Greek Herakles and Tamil God Kaṇṇan (in Nalayira Divya Prabandham) - Mythological Theory of Binary Opposition in Fighting with Animals and the Formula for Variation

It is mentioned by Greek historian Arrian that Indians worshipped Greek Heracles. The myths related with Greek Herakles like fighting against living creatures and wild animals and displaying their extra-ordinary power against natural elements, carrying the entire world on their shoulder are all found in the myths of Tamil God Kaṇṇan. So it is ascertained that the Indian Heracles worshipped by Tamil people is none other than Tamil God Kaṇṇan through myths. This research attempts to compare the Greek and Tamil myths with their theories of mythology.

Keywords: Greek, Herakles, Krishna, myths, Tamil Kannan

Introduction

Every society has myths. It happens that two societies resemble each other in their myths. According to the theories of mythology, the resemblances seen in the myths are said to be influential and parallel. The comparative researches highlight the influence of Greeks on Indians (Campbell 1960) (Edmunds 2002) (Allen 2007) (Alonso 2009) (Adluri 2012) (Allen 2014) (Alonso 2017).

Greek and Tamil are considered to be ancient classical languages. There is a resemblance between Herakles of Greek mythology and God Kannan of...
Tamil culture. The ancient Greek historian Arrian, who belonged to 86–146 AD mentions that Indians worshipped Theban Herakles, shows the influence of Greeks on Indians. This is the mythological theory of influence. On the contrary, Indians mention that the Herakles belonged to their own country. It gives the way to the theory of parallels. So there is need to compare these two myths on the basis of these two mythological theories. This comparison leads to better understanding of these two myths (Strauss 1955).

Historical Possibility of Influence

Mythological theory of parallels reveals that the resemblances between two myths are purely coincidental. But on the contrary, the mythological theory of influence emphasise the connection between these two peoples and the culture exchange takes place through trade. There is a mention of the relation between Greeks and Tamilians through trade in an ancient Greek work named ‘Peripules of the Eritheranian Sea’ (Wilfred 1912).

Tyndis is of the Kingdom of Cerobothra; it is a village in plain sight by the sea. Muziris, of the same Kingdom, abounds in ships sent there with cargoes from Arabia, and by the Greeks; it is located on a river, distant from Tyndis by river and sea five hundred stadia, and up the river from the shore twenty stadia. Nelcynda is distant from Muziris by river and sea about five hundred stadia, and is of another Kingdom, the Pandian. This place also is situated on a river, about one hundred and twenty stadia

Mythology confronts the student with a situation which at first sight could be looked upon as contradictory. On the one hand, it would seem that in the course of a myth anything is likely to happen. There is no logic, no continuity, any characteristic can be attributed to any subject; every conceivable relation can be met. With myth, everything becomes possible. But on the other hand, this apparent arbitrariness is belied by the astounding similarity between myths collected in widely different regions.

Finally it can be understood why works on general mythology have given discouraging results. This comes from two reasons. First, comparative mythologists have picked up preferred versions instead of using them all. Second, we have seen that the structural analysis of one variant of one myth belonging to one tribe (in some cases, even one village) already requires two dimensions. When we use several variants of the same myth for the same tribe or village, the frame of reference becomes three dimensional and as soon as we try to enlarge the comparison the number of dimensions required increases to such an extent that it appears quite impossible to handle them intuitively. The confusions and platitudes which are the outcome of comparative mythology can be explained by the fact that multi-dimensional frames of reference cannot be ignored, or naively replaced by two or three dimensional ones.
This trade relation (Pugazhendhi 2021a) between Greeks and Tamils (Warmington 1928)\(^6\) (Schoff 1917)\(^7\) provided way for transaction of many literary forms (Pugazhendhi 2021b) and myths (Pugazhendhi 2021c) with one another.

The Greek Historian Arrian

Theban Herakles mentioned in Greek mythology has resemblances Indian Herakles. The place of worship of Indian Herakles is ‘Methora’ (Eberhard 1885).

\[4\] Ηρακλέα δὲ, διότι εἰς Ἰνδόν ἀπικόσταθα λόγος κατέχει, παρ᾽ αὐτοῖσιν Ἰνδώσι γηγενέα λέγεσθαι.
\[5\] τοῦτον τὸν Ἡρακλέα μάλιστα πρὸς Σουρασηνῶν γεραίρεσθαι, Ἰνδικοῦ ἐθνος, ἵνα δύο πόλεις μεγάλαι, Μέθορα τε καὶ Κλεισόβορα, καὶ ποταμὸς Ἰοβάρης πλωτὸς διαρρέει τὴν χώρην αὐτῶν.
\[6\] τὴν σκευὴν δὲ οὕτως ὁ Ἡρακλέης "The Herakles who penetrated so far, the Indians tell us, was a native of their country. He is particularly worshipped by the Suraseni, who have two great cities, Methora and Cleisoborus, and the navigable river Jobares, passes through their territories. This Herakles, as Megasthenes asserts, and the Indians themselves assure us, uses the same habit with the Theban Herakles.

\(^6\)Literature tells us that traders in coral and pearls frequented Kavirippadanim of the Chola Kingdom, and this town contained resident Greek merchants; similarly, a poet who visited Uraiyyur, the ancient Chola capital, speaks of coral and pearls together, with rare gems also, and as is shewn by the passage in the "Toy cart," jewellers' shops ……regularly sold coral.

\(^7\)The Tamil poem Paddinnappalai gives us a vivid description of a busy port of the Chola Kingdom, Kavirippadanim.… The goods were stamped with the royal tiger stamp after payment of customs duty and then released to the merchants. Close by were settlements of the Yavana merchants, which name included not only Ionians or Greeks, but Graeco-Bactrians and Parthians.
The Heraklean mythology is explored among the Gods by the Tamil people of Tamil Nadu located in India. There are evidence to reveal the relation between the Greek Herakles and Tamil Gods (Pugazhendhi 2021c). So there is scope of more research to be carried out on these mythological concepts, which may arrive at new theories.

Tamil God Kaṇṇan

The ancient Tamil religious literature, highlights about Kaṇṇan (Kausalya 2018).

1172. Kaṇṇan, dark as a rain bearing cloud, wore a thousand garlands, ornaments of gold and pearl that shine like a waterfall.

23. Thillaichitrakuṇḍam, Periya Thirumozhi, Thirumangai Azhvar.

‘Kaṇ’ means eye in Tamil. Since this God is dark in complexion, he is compared with the dark colour of the eye, that is why his name is coined as Kaṇṇan. Other Indian languages call him as Krishna. ‘Krish’ means dark blue or black colour.

The other name of this God is ‘Mal’ meaning strong as like in Greek. This God is also called by many more names as Raman, Vishnu and Narayanan. There are some researches about the resemblance of Herakles with

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3Thus there are many resemblances seen in the myth of Herakles and Rama. The myth of Rama evolved as a great epic. So the obscure elements seen in the myth of Herakles were elaborated in the epic of Rama. The Greek Historian mentions that the Indians portrayed the Herakles as their own. The resemblances seen between Herakles and Rama proves that both are same. The same person can be seen in Greek religion, Hinduism and Buddhism. There are many sacred places called temples for Rama in Tamil Nadu and all over India. In Thailand the Temple of the Emerald Buddha or Wat Phra Kaew has the story of Phra Rama, the hero of Ramakien, as the Thai Ramayana. Further, in Sri Lanka Kelaniya is a Buddhist Temple related to Rama. Thus the Greek Herakles is worshipped in the name of Rama in many parts of the world.

5And they also said, ‘Because this daughter is so dark in complexion, she should be called Krishna (the dark).’

Section CLXIX, Chaitraratha Parva, Book I, The Mahabharata (Kisari 1896)

190 Ἄρεα τε τὸν μαλερόν, δὲ νῦν ἀχάλκος ἀντιόδον φλέγει με περιβόατον, ἀντιάξο Soph.OT. [190] Grant that the fierce god of death, who now without the bronze of shields, though among cries like those of battle, (Jebb 1887)
Krishna (Bryant 2007)\textsuperscript{11} and Rama (Pugazhendhi 2021c) who are the incarnations of Kannan. Some statement relates Heracles with Baldeva or Balarama (Tod 1873).\textsuperscript{12} The religious poets called Azhvars have registered many myths that are related with Kannan. There are twelve Azhvars who have written 4000 songs (Nālāyira Divya Prabhandam) about this God. The myths mentioned in this literature can be compared with the myths of Greek Herakles using the mythological theory of binary Opposition (Asghari 2011),\textsuperscript{13} (Aimukhambet 2017)\textsuperscript{14,15}

**Twelve Labours of Herakles**

In the Greek myth, Herakles is a hero and a God (Eisner 1987).\textsuperscript{16}

There are altars of Herakles and Hebe, who they think is the daughter of Zeus and wife to Herakles. An altar has been built to Alkmena and to Iolaos, who shared with Herakles most of his labours. "

(Jones 1918)

Though a God, his life was full of pain and hardship that which is mentioned in the ‘Twelve labours of Herakles’. There are many references

\textsuperscript{11}There is a little doubt that the Soursenoi refers to the Shurasenas, a branch of the Yadu dynasty to which Krishna belonged; Herakles to Krishna, or Hari-Krishna: Mehtora to Mathura, where Krishna was born; Kleisobora to Krishnapura, meaning "the city of Krishna"; and the Jobares to the Yamuna, the famous river in the Krishna story. Quintus Curtius also mentions that when Alexander the Great confronted Porus, Porus's soldiers were carrying an image of Herakles in their vanguard.

\textsuperscript{12}How invaluable such remnants of ancient race of Harikula! How refreshing to the mind yet to discover, amidst the ruins on the Yamuna, Hercules (Baldeva or Balarama, god of strength) retaining his club and lion's hide, standing on his pedestal at Baldeo, and yet worshipped by Suraseni! This was name given to a large tract of country round Mathura, or rather round Surpura, the ancient capital founded by Surasena, the grandfather of the Indian brother-deities, Krishna and Baldeva, Apollo and Hercules. The title would apply to either; though Baldeva has the attributes of 'god of strength'. Both are es (lords) of the race (kula) of Hari (Hari-kul-es), of which the Greeks might have made the compound Hercules.

\textsuperscript{13}Comparison of two myths is done with following mythical three indices: 1) Structure; 2) Binary Oppositions; 3) Archetypal patterns.

\textsuperscript{14}Any myth there is an opposition, any myth starts with a binary opposition, for example: life and death, heaven and earth, day and night, right and left, up and down, sacred and miserable, raw and ripe, black and white and etc.

\textsuperscript{15}According to Sossyur, the language elements function in opposition system which distinguishes them from each other and connect with each other’

\textsuperscript{16}Here is that the hero cults signify that certain mortal individuals, ancestors of the Iron Age Greeks, were regarded as more than mere men. The stories told often assign them a divine and a mortal parent and even if they themselves were not semi-divine, they certainly enjoyed the favour of the gods. Their abilities, possibly due to their being related to the gods, and their achievements, bolstered by divine assistance, ensured an enduring impact on mortal society. On their death, they were worshipped – an honour normally preserved for the gods. While not immortal themselves, heroes were immortalised in the fame their deeds earned them.
about this twelve labours of Herakles in Greek paintings and literatures (Oldfather 1989).

τὸν δὲ Δία καταστρατηγηθέντα βουλήθη καὶ τῆς Ἡρακλέους ἐπιφανείας προνοηθήναι: δὲ φασίν αὐτῶν τὴν μὲν Ἡραν πείσαι συγχωρῆσαι βασιλέα μὲν ὕπάρξαι κατὰ τὴν ἱδίαν ὑπόσχεσιν Εὐρυσθέα, τὸν δ’ Ἡρακλέα τεταγμένον ὑπὸ τὸν Εὐρυσθέα τελέσαι δώδεκα ἄθλους οὓς ἢ ὃν ἡ Ἐυρυσθείας προστάξῃ, καὶ τούτῳ πράξαντα τυχεῖν τῆς ἀθανασίας.

Diod. 4.9.5.

This type of naming as ‘labours’ is not found in any other Greek mythology. These are the characteristics that ought to researched among the Tamil God Kaṇṭan.

Numerous Births or Incarnation of God

No other God has so many births other than Tamil God Kaṇṭan of Tamil culture. In other Indian languages, ‘avatāra’ stands equivalent to 'incarnation' or ‘rebirths’. Thus the Labours of Greek Herakles to some extent bear a resemblance to numerous births of Tamil Kaṇṭan, that is not visible among other Gods. The reason for these ‘avatāra’ is mentioned below (Kisari 1896).

‘Lord Vishnu, God of world-wide fame, and worshipped throughout the world, was born of Devaki through Vasudeva, for the benefit of the three worlds. He has neither birth nor death, has radiant splendour, the Creator of the universe and the Lord of all! He is the cause of everything, he knows no deterioration, he is the all-pervading soul, the centre around which everything revolves, the substance in which the three attributes of Sattwa, Rajas and Tamas co-incids, the universal soul, the immutable, the material out of which this universe is created, the Creator himself, the controlling lord, the unseen dweller in every object, progenitor of this universe of five elements, who is united with the six high attributes, is the Pranava or Om of the Vedas, is infinite, incapable of being moved by any force save his own will, illustrious, the embodiment of the mode of life called Sannyasa, who floated on the waters before the creation, who is the source whence hath sprung this mighty frame, who is the great combiner, the uncreate, the invisible essence of all, the great immutable, benef of those attributes that are knowable by the senses, who is the universe itself, without beginning, birth, and decay,—is possessed of infinite wealth, that Grand sire of all creatures, became incarnate in the race of the Andhaka-Vrishnis for the increase of virtue.’

Section LXIII, Book I,
Adivansavatarana Parva, The Mahabharata.
Herakles strives to attain the power of immortality through the twelve labours of Herakles through the heroic myth. Taken into consideration the myth of Kannan, a religious myth in which the God came down from the upper world and took many births to protect mankind. From the above incidents it is revealed that both the myths seems to fall in a structure of reciprocal with one another. Moreover, the numerous births of God Kannan is related to themetology (Penglase 1994)\(^\text{17}\) (Strauss 1955)\(^\text{18}\) which is not mentioned in the myth of Herakles.

This type of ‘labours’or ‘incarnation’ is seen only with Greek Herakles and Tamil God Kannan. This is a horizontalized structure of myths which are loosely joined with one another and so are easily interchangeable (Strauss 1955).\(^\text{19,20}\) This structure is opposite to the vertical structure, which cannot be easily interchangeable as shown in Figure 2.

**Figure 2. Greek and Tamil Nadu**

**Vertical Structure**

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Myth 7
Myth 6
Myth 5
Myth 4
Myth 3
Myth 2
Myth 1
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(Position of the myths can’t be interchangeable)

**Horizontal Structure**

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1  2  3  4  5  6  7
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(Position of the myths can be interchangeable)

Horizontal and vertical structures are opposite to each other. The myths of Tamil God Kannaṇ and Greek Herakles have both horizontal and vertical structures. Eventhough these two structures are opposite to one another, they

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\(^{17}\)The term ‘idea’ is generally used to refer to a complex concept, like that of the ascent sequence, which usually involves many motifs. However, it is sometimes employed to refer to an element that is otherwise described as a motif, but this occurs when it stresses that the motif is a concept in the myth under discussion. The context makes the relevant meaning of the term clear in the exposition of the myths.

\(^{18}\)If there is a meaning to be found in mythelogy, this cannot reside in the isolated elements which enter into the composition of a myth, but only in the way those elements are combined.

\(^{19}\)So that three different readings become possible: left to right, top to bottom, front to back. All of these charts cannot be expected to be identical; but experiences hows that any difference to be observed may be correlated with other differences, so that a logical treatment of the whole will allow simplifications the final outcome being the structural law of the myth.

\(^{20}\)The technique which has been applied so far by this writer consists in analyzing each myth individually breaking down its story into the shortest possible sentences and writing each such sentences on an index card bearing a number of corresponding to the unfolding of the story….. the true constituent units of a myth are not the isolated relations but bundles of such relations and it is as bundles that these relations can be put to use and combined so as to produce a meaning. Relations pertaining to the same bundle may appear diachronically at remote intervals, but when we have succeeded in grouping them together, we have reorganized our myth.
are also related. That is each segment of the horizontal are made up of a
vertical structure. For example the myth of Herakles related with Iole and
Deianira has a vertical structures stresses about monogamy. It is also same in
the myth of Rama. In the horizontal structure both Rama (in the name of
Kaṇṇaṇ or Krishna) and Herakles are related with polygamy. Thus the theme
present in the vertical structure seems to be opposite to the horizontal structure.
Besides, this vertical structure operate the horizontal structure. This
mythological theory of binary opposition is seen in both these myths. Further,
it is possible that within a vertical structure there can be binary opposition that
which is seen in both of these myths. The characters of the Herakles in the play
‘Herakles’ by Euripides is an example for the binary opposition in a play. The
main variants that are there in the myth of Herakles is transfer from hero to
God where as in the myth of Tamil Kaṇṇaṇ it is from God to hero. So there is a
need to evolve a formula to compare these two myths with these variants
(Strauss 1955).

\[ f(a) = f(b) + f(c) \]

Here ‘f’ is a function, x and y are lower and higher limits and ‘a,b,c’ are
variables. By using this formula for these two myths the sequence of the
variations can be found out.

**Mythological Theory of Parallels in Herakles and Kaṇṇaṇ**

In these myths, the mythological theory of parallels shall be discussed first
by considering Herakles and Kaṇṇaṇ with animals and then with that of
women.

These parallels shall be explained using the formula of variants.

**Mythological Theory of Parallels: Herakles and Kaṇṇaṇ with Animals**

Man and animal are binary opposition. The fight between Herakles and
four animals have an important place in myth.

1. Herakles and Snake
2. Herakles and Eagle
3. Herakles and Horse

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21When we have succeeded in organizing a whole series of variants in a kind of permutation
group, we are in a position to formulate the law of that group. Although it is not possible at the
present stage to come closer than an approximate formulation which will certainly need to be made
more accurate in the future, it seems that every myth (considered as the collection of all its variants)
corresponds to a formula of the following type:

\[ fx(a) : fy(b) = fx(b) : f - x(y) \]
4. Herakles and Hart

These myths are related with Herakles and compare with Tamil God Kannan

_Herakles and Snake_

The snake being a poisonous creature evokes fear amongst all. Those who are unafraid of snakes are really courageous. In Greek myth there are two instances that are related with that of the snake which highlights the courage of Herakles. In one instance, Hera send the snake to kill Heracles (Oldfather 1989).

After this Hera sent two serpents to destroy the babe, but the boy, instead of being terrified, gripped the neck of a serpent in each hand and strangled them both.

In the other incident, Herakles need to fight with a snake which has the special ability to shift its shape (Oldfather 1989).

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5 The second Labour which he undertook was the slaying of the Lernaean hydra, springing from whose single body were fashioned a hundred necks, each bearing the head of a serpent. And when one head was cut off, the place where it was severed put forth two others; for this reason it was considered to be invincible, and with good reason, since the part of it which was subdued sent forth a two-fold assistance in its place.

6 Against a thing so difficult to manage as this Heracles devised an ingenious scheme and commanded Iolaüs to sear with a burning brand the part which had been severed, in order to check the flow of the blood. So when he had subdued the animal by this means he dipped the heads of his arrows in the venom, in order that when the missile should be shot the

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22Shape shifting -- shape shifting is the ability to physically transform through an inherently superhuman ability, divine intervention, demonic manipulation, sorcery, spells or having inherited the ability.
wound which the point made might be incurable.

Thus there were two myths that are related with snake which is attributed to Herakles to highlight his strength and courage.

Here the formula for the variants shall be used to calculate.

\[
\begin{align*}
       f(a) &= f(b) + f(c) \\
       f(Herakles) &= f(Snake) + f(Action) \\
       f(Herakles \text{ Super baby}) &= f(Natural \text{ Snake}) + f(Playing \text{ Courage}) \\
       f(Herakles \text{ Super Hero}) &= f(Super \text{ Natural \ Snake}) + f(Killing \text{ Courage})
\end{align*}
\]

Here based on the value of ‘b’ and ‘c’ the value of ‘a’ alters. Playing with the natural snake elevates the baby, but not the grownup man. The hero becomes more heroic killing the super natural snake. Depending on the power of the supernatural snake the acts of the hero goes up. Here Herakles played with the snake instead of killing it. The snake episod was exaggerated as a five headed reptile. Suppose if the snake kills the hero, the worth of the hero will decrease. Thus according to the value of the variables ‘b’ and ‘c’ in the formula, the value of ‘a’ is estimated. The same research can be conducted in the case of Tamil God Kaṇṇan.

**Tamil God Kaṇṇan and the Snake**

There are instances to attest the bravery of Tamil God Kaṇṇan with snake. In one situation it occurs wild whereas in the other it is treated as a pet (Kausalya 2018).

1171. When Kaṇṇan plunged into a cool pond blooming with lotuse fought and danced on the head of the sharp-toothed snake Kālingan, the Gods in the sky, astonished, looked on

23. Thillaichitrakudam, Periya Thirumozhi, Thirumangai Azhvar.
King Kamsa sent Aghanus to kill Kanḍan. Aghanus assumed the form of an 8-mile-long serpent\textsuperscript{23}, disguising his open mouth against a mountain. Kanḍan entered the serpent upon his arrival and then enlarged the size of his own body. In response, the demon too extended his own body size. Nonetheless, his breath stopped. Suffocating, his eyes rolled here and there and then popped out. The demon’s, however, could not pass through any outlet, and therefore it finally burst out through a hole in the top of Aghanus’s head. Thus, the demon met its end through Kanḍan. The above thoughts are figuratively compared in Figure 3.

**Figure 3. Herakles, Kaṇḍan and Snake**

\textsuperscript{23}Therianthropy --- Therianthropy is the mythological ability of human beings to metamorphose into other animals by means of shapeshifting.
Thus Greek Heracles and Tamil Kaṇṇan are both associated with many headed snake. Because of this commonality seen, the same mythological theory of parallels is used in both these situations. As per the theory of binary opposition Heracles fought with exordinary snake and Tamil Kaṇṇan fought with demon which was in the form of venomous snake. The difference in the binary opposition depends upon the personality of the Hero and God. Also, Tamil Kaṇṇan had a pet snake, that was used as a bed (Cook 1894).  

1510. Our lord Nambi who rests on the shining snake Adisesha on the clear milky ocean shot his arrow and killed Marisan when the Raksasan came in the form of a swiftly running deer and went to king Mahabali as a dwarf, asked for three feet of land, and measured the world and the sky with his two feet.  

57. Thirunāṟaiyur Periya Thirumozhi. Thirumangai Azhvar.  

This is shown in Figure 4.

**Figure 4. Kaṇṇan and Snake Bed**

Fighting with the super natural reptile increases the rating of the hero. Fighting with the demon which was in the form of the super natural reptile shake the super natural qualities as that of the God. After fighting with that animal and making the as his pet further increases the power equal to that of

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24 Being nursed by an animal is another kind of recurring interaction between man and beast. The frequent exposure of illegitimate or unwanted children provided ample opportunity for adoption by animals, and this is typically told of persons who later gained special significance or who were blessed with special abilities.
God. And the variants shall be estimated using the formula applied for Herakles.

\[
f(a) = f(b) + f(c)
\]

\[
f(\text{Herakles}) = f(\text{Snake}) + f(\text{Action})
\]

\[
f(\text{Herakles Super baby}) = f(\text{Natural Snake}) + f(\text{Playing Courage})
\]

\[
f(\text{Herakles Super Hero}) = f(\text{Natural Snake}) + f(\text{Killing Courage})
\]

This formula can be applied with the myth of Tamil Kaṇṇan.

\[
f(\text{Kaṇṇan Super God}) = f(\text{Super Natural Snake}) + f(\text{Killing Courage})
\]

\[
f(\text{Kaṇṇan Super God}) = f(\text{Demon Natural Snake}) + f(\text{Killing Courage})
\]

\[
f(\text{Kaṇṇan Super God}) = f(\text{Natural Snake}) + f(\text{Using as Bed Courage})
\]

In all these formulas the segments are same, only the components vary, due to the difference in the values that ranges from hero to God.

*Herakles and Eagle*

Herakles want to free the God Prometheus who was under the custody of Zeus. At that time the eagle of the Zeus fought with Herakles and was killed (Oldfather 1989).

Zeus δὲ, Προμηθεὺς παραδόντος τῷ θεῷ ἀνθρώποις, δεσμοῖς κατελάβετο καὶ παρέστησεν ἁπέν τῶν ἑσθιόντα τὸ ἥπαρ αὐτοῦ. And Zeus, when Prometheus had taken fire and given it to men, put him in chains and set an eagle at his side which devoured his liver. But when
Hēraklēs δ’ ὁρῶν τῆς τιμωρίας αὐτῶν τυχών περίοντα διὰ τὴν τὸν ἀνθρώπων εὐεργεσίαν, τὸν μὲν ἀπό τὸν κατετόξευσε, τὸν δὲ Δία πείσας λῆξαι τῆς ὑργῆς ἔσωσε τὸν κοινὸν εὐεργέτην.

Diod. 4.15. 2

In this myth, Herakles fought with the eagle of Zeus and killed it. If it is an ordinary bird there is no credit in killing it. But the bird was that of God Zeus and so killing it was considered to be an immense task.

\[ f(a) = f(b) + f(c) \]

\[ f(\text{Hero}) = f(\text{Super Hero}) + f(\text{Killing Courage}) \]

In this way Herakles becomes a super hero by killing the bird of the God Zeus. Likewise, the Tamil God Kaṇṇan also killed a bird which was actually a demon (Kausalya 2018).

1018. .................and who as a cowherd split open the beak of the Asuran that came as a bird

8. Thiruvenkaṭam, Periya Thirumozhi, Thirumangai Azhvar

Thus the mythological theory of parallels shall be used between these two myths. The above thoughts are figuratively compared in Figure 5.
Further the Tamil Kaṇṇan also had a pet eagle, Garuda (Kausalya 2018).

1094. The lord who rests on the roaring ocean and rides on Garuda
crushed the mountain-like arms of the strong undefeated Rākshasas

15. Thirukkaṇṭalmallai, Periya Thirumozhi,
Thirumangai Azhvar

This is shown in Figure 6.
In these ways, killing the demon which was in the form of a bird, eagle and having the same species as a pet, increases the degree of power of Tamil Kaṇṇan to make him a super God. Thus the mythological theory of parallels are used in these two myths and both have variants in a determined order as that seen in a formula.

Here these are the formulae used for Herakles.

\[ f(a) = f(b) + f(c) \]

\[ f(\text{Hero (Super Hero)}) = f(\text{Zeus (Super Eagle)}) + f(\text{Killing (Courage)}) \]

This formula can be applied with the myth of Tamil Kaṇṇan.

\[ f(\text{God (Kaan) (Super God)}) = f(\text{Demon (In the form of Super Eagle)}) + f(\text{Killing (Courage)}) \]

\[ f(\text{God (Kaan) (Super God)}) = f(\text{Demon (In the form of Super Eagle)}) + f(\text{Using as Vehicle (Courage)}) \]

Here it is to be noted that the wild animals were tamed and made as vehicle for the Gods of the Tamil myth.
Herakles and Horse

The myth of Greek Herakles was related to a strange horse. This horse is not a herbivorous animal but a carnivore (Oldfather 1989).

3. The next Labour which Herakles undertook was the bringing back of the horses of Diomedes, the Thracian. The feeding-troughs of these horses were of brass because the steeds were so savage, and they were fastened by iron chains because of their strength, and the food they ate was not the natural produce of the soil but they tore apart the limbs of strangers and so got their food from the ill lot of hapless men. Herakles, in order to control them, threw to them their master Diomedes, and when he had satisfied the hunger of the animals by means of the flesh of the man who had taught them to violate human law in this fashion, he had them under his control.

Thus the natural character of the horse was exaggerated to show its wildness nature in the myth of Herakles. Here the formula for the variants shall be applied.

\[
f(a) = f(b) + f(c)\]

Here horse is not dangerous and fearful like that of a snake. So playing with the horse is not considered as heroic act as that with a poisonous snake. There are evidences which show that the horses were killed. Since killing of a horse is considered ordinary, these myths doesn’t eliminate these incidents instead add the value of horse saying that it is carnivores and so was extraordinary. Thus the value is added to ‘b’ so as to increase the value for ‘a’ as per the formula.
The myth of Tamil Kaṇṇan was also related with a strange horse (Kausalya 2018).

1168. The lord danced on a pot, went between two marudam trees and killed the Asurans, wrestled with the Mallars sent by Kamsan and killed them, killed Kesi when he came in the form of a horse, 23. Thillaichitrakudam, Periya Thirumozhi, Thirumangai Azhvar.

In the myth of Tamil Kaṇṇan the horse was metaphorized as a demon. The above thoughts are figuratively compared in Figure 7.

**Figure 7. Herakles, Kaṇṇan and Horse**

Thus Greek Herakles and Tamil Kaṇṇan have resemblances in the myths that are related to the abnormal natureof the horse. Thus these resemblances in the myths shall form the basis to use the mythological theory of parallel.

Here the following formula is used for nature of Herakles.
This formula can be applied with the myth of Tamil Kaṇṇan.

In these ways, both the Greeks and Tamil were related with the beasts which took the form as a snake, deer, eagle, bull and horse. All of these forms are living creatures. There also exist myths in both the Greek and Tamil having resemblances with the non-living things. In all these three topics both the defendant and the opponent have more or less equal strength. Then the victory goes to defendant. It proves the strength of the defendant. Depending upon the strength of the opponent the strength of the defendant is decided whether it is a hero or God. This is shown in Figure 8.

**Figure 8. Hero and God**

Apart from this animals which are not known for the bravery are also found in these two myths.

**Herakles and the Hart**

The Greek Herakles was associated with an animal called hart which had golden horns. There are different types of opinion that exist in the victory of Herakles over this animal (Oldfather 1989).
The next Command which Herakles received was the bringing back of the hart which had golden horns and excelled in swiftness of foot. In the performance of this Labour his sagacity stood him in not less stead than his strength of body. For some say that he captured it by the use of nets, others that he tracked it down and mastered it while it was asleep, and some that he wore it out by running it down. One thing is certain, that he accomplished this Labour by sagacity of mind, without the use of force and without running any perils.

Tamil Kaṇṇan and Deer

When Kaṇṇan lived in the name of Raman with his wife, she saw a golden deer and asked for it. Then Kaṇṇan chased the deer with the intention of catching it. But he couldn’t succeed in his attempt of catching it alive. So he used the bow and arrow and killed the deer. The myth says that it was a demon called Mareecha in the form of a deer (Kausalya 2018).

Our lord who became angry, bent his curved bow and killed the Rākshasa Marisan when he came as a golden deer,

4. Thiruvadariyāchiramam,
Periya Thirumozhi,
Thirumangai Azhvar.

The above thoughts are figuratively compared in Figure 9.
Figure 9. Herakles, Kaṇṇan and Deer
Thus the myth of Herakles with the hart has resemblance with the myth of Tamil God Kaṇṇan on the basis of the mythological theory of parallel. Here this animal did not have any role in highlighting the strength of the defendant. At the same time this animal was killed in the life of both the hero and the God. As mentioned in the myth of the horse this myth also don’t want to eliminate this incident, the reason being it is not a dreadful animal. So it is shown as a demon in one of the myth to add value to ‘b’ so as to increase the value of ‘a’ in the formula. In both of the myths this particular animal did not harm them, but it was being liked by their partner and based on their request it was hunted. So one more component is added to the structure.

![Diagram]

Thus all the animals killed in the myth of Tamil Kaṇṇan were exaggerated as demon and the reason being to add the value of ‘a’ as ‘Super God’. Where as in the myth of Herakles it was mentioned as super natural animal in place of ‘b’ to add the value to ‘a’ as Hero.

The Theory of Influence

1. Greek to Tamil – Wild Boar and world
2. Tamil to Greek – Bull leaping and Marriage

Greek to Tamil – Wild Boar and World

The myths related with boar and carrying the world on his shoulders is seen in the myth of Tamil God Kaṇṇan.  

1180. The lord who took the form of a boar with sharp horns split open the earth and brought the earth goddess from the underworld, and cut off the thousand strong arms of Vānāsuram with his sharp discus smeared with oil

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25Zoanthropy - A kind of delusion in which the patient believes himself transformed into one of the lower animals
26Theriocephaly - to beings which have an animal head attached to an anthropomorphic or human body as the animal-headed forms of gods depicted in ancient Egyptian religion (such as Ra, Sobek, Anubis).
27That the difference between monster and hero is not that great at all, and that both are frequently assigned similar attributes – fearlessness, stamina, supernatural power – and that they behave in similar ways. (Gilmore 2003)
In the myth, the demon stole the earth and hide underneath the waters. The Tamil God Kaṇṇan took an incarnation with a boar's head. This boar incarnation slew the demon and retrieved the Earth from the ocean, lifting it on his tusks, and restored to its place in the universe.

There is no more information available regarding this myth. Stole the earth, retrieved the Earth by a wild boar can be understood with the aid of Herakles myth. Here it needs to know about the theory of ‘Union Binary Opposition’.

The Mythological Theory of ‘Union of Binary Opposition’

Clinical lycanthropy is defined as a rare psychiatric syndrome that involves a delusion that the affected person can transform into, has transformed into, or is, an animal.[1] Its name is associated with the mythical condition of lycanthropy, a supernatural affliction in which humans are said to physically shapeshift into wolves. It is purported to be a rare disorder. A patient reports in a moment of lucidity or reminiscence that they sometimes feel as an animal or have felt like one. A patient behaves in a manner that resembles animal behavior, for example howling, growling, or crawling. It also seems that lycanthropy is not specific to an experience of human-to-wolf transformation; a wide variety of creatures have been reported as part of the shape-shifting experience. A review[1] of the medical literature from early 2004 lists over thirty published cases of lycanthropy, only the minority of which have wolf or dog themes. Canines are certainly not uncommon, although the experience of being transformed into a hyena, cat, horse, bird or tiger has been reported on more than one occasion. Transformation into frogs, and even bees, has been reported in some instances.

Those human/animal hybrids that walk upright on two legs are referred to as “Demons”, while those that walk on four and seem more animal-like are called “Monsters” – a distinction in terminology that is unique to this area (Porada 1987).

Binary opposition originated in Saussurean structuralist theory. German philosopher Friedrich Nietzsche proposed the concept of “Appolo” and “Dionysus” (Nietzsche 2006). Both Apollo and Dionysus are the characters of Greek myth and Zeus, the god of lightning is considered their father. According to Nietzsche’s statement western thinkers Plutarch and Thomas Mun give their views. They systematize different qualities in the nature of the sun god Apollo and Dionysus the god of wine, which are different from each other, and define their opposite way of life. Heaven and earth, black and white, darkness and light, hot and cold, day and night, height and bottom, north and south, east and west, good and evil, angel and demon in the mythical knowledge create the pairs opposed to each other, but inseparable from each other. Although they are fighting among themselves, they cannot function without each other. From a philosophical point of view, we know that one of the basic laws of dialectics is the unity and law of struggle. According to this law, it is known that there are contradictions of phenomenon and processes on the basis of development. These contradictions will become the cornerstone of development. Unity and struggle of opposites are the source of movement and the whole being.

Recognizing the shadow archetype as the beginning of a man’s animal instinct, K. Jung explains that “the body is an animal, with the nature of the animal, which is a living system integrated with the instinct, the instinct of the beginning. To be with the shadow is to tell the instinct “yes”, as well as to approve the scandalous trend in the depth of the heart”. Here the problem of the struggle between mind and body, spirit and lust are taken into account. When it comes to binary opposition and artistic transformation of the notion of a dyadic unity, we can give examples from world literature. The source of metamorphosis, which has become a regular motive of fairy tales, is mythical variability. Changeability in myth, transition from one form to another indicates duality.
another. Herakles and lion are binary opponents.\(^3\) Herakles wore the lion’s head is the union of binary opposition. One more step is also there, that is Herakles became lionised man. This animalized form is seen in the myth of Tamil God Kaṇṇan\(^3\) (Vernant 1982)\(^3\) (Porada 1987)\(^6\) Herakles not only fought with lion, but also with many animals including wild boar. When he carried the wild boar the king hid himself in a vessel (Oldfather 1989).

\[\text{τρίτον δὲ πρόσταγμα ἔλαβεν ἐνεγκεῖν τὸν Ἑρυμάνθιον κάρπον ζῴατα, δὲ διέτριβεν ἐν τῇ Λαμπείᾳ τῆς Ἀρκαδίας…….πλέον δὲ τοῦ δέοντος καταπολεμήσας ἀπέκτεινεν, ὡστε τὸν ἄθλον ὑπάρχειν ἀσυντέλεστον.}

2 ὡστε δὲ κατὰ τὴν μάχην ταμιεύσαμεν ἀκριβῶς τὴν συμμετρίαν ἀπήνεγκε τὸν κάρπον

The third Command which he received was the bringing back to lift the Erymanthian boar which lived on Mount Lampeia in Arcadia. …….and should he attack it more violently than was proper, then he would have killed it and so the Labour would remain unfulfilled.

\[\text{2 ὡστε δὲ κατὰ τὴν μάχην ταμιεύσαμεν ἀκριβῶς τὴν συμμετρίαν ἀπήνεγκε τὸν κάρπον}

and struggle. Transformation of a person into an animal at night and into a human by day is found in the tales of Turkic and Slavic peoples.

\(^3\)The Nemean lion’s conduct is an “inversion of the proper relations between men and beasts through his ‘ruling over’ men.” (Strauss Clay 2003)

1042. You, the god of the tall majestic Thiruvenkaṭam hills, took the form of a pillar, split it open, emerged from it in the form of a man-lion and killed the Asuran Hiranyan. Your arrows never fail to hit their targets.

10. Thiruvenkaṭam, Periya Thirumozhi, Thirumangai Azhvar.

\(^5\)In Greek Mythology the relationship between god, man and animal forms a linear arrangement with man positioned mid-way between god and animal, as proposed by (Vernant 1982)

\(^6\)But theirs is a hieroglyphic representation and according to Fischer their very elegance is “proof against them being monstrous”. Fischer also points out that these depictions possess an inner logic absent in hybrid monsters: In representations of the king, various aspects of his power are displayed by placing the head of the king - a constant feature - on the bodies of various animals like the falcon, snake or lion. This basic arrangement remains regular, but there is variation in degree of human / animal proportions which implies shape-shifting. This, according to Fischer, is entirely appropriate in depicting a king who of all people stands on the edge of divinity as the link between man and god. In the same way it must not be assumed that the elements of composition necessarily carry a standard significance. The serpent for instance does not always represent that which is dangerous: in Iran and Bactria serpents were used to signify life death but also because the wave-like motion of their bodies was associated with life-giving water.

24
Thus he fought with wild boar much technically and brought the boar alive by carrying it on his shoulders. On seeing this, the king got terrified and hid himself. Thus Heracles is related with the myth of wild boar.

This can be compared with the myth of wild boar headed Tamil God Kaṇṇan based on the theory of ‘Union of Binary Opposition’ in Table 1.

<table>
<thead>
<tr>
<th>Lion</th>
<th>Wild Boar</th>
<th>Theory of Binary Opposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herakles</td>
<td>Herakles</td>
<td>Man versus animal (Binary Opposition)</td>
</tr>
<tr>
<td>Herakles</td>
<td>Man with animal (head) (Union of Binary Opposition)</td>
<td></td>
</tr>
<tr>
<td>Herakles</td>
<td>Animalized with the body of the Man (Tamil Kannan)</td>
<td></td>
</tr>
</tbody>
</table>
Thus the theory of union of binary opposition gave light to the myth of boar head Tamil God Kaṇṇaṇ. In the myth of Herakles related with boar the king was frightened and so hide himself in a closed vessel. Likewise here the world was hidden in a sea, which is like a closed vessel. Here the myth about the world should be found out. It sheds light on the myth.

**Herakles and World**

The Heracles who was related with the myth of boar is also related with the knowledge of Astronomy and the world (Oldfather 1989).

4 τοῦς δὲ ληστὰς ἐν κήπῳ τινὶ παιζούσας τὰς κόρας συναρπάσαι, καὶ ταχὺ φυγόντας εἰς τὰς ναῦς ἀποπλεῖν. τούτοις δ᾽ ἐπὶ τινὸς ἀκτῆς δειπνοσιουμένως ἐπιστάντα τὸν Ἡρακλέα, καὶ παρὰ τὸν παρθένον μαθῶντα τὸ σωμβεβήκος, τοὺς μὲν ληστὰς ἀπαντάς ἀποκεῖναι, τὰς δὲ κόρας ἀποκομίσαι πρὸς Ἀτλαντα τὸν πατέρα: ἀνθ᾽ ὅν τὸν Ἀτλαντα χάριν τὶς εὐεργεσίας ἀποδοῦντα μὴ μόνον δοῦναι τὰ πρὸς τὸν ἄθλον καθήκοντα προθήμως, ἀλλὰ καὶ τὰ κατὰ τὴν ἀστρολογίαν ἀφθόνος διδάξαι.

5 περιπτότερον γὰρ αὐτὸν τὰ κατὰ τὴν ἀστρολογίαν ἐκπεπονηκότα καὶ τὴν τῶν ἀστρον σφαιραν φιλοτέχνως εὐρόντα ἔχειν ὑπόληψιν ὡς τὸν κόσμον ἔλον ἐπὶ τῶν ὀμον φοροῦντα. παραπλησίως δὲ καὶ τοῦ Ἡρακλεώς ἔξαγγελαντος εἰς τοὺς Ἑλλήνας τὸν σφαιρικὸν λόγον, δόξης μεγάλης τυχεῖν, ὡς διαδεδεμένον τὸν Ἀτλαντικὸν κόσμον, ἀντιτομένων τὸν ἀνθρώπον τὸ γεγονός.

Diod. 4.27. 4&5

4 Meanwhile the pirates had seized the girls while they were playing in a certain garden and carried them off, and fleeing swiftly to their ships had sailed away with them. Heracles came upon the pirates as they were taking their meal on a certain strand, and learning from the maidens what had taken place he slew the pirates to a man and brought the girls back to Atlas their father; and in return Atlas was so grateful to Heracles for his kindly deed that he not only gladly gave him such assistance as his Labour called for, but he also instructed him quite freely in the knowledge of Astrology.

5 For Atlas had worked out the science of astrology to a degree surpassing others and had ingeniously discovered the spherical nature of the stars, and for that reason was generally believed to be bearing the entire firmament upon his shoulders. Similarly in the case of Heracles, when he had brought to the Greeks the doctrine of the sphere, he gained great fame, as if he had taken over the burden of the firmament which Atlas had borne, since men intimated in this enigmatic way what had actually taken place.

37 Division of a character into two and becoming an antagonist/protagonist person in T. Abdikov’s story “Battlefield of sanity” is compared with the image of Harry Haller in Hermann (Aimukhambet 2017)
In the myth it is mentioned that Heracles saved the daughters of Atlas from the pirates. Atlas praised him for his kindness and as a mark of his gratitude he shared his knowledge of astronomy with Heracles. So, Heracles gained knowledge about astronomy that which is shown metaphorically as carrying the world on his shoulders.\textsuperscript{38} The above thoughts are figuratively compared in Figure 10.

\textbf{Figure 10. Herakles, Kaṇṇan and Boar}

As lion head and the wild boar both belonged to Herakles, the lion head was changed in the myth of Tamil God Kaṇṇaṇ. Thus the myth of Herakles influenced the myth of wild boar headed Tamil God Kaṇṇaṇ. This is shown in Figure 11.

\textsuperscript{38} Mythological figures are considered as personified abstractions, divinized heroes or decayed gods (Strauss 1955).
The Theory of Influence

Tamil to Greek – Bull Leaping and Marriage

In Greek mythology, both Jason and Theseus were related with the love of women³⁹ by controlling the bull monster.⁴⁰ Herakles also is related with this type of myth. Here it is noted that the women falling in love to a person who control a bull is not seen to happen in the land of Greece (Frazer 1921).

³⁹ It is also assumed, though not explicitly stated, that Theseus obtains the sword, with which a plethora of Attic vase paintings show him killing the Minotaur, from Ariadne. It is appropriate that this masculine symbol comes from Ariadne as it is her role to initiate Theseus into sexuality (Graf 2003).

⁴⁰ the bull was closely associated with fertility, as such it was associated with Demeter, Dionysos and Zeus (Cook 1894).
This is shown in Figure 12.

Figure 12. Herakles and Bull

In this myth bull horned man\textsuperscript{41,42} and its relation with the marriage are obscure. In the same way the bull monster in the Greek myths of Jason and Theseus also have obscurity (Shear 1923)\textsuperscript{43} It is because these myths did not happen in the land of Greeks, but in a foreign land (Lenfant 1999)\textsuperscript{44} Greeks have only heard about these myths. This makes some exaggeration in this myth (Gantz 1996)\textsuperscript{45} (Goodnick 2004)\textsuperscript{46} (Bronowski 1973)\textsuperscript{47} It can be understood

\textsuperscript{41} As early as the beginning of 3000 BCE the bull-man of Mesopotamia was portrayed with the same general composition (Goodnick Westenholz 2004)

\textsuperscript{42} In the literature of the area, the bull-man’s dual nature as both enemy and associate of deities is frequently called to the fore (Childs 2003)

\textsuperscript{43} So, as with many of the hybrid monsters of ancient Greece, the Minotaur also had its roots firmly in the East. Shear contends that narrative aspects as well as the iconographical tradition associated with the Theseus-myth was transferred from Asia Minor to the Mediterranean via Lydia. In support of this theory he calls on the composition of the Minotaur which closely resembles the Mesopotamian bull-man configuration in literature and art

\textsuperscript{44} By believing the outside world to be inhabited by beings that are physically and morally corrupted, the Greeks emphasised their own cultural identity.

\textsuperscript{45} Minotaur’s very existence is attributed either to Poseidon’s punishment for Minos’ snub (by not sacrificing his favourite bull) or to Aphrodite’s reprimand of Pasiphae for neglecting her rites.

\textsuperscript{46} On a linguistic level this is illustrated neatly by the suhurmašû, a hybrid creature of the Ancient Near East. It is believed that the word suhurmašû originally referred to the common seal, but a
only with the help of the myths of foreign land. In this way the myth of Tamil God Kaṇṇaṇ can give light.

Tamil Kaṇṇaṇ and the Bull

Tamil Kaṇṇaṇ fought with seven bulls and married a woman called Napphina (Kausalya 2018).

The dark cloud-coloured God who fought with seven humped bulls and killed them to marry Nappinnai with beautiful fish eyes

983. Thiruvadriyāchiramam, Periya Thirumozhi, Thirumangai Azhvar.

There was a marriage system in Tamil culture that is to marry a girl it is mandatory that the male should show his bravery by controlling the vigorous bulls (Pugazhendhi 2021d). According to this custom Kaṇṇaṇ married Napphina by bringing the bull under his control. This is shown in Figure 13.

 literal interpretation of the composite Sumerian name (suhur: carp, maš: goat) resulted in depictions of a hybrid monster with both goat and fish attributes.

47 The same thing could happen on a conceptual level when what is seen is misinterpreted due to the limitations of the observer’s frame of reference. Nash cites this as a hypothesis put forward to explain the Centaur: quoting Bronowski, he describes the impact that riders on horseback would have on people with no experience of such a practice and who did not know domesticated horses. The associated speed and noise of thundering hooves would be bewildering enough, but mounted by skilled riders with hostile intent the sight would be truly terrifying. The consummate horsemanship displayed by the Scythian riders, aided by the disorientation brought on by the fear at the sight of them, is believed to have left the Greeks with the impression that the horse and rider were a single being.

48 Bull leaping is also described in Tamil Silappathikaram. Here it is a custom of the community related with cattle. So the ladies of that community proposed their love only to the brave men who were capable of taming the wild bulls.
To exaggerate the bravery of Kannan, it is mentioned that he fought with seven humped bulls and killed them to marry Nappinnai. It is also a way to mention the myth as per the formula.

\[ f(a) = f(b) + f(c) \]

The lady will love who control the black bull
This lady is for who will control the fore head of a bull
The lady is for who will control this strong bull
The lady is for who will control the white dotted bull
The lady is for who will control the gold dotted bull
This lady is for who will control the winner bull
This flower like lady is for who will control the pure white bull
Thus these seven ladies were grown for the controller of the bull
Thus the mystery in the myth of Herakles related with controlling the horned bull and marriage can be defined with the help of the myth which is related with Tamil God Kaṇṇaṇ. And it is also clear that there is influence of the Tamil myth on Greek myth. Thus the myths belonging to both the languages have influence on one another.

**Conclusion**

The ancient Greek historian Arrian who belonged to 86 – 146 AD mentioned that Indians worshipped Theban Herakles. Many researches identified the God in India and Tamil Nadu which was mentioned by Arrian. Tamil God Kaṇṇaṇ have resemblances with Greek Herakles in the myths related with biting the breast of the cruel step mother, fighting against living creatures like that of snake, lion, boar, horse, bull, deer and eagle. Thus the mythological theory of parallels is seen to be applied between these two myths. More than that the Tamil myth of bull leaping and marriage had influence on the Greek myth of Hercules wooed Deianira. In the same way the myth of wild boar head Tamil Kaṇṇaṇ carrying the world was influenced by the Greek myth. The variants seen between these resemblances in the myths also flows in a manner like a formula. It ensures the oneness of these two myths. And it also mentions about the gradual development of the myths from the level of heroic to God (Allison 2017)\(^{49}\)

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\(^{49}\) Evolutionary biologists have identified two types of transformations of species: phyletic gradualism describes the slow transformation of one species into a new one, and punctuated gradualism describes sudden evolutionary shifts.
References


