the rational beings mind also assists the senses in bringing knowledge to the soul.
the analysis of sense qualities given by the Jainas purely through rational insight and not on the basis of experimental research cannot be ignored.