The relationship between science and culture has evolved over time in a significant fashion. During the Renaissance, naturalism was portrayed in a distinct way, one that entailed simply naturalistic renditions of scientific and cultural illustrations. Sometimes objective representations were at stake, while other times efforts were made to make it look real. This paper examines naturalism in the artistic tradition and scientific illustrations. It uses the lens of travel narratives of Jesuits in North and South India to examine the interrelationship between Europe and India through pictures. These myriad representations show often the different interpretations of the same reality and the notion of a 'difference' about the Orient.

Introduction

The paper will examine how scholars have defined naturalism in the artistic tradition and its relation to early modern science. This strand of scholarship which assigns a particular value to the role of naturalism in art and scientific illustrations then becomes the pivot point of first part of the paper. Considering examples from travel narratives this research questions the validity of such definitions of naturalistic renderings of scientific illustrations. In particular, it is examined in the second part of the paper how the travel narratives from sixteenth century European travelers—namely the Jesuit missionaries—and their exchanges in North India with the Mughal painters and in South India in the Vijaynagar Empire. How did such cultural exchanges influence the intellectual concerns of the role assigned to naturalism in European art and the creation of the Oriental ‘other’?

As no unique interpretation of what is ‘real’ or ‘natural’ existed within early modern art, there were underlying differences in the travel narratives while interpreting an indigenous culture. This difference could have come from one’s own cultural biases and constraints leading to ambivalence in interpretation and a subsequent incommensurability of what is the best rendering of reality. Also important in this context was the role these travel narratives played in the perception of the artists and philosophers in reshaping their ideals during the Renaissance in Europe.

Scientific Illustrations

James Ackerman in his paper Early Renaissance “Naturalism” and Scientific Illustration reflects on three different ways studio artists advanced the goals of science in the early renaissance. The first which was popularly known as natura naturans involved “improving the means of presenting visually the kind of evidence from natural objects and phenomena that was of interest to the scientific investigator and naturalist...” The second which was called natura naturata was more Platonist, and involved tailoring the visual evidences from natural objects in conformity to an underlying mathematical order. The third which was more humanist in approach involved “preservation of traditional representational imagery” which Ackerman remarks as “paradoxically characterized the illustration of scientific texts.”

In essence Ackerman indirectly defines naturalism as “…close investigation of natural objects and phenomena
for their own sake...”1 by which one has to conclude that objectivity is one of the features of a naturalistic illustration. The examples Ackerman gives are Pisanello’s Fox1 and Dürer’s Crab1 and Hare1. The fox looks amazingly lifelike and real having a dark outline of its body against a light background. Strangely enough, when one comes to know that the drawing was made from dead specimens, the living rendition of the fox becomes a manifest unnatural representation of reality, something which is not objective and hence not naturalistic. Dürer’s drawing of the crab reveals that the creature is not living as the claws are missing. His representation of the hare is very naturalistic. In particular the hare is represented in a particular lighting condition in a particular environment. The weeds next to the hare show that it is in a natural habitat. However, the illustrations all show the fox, crab and the hare at a particular instant of time, though the object was observed for a considerable span of time leading to a composite image rather than an approximation of a momentary visual image. Ackerman remarks “We see the record of a process of observation rather than of a Gestalt perception.”1

Furthermore, important in this context of naturalism is the works of Leonardo da Vinci. In his botanical works as seen in Ackerman’s paper specifically that of a plant reveals an ambivalence in interpretation.1 The illustration is neither an idealization, nor particular emphasis is given on individual details. However, observing the lengths of the stem, the leaves and the flowers which are all very proportionate, one can say that it is naturalistic. If one analyzes Leonardo’s The Last Supper one sees that Leonardo was well aware of Alberti’s “legitimate construction” and even refined it.2 The Last Supper also reveals the application of several aspects of linear perspective. In this illustration the figure of Christ and his apostles are out of proportion. The ends of the table look incoherent which makes the length of the table unclear. Consequently, the distance between Christ and his apostles and the windows behind them are ambiguous. The objects of the table seem more orderly between the hands of Christ while more disordered to the other parts of the table. On the rhetorical side, one can also argue about the space in which the figures are placed, especially in the context of a linear perspectival representation the space and the figures are geometrically dependent on each other. If one looks at the individual faces, one is struck by their distinctiveness. Some of the figures seem to have no correlation with one another, along with repetitiveness of characters. After which one can speculate that the individual objects in the painting might have been drawn separately with the help of a concave mirror like a hole-in-the-wall method, where the back window was used and later pieced together like a collage.6 However seemingly abstract in Leonardo, one finds an artist who used a scientific1 approach to visual representation.

Erwin Panofsky has argued in his paper Artist, Scientist, Genius: Notes on the “Renaissance Dämmerung” about the interaction between the artists and scientists by what he terms as “decompartmentalization” during the Renaissance, especially the role played by naturalistic images in early modern science.3 An important figure for Panofsky is Filippo Brunelleschi who gave perspective drawing a scientific basis, which later culminated into the emergence of projective and analytical geometry. A similar argument is given by Samuel Edgerton who claimed that naturalistic representations as seen in linear perspectival illustrations played a crucial role in the Scientific Revolution.4 Michael Mahoney gave a strong critique of the Edgerton thesis by showing that Edgerton had exaggerated the role played by the visual arts.5 Mahoney further showed that by the later seventeenth century those concerned with the theoretical aspects of mechanics had forsaken the visual arts tradition as inconsequential to the scientific (mathematical) understanding.6

In the context of the Edgerton-Mahoney debate, Bert Hall in his paper The Didactic and the Elegant: Some Thoughts on Scientific and Technological Illustrations in the Middle Ages and Renaissance, alludes to the Jesuit missions in China, an analysis of which reveals that Chinese artists used altogether a different set of protocols to describe reality.7 Hall further states that the technique of linear perspective was absent in China, Chinese illustrations of Western machines were also not workable. For justifying his argument Hall considers the example of Ramelli’s waterwell windlass in the form of a crankshaft.7 The Chinese rendering of such an artifact is very different than its European counterparts, which suggests magical events in Chinese iconography. However, this also shows the incommensurability of different modes of naturalism, which transcends beyond just the “didactic” and the “elegant” the manifestly simplistic categories of Hall. Though Hall argues that “naturalism” had a privileged position in the early modern West; one can say that there is no privileged position of an unique interpretation of reality. This ambivalence in interpretation depends on cultural translation as well. In this context it would be interesting if Hall would have given a Jesuit rendering of a Chinese artifact and its analysis to make his argument more convincing. Analyzing travel narratives especially those concerning the

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1 Here I agree with the Hockney-Falco thesis.
2 Mathematical.
methodological distinctions of representing reality, one might shed new light on the role of naturalism in its relation to the arts and culture in early modern Europe.

**Jesuits and Mughals**

Jesuits or members of the Society of Jesus can be taken as a representative of having particular characteristics of early modern Europeans which interacted with the Eastern cultures. Though ‘Jesuitical’ has become a synonym for manipulative ‘Jesuit style’ (French origins) and to a certain extent held responsible for making appeals to the senses as a vehicle for control and hence

Aristotelian in nature, the organizational dynamics of the Society required a long-distance network which facilitated the gathering of scientific information within the society. Though Jesuit overseas missions were characterized by myriad cultural and scientific activities which included art, literature, music, astronomy and medicine, this paper only considers the strand concerning the cultural exchanges in art.

India was in essence made notable by several seventeenth-century European travelers and occupied an important area in the exotic imagination of the Enlightenment. This was essentially the India of the Akbar's Mughal Empire. Though the Jesuit presence in India officially started in 1542, when Francis Xavier arrived in Portuguese held Goa (a state on the West coast of India), the innovation and assimilation of knowledge from this exchange was mostly in the development of architecture in Portuguese India. Hence, this paper’s focus will be on the Jesuits who came to the Mughal Empire and also on the European later travelers to South India.

The Mughal mission was the result of two of the most accomplished Jesuit missionaries Rodolfo Acquaviva (1550-1583) and Jerónimo Xavier (1549-1617). The mission was invited to Akbar’s court in 1580 for two main purposes: to provide Catholic debaters for an interfaith forum held regularly in Akbar’s palace at Fatehpur Sikri and to provide works of European Renaissance art for Akbar’s court artists' edification. The Jesuits provided a representative collection of European paintings that Mughal artists were able to appreciate. Xavier came into contact with Mughal court historian and artist Abd al-Sattar Ibn Quasim Lahori and Abu'l-Hasan. Figure 1 shows a painting of Virgin Mary and an Angel by a court artist of Akbar, Abu’l-Hasan who had read Xavier’s writings of the Bible and translated them into Persian. The painting shown in Figure 1 shows Virgin Mary holding on to a book. In the background one can see patches of grass and flowers which signifies a natural surrounding. It can be also be considered as an iconic portrait used for religious purposes as Mary is holding an opened book showing some Persian writings, as if in a mode of teaching, which makes it more realistic. It has a blank background with a peculiar interplay of light and dark shades. Clearly individual details like the finer lines of the face or that of the hand is not much emphasized, it represents more of an ideal type representation of the figure.

Figure 2 shows the Crucifixion which can be attributed to Kesu Das a court painter of Akbar. The figure of Jesus looks quite realistically done with opaque water colors and gold on paper. There is another figure of a woman
praying under the cross. Strangely enough, the top half of the cross is not visible. These iconic figures as seen in the paintings were part of the Mughal empire by which they ushered in a syncretic ideology of kinship in their multicultural empire. This was mainly used as a tool by the Mughals to reach the masses and make them aware of the religious tolerance of Akbar. Gauvin Alexander Bailey argues that Jahangir the son of Akbar, was deeply influenced by the images of Christian art. On observing the Crucifixion, he asked the Jesuits “Why if [you] adored Christ our Lord so much, did [you] paint him in such a dishonourable state?” One of his court painters added “When we depict Christ, we always paint him very beautifully and not on the cross.” Xavier then responded by saying that the image of the Crucifixion had a mnemonic value and the image represented that Christ had died for our sins and the wounds as seen on his body were reminders of his sacrifice. Jahangir seemed to have applauded the explanation.

Figure 3 shows another painting by Manohar, a court painter of Emperor Jahangir with a portrait of the Virgin Mary and the Emperor. This is seen in the Francis Xavier’s work called Mirât al-Quds or Mirror of Holiness finished in 1602. All the paintings including Figure 3 were commissioned directly from Mughal artists under the leadership of the court painter Manohar, which were full of naturalistic representations of landscapes and lively colors. The figure 3 reveals a very life-like picture of Emperor Jahangir holding on to a portrait of Virgin Mary. Jahangir also has a turban on his head as was the normal custom for all Mughal emperors. The peculiar feature of the image is that it is a sidereal view and only one half of the face can be seen. The elaborate jewellery which includes a necklace on his neck, rings on his fingers and ear gives it a realistic appearance. There is also a visible circular halo on the background of Jahangir’s head, done with a lighter color. Furthermore, the face of Jahangir appears to be disproportionately big relative to the hands. Whether Manohar was using optical devices like mirrors and lenses and its combination as compared to purely artistic intuitions to create projections of his object to make it very realistic and natural is unclear, but it cannot be ruled out. This reminds one of a similar strand in the artistic tradition in the West, especially as seen in the works of Ingres’s portrait drawing (see Figure 4) of Madame Louis Francois Godinot from 1829.

David Hockney claims by carefully observing the portrait that Ingres used a camera lucida to create it. The artifact reveals that the lady’s head seems to be considerably bigger compared to her body parts like the shoulder and the hands. Hence the conclusion is that Ingres drew her face first and later did her body by moving his camera lucida. This discontinuity in the spatial use of the camera lucida led to a small change in the magnification, explaining the discrepancy in proportion. Whether the Hockney-Falco thesis—that Renaissance artists were using optical aids to increase realism—holds good for artists in the Mughal empire in India, especially because of the cultural exchange with the Jesuits and earlier by the Portuguese is however debatable.

An important text in this context is Francis Xavier’s Āyine-ye Haqq Numā or The Truth-Showing Mirror (c. 1609) which was presented to Jahangir. The book written in Persian is in the form of a debate between a priest, a philosopher and a mullah (a learned Muslim) in the court of Jahangir. In this book a whole chapter is devoted to the

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**Fig. 3:** Emperor Jahangir by Kesu Das (Source: Reference 8)

**Fig. 4:** Madame Louis Francois Godinot by Ingres. (Source: Reference 12)
role of images as compared to that of the verbal tradition. Xavier argues that religious images are necessary to remind one of the deeds of Christ and the saints, as humans are forgetful by nature, and he sees pictures like a doctor reviving one and curing one of moral sickness. For him, information conveyed through pictures can be easily remembered by the human memory rather than the complicated way of conveying the same information through words. Xavier remarks:

The speech [of an image] is an abbreviated book and brief worship. It is something that speaks without talking and is heard without the ear; something written that everyone understands; a letter that everyone can read; a book for the learned; an attribute that makes manifest things which are past and ancient. It is a mirror that reflects things held in trust [i.e., things that are not actually part of it] … an assistant to the temperament, a teacher of the intellect; and it depicts intention.8

Clearly Xavier takes recourse to explaining in somewhat philosophical terms the myriad advantages of images especially over the verbal tradition. This is similar to Leonardo’s views on naturalistic representations. This also reminds us of what Eugene Ferguson calls “mind’s eye” as a visual, non-verbal process.13 However, Xavier had other motivations as well. As mirrors were quite often compared to poetry paintings in the sect of Islam which the Mughal emperors followed i.e. Sufism, it was an ideal trope for Xavier to increase the universality of his writings. He was also very attentive to the attractive power of an image. In him we see a coherent enmeshing of “didactic” and “elegant” aspects of an illustration. This is especially evident when Xavier also applies the Ciceronian rhetorical justification to images, showing how they can delight, teach and move (delectare, docere, movere).8 On the rhetorical side, Xavier also considered an image as a treasure-trove where valuable items and parables were safely kept. On the Mughal side, Akbar himself believed that it was possible to perceive the divine through images and remarked “The imageless [bisūrat, i.e., God] cannot be seen either when one is asleep or when one is awake, but with our skill we can form an image…” 8This shows Akbar’s Platonic way of thinking—where he is espousing an approach of images and the abstract.

Naturalism in the Mughal Empire

Figure 5 shows Emperor Jahangir’s final encounter with his son Shah Jahan before the latter’s departure for the Deccan (an area covering most of central and south India) drawn in 1640 by opaque water colors on paper in the form of a rectangular engraving.14 This painting was done by Payag an artist in the court of Shah Jahan. This is a court (darbar) scene which is lavishly decorated and hence very realistic. Here we observe that a lot of attention has been given to small details which involves the intricately designed Mughal architecture. It has a bright white background signifying the time of the day and an attractive environment in which such a court was situated. There are innumerable flowers in the background, however it is unclear by just looking at the picture, how far the flowers are from the court. A similarity with one of the past drawings of Manohar is that this is also a sidereal view and one can only see one side of the face of the people presented. Another striking feature of the artists’ rendition is that while the faces of Shah Jahan and Jahangir are bright, the Noble standing behind Jahangir has a darker complexion. This might be attributed to the fact that the emperors were from a higher caste than the Nobles and hence a brighter complexion. We can also see near the sides of the ceiling, a panoply of images which involves rectangular engravings of Jesus, Mary, John the Baptist among others. These pictures, however, have a frontal view unlike the faces of emperors. This shows the religious tolerance of the emperor which is revealed by his own inclination to patronize Christian religious art by his own will. On the symbolic aspect, such a representation of the deities of saints can also be interpreted as a distinct divide between the terrestrial and the celestial, an Aristotelian doctrine probably appropriated by the Sufis. Bailey argues that such a divide was prevalent amongst the Sufis “that depicts the heavens as consisting of several tiers of angels.
and saints who transmit God’s light to cognizant mortals.”

Clearly Payag’s painting is very naturalistic and resonated with the worldview of the Mughal empire.

**Scientific Naturalism in South India**

Figure 6 shows the sketch of Roberto de Nobili by his contemporary and fellow Jesuit Balthasar da Costa. De Nobili was an Italian Jesuit who came to India in 1605 and went to the city of Madurai in South India which was outside the reaches of the Mughal Empire (the Mughals was mostly confined to the North, West and parts of East India). The painting shows De Nobili in a South Indian attire holding on to a stick, wearing wooden shoes (kharam), also carrying a container of water, and having a rectangular shaped design on his forehead (made by sandalwood paste, signifying good luck) which is usually a tradition in South Indian culture. It is a very simple drawing, with not much attention to particular details and looks quite different than those by the Mughal painters. Though it has a specific degree of a naturalism, which is distinctly different from few other travelers’ narratives. The painting has a black and white background, while De Nobili’s figure is drawn with a dark color, as South Indians are typically dark in complexion. The borders of the pavement where the figure stands can be seen.

De Nobili was also an important thinker and writer, particularly in the South Indian language of Tamil. The most influential of his work includes a theological treatise in Tamil called the *Dialogue on Eternal Life* (*Nitya Jivana Callâpam*) which was meant for his fellow missionaries as well as Indian scholars. In this work, De Nobili applied established theological principles in understanding the Tamils and their culture.

Ludovico de Varthema of Bologna was another European traveler to have visited and described the independent Hindu kingdom of Vijayanagara on the southern tip of the Indian peninsula in 1505. Narsinga and Binsagar were the two names by which the kingdom was known to Europeans in the late-Renaissance. Figure 7 shows an idol of Calicut (a city of South India) eating souls according to a woodcut by Augsburg artist Jorg Breu in the first German edition of Varthema’s *Itinerario* (1515). Analyzing the illustration shows three crowns on the head of the devil as in the papal kingdom. It has two visible horns on his head, hairy hands, a big mouth and nose, and feet like that of a hen. The small creatures near its legs are human souls, and he has a soul in his right hand. There seems to be a woman-like figure standing next to his right and a big fire to his left. As it is a woodcut the light and dark shading effects are done by closely spaced parallel lines, one does not find a lot of cross-hatching though, refined versions of which can be seen in Albrecht Dürer’s woodcuts.

![Fig. 6: Roberto de Nobili by Balthasar da Costa. (Source: Reference 15)](image1)

![Fig. 7: Idol of Calicut by Georg Breu (Source: Reference 9)](image2)

Next, we see in figure 8 another woodcut of Jeorg Breu in which we see the devil sitting on a podium in conversation with a person worshipping him. The person is on his knees and is presumably is a Brahmin (the uppermost priestly caste in Hindu society). The Brahmin (or the King of Calicut) has a long beard, a turban on his head. The devil has similar physical attributes as the previous woodcut, but now he does not wear three crowns, so now four horns are visible. In the background one can also see three other figures barely clothed, and one can presume they were nobles who accompanied the king. It does not appear to be a very naturalistic representation of
the idol of Calicut and one can ask why Breu made such an unrealistic illustration of Indian art. Rubies argues that Breu used Varthema’s description for his drawing for the most part, but as Breu did not have access to an actual Indian image, he turned to a European stereotype that was close enough. Rubies remarks: “…Varthema setting a precedent of travelers to India demonizing Hindu art which would mark the tone for the whole century…”

Hence, Varthema wanted to portray a traditional European image of Satan eating souls in hell on one hand while administering justice in an ethical way as God’s incarnation on the other. Here we have an example of an illustration which can be considered naturalistic by Breu’s terms but not at all objective nor empirical in a broader perspective as it is not an accurate description of reality. Calicut’s idol never looked like Breu’s figure. Hence travelers sometimes gave accounts of different cultures through a lens of their own prejudices, leading to incommensurable interpretations of the same reality.

**Illustrations of Francois Bernier**

Another illustration (figure 9) obtained from travel narratives is that of an Indian Sati by French doctor Francois Bernier in his *Voyages de Francois Bernier...contenant la description des Etats du Grand Mogol.* Bernier happened to be the disciple of famed philosopher-scientist Pierre Gassendi. Bernier visited India between 1658 and 1671. Rubies adds that Bernier was not a passive observer and tried his best to convince the widow not to get into such an act. The drawing shows Bernier watching the act from one side. Furthermore, in the illustration the musicians are playing music. Behind the widow are standing five other figures are found to be standing, who can be taken considered to be the relatives of the widow. Few of the features in the painting stand out. The dress (presumably a French costume) worn by Bernier and the person standing next to him though similar are very different from that of the widow’s relatives.

This is interesting as there were Jesuit travelers like De Nobili whose portraits reveal that they dressed in indigenous clothes (probably to get closer to the culture), unlike Bernier. On the pyre we see the dead body of the husband, strangely enough the face of which is turned towards the painter, unlike what would be in reality, where one hoped to see the face turned towards the sky. This might be purposefully done to show the face of the husband. Also notable is the fact that the widow who is on the verge of immolating herself in the fire is barely dressed. This is also not very realistic, as by the usual custom in *sati* the widow is supposed to dress up in her wedding robes adorned by all her jewellery, as this event would be seen as a culmination of her marriage. The scene is represented in a natural environment which who looks naturalistic with the trees, plants and the surrounding hills. Considering the factual errors in describing the event by seeing it, Bernier’s description is not fully accurate, mostly stemming from his lack of detailed knowledge of the Indian culture along with his personal biases. Some caveats from this narrative can be drawn.

**Final Thoughts**

Michael Adas in his book *Machines as the Measure of Men* remarks that “…Bernier’s account perhaps best illustrates, early European ambivalence towards Indian scientific (and cultural) learning…” It will be interesting
to find an indigenous visual tradition in the natural or the physical sciences where images play an important role to which Bernier was responding to. Future researchers can examine broader implications of the indigenous knowledge systems present in such a period which influenced the Jesuits. However, such naturalistic images did create an impact in the Western ideals of Enlightenment especially by creating a stereotype of the “other” culture, a variant of which led to the creation of the Oriental image of India (as seen in the works of James Mill in the early nineteenth century).16

Science as we understand now in the twenty first century is very different than what it was in early renaissance. Thus the relationship of science and culture have also evolved especially seen through the naturalistic renditions of scientific and cultural illustrations. The cross-pollination of ideas between Europe and India is an interesting case study. Especially considering the Jesuits in North India during the Mughal Empire and in South India in the Vijaynagar Empire. India as seen through these European travel narratives of Rodolfo Acquaviva, Jeronimo Xavier, Francis Xavier, Roberto de Nobili, Balthasar da Costa, Ludovico de Varthema, Jeorg Breu and Francois Bernier show images which display scientific naturalism. These European understandings of India were often times based on personal beliefs and prejudices and not necessarily an accurate description of the local culture. However, such conceptions created a view of India in Europe which was sometimes exotic and other times naturalistic. This laid the ground for later European Orientalist understandings of India especially with the rise of British Empire.

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