In the early schools of Indian logic, inference was divided in two ways. The Vaiśeṣika and the Mīmāṃsā systems divide inference into two kinds, while the Nyāya, Sāmkhya and the medical school of philosophy divide inference into three kinds. Prāśastāpadā calls the two kinds of inference as 'drṣṭalīnga' (inference based on the perceived mark) and 'adṛṣṭalīnga' (inference based on the mark which is not perceived) or 'śāmānyatrodṛṣṭalīnga' (inference which is based on the mark which is known on the basis of its similarity with something which is perceptible). Sābara calls them as the inference which is based on the perceptible relation between the mark and that of which it is the mark, and the inference which is based on the imperceptible relation. The three kinds of inference recognized by the early Nyāya are called as 'pūrvavat', 'sesavata' and 'śāmānyatrodṛṣṭa'. In 'sāmkhya tattva kaumudi', Vācaspati Miśra first divides inference into two kinds as 'vīta' and 'Avīta'. He identifies 'Avīta' with the 'Sesavata' inference and regards 'vīta' as comprising of 'pūrvavat' and 'śāmānyatrodṛṣṭa' kinds of inference.

II
PRĀŚASTĀPADĀ ON THE TWO KINDS OF INFERENCE

Prāśastāpadā defines 'drṣṭalīnga' inference as that in which the generic property inferred is identical with the generic property which had been known to be necessarily related to the reason. For example, having perceived a dewlap only in a cow in the town, when we perceive an animal with the dewlap somewhere else, we infer that the animal is a cow.

Prāśastāpadā holds that in the case of 'śāmānyatrodṛṣṭa' inference, the property inferred and the property known to be necessarily related with the
reason are absolutely different and the inference takes place on the basis of
the invariable concomitance between the genus of the reason and the genes
of the 'sādhyā'. For example, on the basis of the cognition that the voluntary
activities of the worldly men such as the traders, peasants and the government
officers and the like bear fruits, we infer that the activities of the hermits
also bear fruits, though they do not have any motive to obtain the fruits of
their activities. Here, there is no similarity between the activities of the
worldly men and the activities of the hermits. But both belong to the genus
'activity' which is known to be necessarily related with fruits.

III
THE THREE KINDS OF INFERENCE ACCORDING TO
THE NYĀYA-SŪTRA

The Nyāya-sūtra mentions that there are three kinds of inference -
'purvavat', 'sesavat', and 'sāmānyatodrata. But these terms have not been
defined anywhere in the 'Nyāya-Sūtra. Vātsyāyana is not sure regarding the
original meaning of these terms. He offers two alternate interpretations of
these terms.

According to 'Vātsyāyana's first interpretation, 'purvavat' means
inference of an effect from its cause, e.g. in the inference of the impending
rain from the rising clouds and 'sesavat' means the inference of cause from its
effect e.g. the inference of the fall of rain in the upper regions of a river
from seeing the river in spate. He regards the inference of the movement of
the Sun from seeing it at different places, as an instance of 'sāmānyatodrata'
inference.

IV
THE KABHAYA KAPICHAH DISCUSSION
The Buddhist Logician Dignāga criticises the validity of the inference of effect from its cause. He points out that we cannot infer an effect from the presence of its cause because it is possible that even in the presence of a cause (general cause), its effect may not occur either due to some impediment or due to the absence of the secondary cause.

Uddyotakara and Jayanta explain the Buddhists objection put against the inference of effect from cause. A cause cannot co-exist with its effect in the same substratum. Therefore, the latter cannot be inferred from the former. Is the effect synchronous with the cause? If it is, it must be perceived along with the cause. If it is not, it is non-existent like the sky-flower. Therefore, in neither case it can be inferred. A reason which belongs to one substratum cannot lead to the inference of a thing belonging to another substratum. We cannot argue that a spoken word is transient because the cry of cow is transient. Moreover, the occurrence of an effect is not necessarily tied up with the presence of a cause. A general cause of an effect may be present, but the effect may not occur either due to the impediment or due to the absence of the supporting conditions. It is very difficult to determine all such conditions which unconditionally produce an effect.

Uddyotakara realises that an attempt to infer effect from cause will go against the very structure of inference. But he points out that the author of the Bhasya does not hold that an effect is inferred from its cause. Jayanta also says that only a person having perverted mind thinks that the Naiyayikas hold that an effect is inferred from its cause. What the Naiyayikas hold is that from the cognition of the presence of cause that very cause is inferred as qualified by its relation with its effect. Similarly, in the case of the 'sesavat' inference, what we infer from the presence of an effect is that very effect as qualified by its relation with its cause. An effect cannot be
inferred from a general cause. But it can be inferred from the totality of the conditions which necessarily give rise to the effect. There is no necessary relation between the presence of clouds and the fall of rain. But there is necessary relation between the fall of rain and the clouds accompanied by deep rumbling, having many cranes flying through them and flashing with lightning as such clouds have never been found in the past without being followed by the rain. Thus, from a specific cause (kāraṇa viśeṣa) such as the clouds having specific characteristics, we infer that very cause as qualified by its relation with the effect. Similarly from the cognition that a river in spate is qualified by such characteristics as swift current, muddy and foamy water etc. we infer that very river as connected with the upper regions where it had rained heavily.

The Buddhist Logicians who accept only two kinds of inference viz. inference based on 'svabhāva hetu' and inference based on 'Kārya hetu', include the cases of the inference of effect from the totality of its causal conditions under the former category. They hold that from the totality of the causal conditions we infer only the possibility of the production of the effect. It is only the capacity of the collocation of the total causal conditions to produce the effect which is inferred from it. As the capacity to produce the effect follows unconditionally from the totality of the causal conditions, such cases of inference belong to the first kind of inference.

It cannot be held that we infer the effect from the collocation of the total causal conditions as the collocation does not immediately and unconditionally produce effect. There are several moments between the moment of the production of the effect. The first moment of each of the causal factors give rise to the next moment of its own kind. If this process continues there arises the new effect which is known as the product of all the causal factors collectively. But during the moment between the first moment of
collation and the production of the effect, there are many a slip. If the
causal chain which starts from the collocation of all the necessary factors
of an effect continues, the effect will be produced definitely. But who can
say with certainty that the causal chain will continue uninterruptedly?
Therefore, an effect cannot be inferred from the collocation of all its
essential causal factors. But from the cognition of the presence of the
collocation of all the essential factors of an effect, we can infer that the
collocation has the capacity to produce the effect as the capacity depends
unconditionally upon the collocation.

The opponent may ask what the Buddhists mean by the 'capacity' of the
cause to produce the effect. If it means that the effect will necessarily
occur when all the essential causal factors are collocated, then there is no
risk in inferring the effect from the cause. And if it is thought that there
is risk in inferring the effect from the cause, then it cannot be denied that
there is also risk in inferring the capacity of the collocation of the
essential causal factors from the presence of these causal factors. The
Buddhists reply that 'the capacity' of the cause to produce the effect means
only the possibility of the production of the effect in the presence of the
cause. It means that the total causal factors will produce the effect, if
some impediment does not happen to disturb the causal process and that when
it is disturbed by the obstructing conditions, the effect will not be produced.
Nothing can be said with certainty whether in a particular given case there
will rise some disturbing condition or not. Therefore, from the totality
of the causal conditions, what we infer is only their capacity of producing
the effect collectively.

Uddyotakara does not accept Vatsyayana's interpretation of 'samanyatodrsta'
inference. He holds that 'samanyatodrsta' inference covers up all such cases
of inference which are not based on the relation of cause to effect or the relation of effect to cause. The inference of the presence of water at a particular place from the presence of the cranes, the inference of colour from savour, the inference of the sensation of touch from the sensation of colour, the inference of 'tree' from 'śīmāpa' and other similar instances will come under this category. Any inference based on any uniform relation other than the relation of cause to effect and the relation of effect to cause comes under the class of 'samānyatodṛṣṭa' inference.

Vākyāyana gives second interpretation of 'pūrvavat', 'sesavat,' and Sāmānyatodṛṣṭa inference. It shows that he was not satisfied with his first interpretation. Having perceived two things together, when we infer the existence of one from seeing the other, we have 'pūrvavat' inference. For example, the inference of fire from smoke is regarded as the inference of the 'pūrvavat' kind, because it is based on the knowledge of invariable concomitance between them determined by observing them together.

The 'sesavat' inference is an inference by elimination. For example, we experience that sound is an entity and is transient but we do not know to which of the categories it belongs. By the process of elimination we infer that it belongs to the category of 'quality'. Sound cannot belong to the categories of 'Generality' (śāmānya), 'Individuality' (visēsa) and 'Inference' (śāmēśya) as these are not transient. Of the remaining three categories it cannot belong to the categories of Substance (dravya) and Activity (karma). It cannot belong to the category of Substance, because it inheres only in one eternal substance. A substance may be either eternal or non-eternal. An eternal substance e.g., atom does not inhere in any substance. A non-eternal substance e.g., a jar inhere in many substance viz. in atoms. Sound also cannot be an activity as a sound gives rise to another sound, while an activity cannot give rise to another activity. Thus, by elimination it is established that sound is a quality.
When the relation between 'hetu' and 'sādhya' is imperceptible and the 'sādhya' is inferred from the similarity of the 'hetu' to something else, we have an inference of the 'sāmānyatodrśta' type. For example, the existence of the soul is inferred from the psychic qualities such as desire etc. Explaining these three kinds of inference, Jayanta points out that every form of inference is based on the relation of invariable concomitance between 'hetu' and 'sādhya'. Therefore, it is redundant to recognise different kinds of inference on the basis of causal relation. A 'hetu' leads to an inference of the 'sādhya' not by virtue of its being the cause or the effect of the 'sādhya' but by virtue of the relation of invariable concomitance between them. Therefore, the first classification of inference is not proper.

Explaining the nature of the 'pūrvavat' inference he points out that it consists in the inference of a 'sādhya' which is of the same kind which was perceived in the past as the invariable concomitant of the 'hetu'. Thus, 'pūrvavat' inference of Nyāya, is identical with the śrāva 'drśtalīnga' inference of Śrāvastīputrā. For example, having realised the invariable concomitance between fire in general and smoke in general, when we infer fire of general nature from visible smoke, we have an example of 'pūrvavat' inference. But having realised the invariable concomitance between smoke in general and fire in general when from the specific characteristics of a visible smoke we infer the fire of specific kind of elimination we have an example of 'sesavat' inference. When the object inferred is imperceptible by its very nature, we have an example of 'sāmānyatodrśta' inference. Thus, the pūrvavat and the 'sesavat' inferences of the Nyāya seem to be the two subclasses of the drśtalīnga inference of the Vaiśeṣika.

The above three forms of inference may be illustrated with regard to the same object of cognition. The desire etc. inhere in some substance (soul) because they are produced. Whatever is produced inhere
in some substance like the jar. This is *purvavat* inference. When by eliminating the inherence of the desire etc. in the body and the sense organs, it is established that they inhere in soul, we have an inference of the nature of *sesavat*. The soul is imperceptible. Therefore, the inference of the soul from the desire etc. may also be regarded as the inference of the kind known as the *śānāyatodrṣṭa* inference.

There is no formal difference between *purvavat* inference and *śānāyatodrṣṭa* inference. The difference between them is only material. While the object of *purvavat* inference is perceptible, the object of *śānāyatodrṣṭa* is imperceptible.

Though the object of both the *purvavat* inference and the *sesavat* inference is perceptible, there is a difference between them. While the object of *purvavat* inference is inferred as a thing of general nature, the object of *sesavat* inference is inferred as something specific.

There is also the difference of form between the *purvavat* and the *sesavat* inference. While the former is applicative, the latter is disjunctive. *Śānāyatodrṣṭa* inference is also applicative in nature.

Besides the formal difference between the *sesavat* inference and *śānāyatodrṣṭa* inference, there is also material difference between the two. While the object of *śānāyatodrṣṭa* inference is always something imperceptible, the object of *sesavat* inference may be imperceptible in some cases, and perceptible in some other. Soul which is imperceptible may be the object of *sesavat* inference. But the object of *śānāyatodrṣṭa* is always imperceptible.

Thus, according to the Naiyāyikas the difference between *sesavat* inference and *śānāyatodrṣṭa* is mainly formal. Formally both the *purvavat* and the *śānāyatodrṣṭa* belong to one category - the category of applicative inference, and *sesavat* belongs to another category of disjunctive inference.
Uddyotakara classifies inference into three kinds in a different way. According to him, the three classes of inference are: (1) 'Anvayinumāna'-inference based only on the positive reason; (2) 'vyatireki anumāna' - inference based only on the negative reason; (3) 'anvayavyatireki' - inference based on the positive negative reason. In the case of 'anvayi' inference the reason exists in the subject and only in the similar cases. There is no dissimilar case. Therefore, it cannot be said that the reason does not exist in the dissimilar cases. In the case of 'vyatireki' inference, there is no similar instance. Therefore, it cannot be said that there is positive invariable concomitance between the 'hetu' and the 'sādhya'. In the case of 'anvayavyatireki' inference the reason has both positive and negative vyāpti with the 'sādhya'. Čaṅgesa appropriately calls them as 'kevalānvayi', Kevalavyatireki and 'anvayavyatireki' kinds of inference. As an instance of the 'anvayi' inference, Uddyotakara mentions the Buddhist's argument that 'the sound is transient because it is a product.' According to the Buddhists, the basic metaphysical assumption is that there is nothing which is not a product. Therefore, there cannot be the possibility of the 'vyatirekavyāpti' between the 'hetu' and the 'sādhya'.

Uddyotakara quotes the Buddhists example of inference with a motive to refute the Buddhist theory of 'trairūpa'. But this does not refute the Buddhist theory which holds that the valid form of inference is based on 'anvaya' and 'vyatireka' relation between 'hetu' and 'sādhya', because the Buddhists do not hold like the Naiyayikas that the 'anvaya' and the 'vyatireka' relation between 'hetu' and 'sādhya' is based on the method of agreement in presence and in absence. On the contrary, they hold that the relation of 'vyatireka' between 'hetu' and 'sādhya' is based on the 'pratibandha' determined
either by the relation of 'tadatmya' or by that 'tadutpatti'. But the Naiyāyika cannot accept any proposition which is empty i.e., which has no empirical basis.

The later Naiyāyikas give another example of 'kevalānvayi' inference which is based on the Naiyāyikas' metaphysical assumption. The jar is nameable because it is knowable. All that is knowable is nameable. According to the Naiyāyikas' assumption there is nothing which is not knowable.

The Advaita Vedāntins reject the Naiyāyikas' 'kevalānvayi' inference on the ground that it is not based on a vyāpti determined by the empirical methods but is based on a 'vyāpti' which is simply an assumption of particular school. The proposition that 'all that exists is knowable' is the Naiyāyikas' metaphysical assumption. It is not based on any inductive method. Similarly, 'all that exists is a product' is the Buddhists' assumption. The assumption of one school carries no logical validity to the logicians of the other schools. The Advaitin does not accept that whatever is real is knowable. Brahma is real but it is not knowable. Therefore, 'Kevalānvayi' inference is not inference at all.

Uddyotakara accepted Kevalānvayi form of inference, in opposition to the Buddhists' theory of 'anvaya' and 'vyatireka' relation. He seems to hold that a proposition which is not based on empirical ground has no meaning. But he himself contradicts this principle when he recognizes 'kevalānvayi' inference, because it is not based on an empirical method. The major premise of Kevalānvayi - inference is only an assumption.

It should be noted that 'kevalānvayi' inference is based on the relation of equipollence between 'hetu' and 'sadhya' (samavyāpti). But every inference based on 'samavyāpti' cannot be called 'kevalānvayi' inference. For example, there is the relation of equipollence between smoke and fire of wet fuel. Wherever there is smoke, there is fire of wet fuel. And wherever there is fire of wet fuel, there is smoke. But the inference based
on this 'vyāpti' cannot be called 'kevalānvayi' inference as there are things which are neither smoke nor the fire of wet fuel. A kevalānvayi inference is that in which the reason is not the counter- positive of any absence that resides any where (vṛttimadatyantarabhava apratiyogitvam kevalānvayitvam Anu, cinta P.47)

The Advaita Vedantini does not have any objection against the formal aspect of 'kevalānvayi'inference. But he does not recognise the 'kevalānvayi' inference, because he thinks that the major premise of the 'kevalānvayi' inference is not established by induction.

KEVALAVYATIREKI INFRINGEMENT

A 'vyatireki' inference or more appropriately 'kevalavyatireki' inference is that in which the reason exists in the subject (pakṣa) and does not exist in the dissimilar cases (vipakṣa), and regarding which there is no similar case (sakṣa). For example, the living body is not devoid of soul, because if it were so, it could not be living. In this case there cannot be any similar instance. What is proved here is the absence of non-soul and it cannot be found in any thing other than the living body which is the subject (pakṣa).

Gangesa points out that 'kevalavyatireki' inference is that in regard to which there is no similar case (sakṣa) and 'vyāpti' between the 'hetu' and 'prasmād sadhyā' is based on the observation of the concomitance between the absence of the 'ṣādhyā' and the absence of 'hetu'. The 'vyāpti' which is the basis of 'kevalavyatireka' inference is in the form that 'where there is non-', there is non- M., The earth is different from all the other substances, because it possesses smell, or earthness (prthivītvā). The predicate which is affirmed of the earth in the conclusion is non- non-earthness and it can be found only in the earth, the subject (pakṣa). However, we can state 'vyāpti' between non-earth and that which is devoid of the quality of smell.
We observe that whatever does not possess smell is not earth. The earth possesses smell. Therefore, it is different from every thing else.

The Advaita Vedāntins and the Mīmāṃsakas do not accept 'kevalavyatireki' inference. They regard it as a distinct process of cognition called by them 'Arthāpatī'. The Advaitins and the Mīmāṃsakas refuse to accept 'vyatireki annūmāna' on the formal grounds. They think that there is no middle term in the case of what the 'Nāyāyikā regards as 'vyatireki' inference. The form of 'vyatireki' inference is as follows:-

All the cases of non - S are the cases of non - H

X is a case of H

Therefore X is a case of S.

Obviously there is no middle term in this argument. Therefore, the Advaitins and the Mīmāṃsakas do not accept it as a valid form of inference.

When 'vyāpti' is regarded as a formal relation as held by the Buddhists it can be maintained that 'vyāpti' between non - S and non- h implies 'vyāpti' between h and s. But when 'vyāpti' is regarded as the generalisation established by induction, it cannot be held that the 'vyatireka vyāpti' implies 'anvayavyāpti'. And unless, there is 'anvaya - vyāpti' between h and s, s cannot be inferred from h.

The Naiyāyikas hold that in the case of 'kevalavyatireki' inference, the possibility of 'anvaya - vyāpti' is completely ruled out. The Mīmāṃsaka argues that inference is the process in which the 'sādhya' is affirmed of that of which the 'hetu' is affirmed. The sādhya can be affirmed by the thing of which the 'hetu' is affirmed only when the 'hetu' is pervaded by the 'sādhya'. Thus, 'anvaya - vyāpti' alone can be the basis of inference (annūmāna).

The Mīmāṃsakas and the Advaitins, thus, accept only one form of inference (annūmāna) viz: the anvayi-inference.

The Advaita vedāntins and the Mīmāṃsakas hold that the Kevala-vyatireki -
ANUMANĀ of the Nyāya does not present a valid form of reasoning. However, they think that all the instances of Kevala-vyatireki-anumāna can be formulated in the valid form which is called Arthāpatti.

**ANVAYAVYATIREKI ANUMĀNA**

The inference which is based on 'hetu' which has affirmative as well as negative 'vyapti' with 'sādhya', is called 'anvaya-vyatireki' inference. The inference of fire from smoke is the common example of this kind of inference. There is invariable concomitance between smoke and fire and also between the absence of fire and the absence of smoke. Both these aspects of invariable concomitance between smoke and fire are established independently on the basis of observation of smoke and fire and the absence of smoke and the absence of fire.

The Advaita vedāntins reject the concept of anvayavyatireki anumāna for the same reason for which they reject the concept of Kevala-vyatireki inference. They accept only one form of inference which they call 'anvaya-anumāna'. It should be noted here that the anvaya-anumāna of the Advaitin is not the same as the Kevalanvayi of the Nyāya. According to the Nyāya, the Kevalanvayi anumāna is that form of anumāna in which there cannot be a negative instance of 'hetu' and 'sādhya'. The Advaitings do not accept such form of anumāna because they think that in such cases the necessary relation between 'hetu' and 'sādhya' can be a matter of postulate only. It cannot be established by empirical methods. But in the anumāna, the vyapti which serves as the major premise should be a proposition which is established by induction. They also think that induction can establish only affirmative propositions.

It seems to me that the Naiyayikas recognition of Kevalanvayi inference and Kevalavyatireki inference is based on two distinct logical
principles. 

The kevalanvayi inference is based on the law of equipollence; h=p.

The Mīmāṃsakas and the Advīta Vedāntins do not object to the formal validity of the 'kevalanvayi' inference. Their only objection against it is that it is based on a major premise the material validity of which is not tested by the empirical methods.

The 'kevalāvayatireki' inference is based on the law of Contradiction and the law of contraposition. The Mīmāṃsakas hold that a 'vyatireka vyapti' cannot be obtained on the basis of induction as there is no negative universal such as non-fireness etc.

The negative vyapti which is regarded by the Naiyāyikas as the basis of 'kevalanvayi' inference, in fact, is not obtained by induction, though the Naiyāyikas may make futile efforts to show that it is based on induction. It is deduced from the law of contradiction. The earth is the contradictory of the non-earth. What is true of earth cannot be true of non-earth. The smell is the essential quality of earth. Therefore, it is not the quality of non-earth. Thus, whatever is devoid of the quality of smell is non-earth. The deduction is based on the law of contradiction is called Arthapatti by the Mīmāṃsakas. They would say that the cognition that non-earth is devoid of smell is not known by induction but by 'arthāpatti'. The concept of earth as that which possesses smell cannot be reconciled with the concept of non-earth without assuming that the non-earth is devoid of smell - the essential property of earth. But the Naiyāyikas sometimes unnecessarily emphasize that the cognition that 'all the elements other than earth are devoid of smell' is obtained by observing the absence of smell in all of them.

It seems that the controversy between the Naiyāyikas and the Mīmāṃsakas with regard to the 'kevalāvayatireki Anumāna' is based on the ambiguous use of the term 'anumāna.' The term 'anumāna' is used, sometimes, for a process of
cognising something which is not presented to the senses. It is its original meaning. But sometimes, it is also used for inference as a formal process of deduction. The Naiyāyikas use it in both the senses. When the Naiyāyikas talk of 'kevalavyatireki' anumāna or 'kevalanvayi anumāna, they use the term 'anumāna' for the formal process of inference.

The Mīmāṃsakas and the Advaita Vedāntas emphasise the use of the term 'anumāna' only in one sense viz: in the sense of a source of knowledge. They therefore, do not speak of 'Kevalavyatireki' and Kevalanvayi - anumāna which present only the forms of inference. The form which is expressed by the Naiyāyikas as Kevalavyatireki - anumāna is explained by the Mīmāṃsakas as 'Arthānatti'.