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Geometrical Study of Yagya Kunda

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Abstract

Geometry is the word without which we can never expect the development in the world we have and we will have in future .But the story behind the development of it is very interesting and depicts us the importance of mathematics and its accuracy. Figures always have their own language and a systematic figure can say everything which is the result of mathematical geometry. All the gradual development of geometry, algebra, arithmetic directly associated to only one term which 'Yagya'. Yagya is the predominant deed and our civilisations always acknowledge its importance. Construction of various 'Yagya kunda' gave the birth of geometry. Systematic arrangement of bricks with different patterns in 5 layers of kunda construction gave the birth of algebra. Finding out the diagonal of square kunda evaluated the value of $\sqrt{2}$ *. Construction of Asvameda vedi evaluated the value of* $\sqrt{3}$*. Construction of Rathachakraciti created a problem and the solution of this problem gave the birth of A.P. (Arithmetic Progression) . Today it seems very true that if we have to get actual knowledge of Mathematics then we must look back towards our Veda , Puranas, Dharmasutra, Grahyasutra and other spiritual texts which will give us incite in the form of capsule that our ancient Mathematicians Baudhayana, Apastamba, Katyayana, Manava, Bhaskara etc. used to employ in various spiritual contexts. This paper will also include a new formula to construct a Yagya kunda having a huge kunda to treat Covid 19 like bronchial diseases in mass level. It will provide a new formula to find area of different kunda of respective lengths. At last it will provide a very easy method to construct Yagya kunda of Vulvar shape.*

Keywords: Geometry, Yagya kunda, Mathematics, Veda, Formula.

Introduction

The Earth is a mysterious planet so saying anything happened in past exactly is too much confusing. Vedic age witnessed a very much development of mathematics in the form of geometry. Max Muller tried to fix the dates of Vedic literature from 1000 B.C. to 2000 B.C.[1]. But he expressly said "that we cannot hope to fix a terminus quo." Whether the vedic hymns were composed 1000 or 1500 or 2000 or 3000 years B.C. no power on Earth will ever determine[2]. Western scientist accepted the view of Maxmuller. The word geometry is the result of continuous efforts by our Sulbakars. Geometry cannot be discussed without putting light on Sulbasutras. There are nine Sulbasutras on record out of which only four are in existence by the time. These four Sulbasutras are Baudhayana Sulbasutra, Aapastamba Sulbasutra, Kaatyayana Sulbasutras, Maanava Sulbasutra. All Sulbasutr as in general treat the construction of the Yagya Vedis of specified dimensions with bricks of precise size and numbers[3]. The English word geometry is a combination of two Greek words 'geo' and 'metry' where geo means surface and metry means measurement. On other hand Sanskrit word 'Jyamiti' is combination of two words 'Jya' and ' Miti' where Jya means Bhumiti and Miti means Parimanarthak[4] The conflict about the father of Geometry is very old. There are two views in this regard the first one is (a) According to Unani Thels (600 B.C.) is known as father geometry (b) but in India Sulba period (1200 B.C. to 600 B. C.) witness the sufficient knowledge of geometry, thus India taught the whole world "Geometry" like "Algebra" and "Arithmetic"[5]. This paper is about the Yagya kunda geometry and we are slightly moving towards our main topic. Yagya is the hub and nexus of the entire world of thought of ancient civilized man[6]. The Vedas signify Yagya as the nucleus of the cosmic creation and cycle of nature[7]. To elaborating more in context of Yagya it is said that

देवाणांद्रव्यंहविषंऋक्साम्यजुसन्ततः।
ऋत्विजंदक्षिणाणंचसंयोगीयज्ञउच्यते॥

Which means the offering of materials, ahutis, continuous recitation of Rig, Sama and Yajurved as comprising priests and their fees is called Yagya[8].

The following are the main goals of this research work: i. To give a new mathematical formula called L' hast formula in the name of author which will help in construction of Yagya kunda with huge kunda size for purifying our environment for tackling situation like Corona. ii. To give a new formula to find area of different kunda of respective lengths. iii. To available a new easy method to construct Yagya kunda.

Literature Review

According to Vedic literature the size of kunda is dependent on number of offerings[9] so that no portion of sacred fire ash give

optimum (maximum or minimum) condition. To complete this task a very fine mathematical knowledge depicting the relation between number of oblation and size of kunda required. The ancient spiritual book Shardatilak[10] comprising a shlok states that length of Yagya kunda should be considered in accordance of number of offerings to fire to be offer 11 which is given in Table-1.

Table-1: Number of offerings with respect to length of kunda.

Length of Kunda	Number of offerings (oblations)
1 Hast	≤ 1000
2 Hast	$\leq 10{,}000$
4 Hast	$\leq 1{,}00{,}000$
6 Hast	$\leq 10{,}00{,}000$
8 Hast	$\leq 1{,}00{,}00{,}000$

Area of kunda and relationship between their dimensions: The dimensional knowledge of Yagya kunda we can get from the book Kundark. For each kunda of one hast, height of kunda is same. The inside structure of all kunda has reverted shape just like pyramid i.e. top surface broader and bottom surface narrower according to the book Kundark.

Earlier units of measurement of Kunda in terms of modern day unit:
24 Angula = 1 Hast = 48 cm = 18.897648 inch
21 Angula = 1 ratni = 42 cm = 16.535442 inch
22 Angula = 1 aratni = 44 cm = 17.322844 inch[11]

The following Table-2 gives the relationship between length of kunda and its area[11].

Table-2: Relation between kunda type, length of kunda and area of kunda.

Kunda type	Length of Kunda	Area of Kunda
1 Hast Kunda	24 Angula	576 Sq. Angula
2 Hast Kunda	34 Angula	1152 Sq. Angula
3 Hast Kunda	41 Angula 5 Yava	1728 Sq. Angula
4 Hast Kunda	48 Angula	2304 Sq. Angula
5 Hast Kunda	53 Angula 5 Yava	2880 Sq. Angula
6 Hast Kunda	58 Angula 6 Yava	3456 Sq. Angula
7 Hast Kunda	63 Angula 4 Yava	4032 Sq. Angula
8 Hast Kunda	67 Angula 7 Yava	4608 Sq. Angula
9 Hast Kunda	72 Angula	5184 Sq. Angula
10 Hast Kunda	75 Angula 7 Yava	5760 Sq. Angula

Importance of Yoni Kunda: The whole world will come to a standstill if there is no population. According to Hindu religion everyone in this world born as a debtor of three deeds they must complete within their life span they are: i. God Debt., ii. Ancestors Debt, iii. Priest Debt. The second debt can be repay by the birth of baby[12]

According to our Vedas if a parents facing complication in conceiving a child they must perform Yagya on Vulvar (Yoni) shape Yagya Kunda. The same Kunda is helpful in treating women diseases too[13].

Construction method of Vulvar (yoni) shape kunda: As mentioned in the book Mandapkundasiddhi the construction method of such kunda is very tedious to understand for this generation but the method discussed below in result section is quite simpler , translated and updated version which makes it quite easy to construct than the book mentioned above.

Impact of Yagya on gradual development of Mathematical aspects: Yagya is also known as kratu, adhwar, hom, hawan, shawan etc[14]. Different types of Yagya kunda and under each kunda size vary from 1 hast (24 angula) to 10 hast or more in which each of them have fixed dimension follow a definite proportion. There is important role of proportionality in the geometry of Yagya related elements. The size of mandapa is directly proportional to the size of kunda, size of kunda proportional to the number of offerings; the same is proportional to the spiritual penance. i.e. Size of Mandapa Size of Kunda Number of offerings Spiritual penance. All important fundamentals of Yagya related mathematics we can get from Sulbasutra of Maharsi Baudhayana that contains theorems of early mathematics which comprises value of, square root of 2 and a statement of Pythagorus theorem. The study of Sulbasutra in modern time credited to George Thibaut for his work around second half of 19th century[15]. The value of $\sqrt{2}$ we can understand how they find after consrtruction of 1 hast square kund the measure of whose diagonal $\sqrt{2}$ times the side gave the first approx value of $\sqrt{2}$[16]. In modern day mathematics we know multiple series as instance Gregory's series, Euler's series, Machin's series (In 1706 J. Machin 1680-1751, Professor of Astronomy at Gresham College, London, obtained the value of π up to 100 place of decimals), Dase's series, Rutherford's series and more who worked for the exact value of π that make the sense how important the work Baudhayana did that early time[10]. These are the sparks we can estimate in the study of Yagya kunda geometry. The interesting fact is that irrespective of shapes all the Yagya kunda have same surface area and have approximately same volume compared to circular kunda with some errors respective to different shapes[17].

From Sulbasutra it proves that 'angula is the standard unit for measuring lengths of different Vedis, whereas 'purusa' is the standard unit for measuring length of citis like Syena and other. All other units are derived from these two standard units[18]. According to Baudhayana the measurement of Angula is equal to the length of 14 grams of anu or that of 34 sesamum seeds when placed in contact with each other along their width. The term 'Vedi' is very important we can understand it from "The

Vedi is that which the Gods obtained. Besides the Gods find out Vishnu (Vid+Anu) in the same place hence it is known as Vedi[19]. Another definition is Vedi is the place which is made by digging the ground and by cleaning all grass and stems on the surface, after that it is purified by water and then use for Yagya[20].

Yagya is called the father of geometry we can estimate by the following geometrical operations are found to have studied in relation with different constructions[21]: i. Construction of a square on a given straight line. ii. Construction of circle equal to a given square and vice versa. iii. (a) Doubling a circle. (b) Geometrical method to find the value of $\sqrt{2}$ which is expressed as $\sqrt{2} = 1 + \frac{1}{3} + \frac{1}{3.4} - \frac{1}{3.4.34}$ … iv. (a) A theorem on the square of the diagonal which runs thus "the diagonal of a square produces an area double of the original square". (b) A general statement in the square of the diagonal of a rectangle now known as Pythagorus theorems runs that "the diagonal of a rectangle produces both (areas) which its length and breadth produce separately. And many more theorems which has its genesis on Yagya and its associated terms.

Results and Discussion

After observing the above relationship between number of oblations and the kunda length we concluded towards a general formula in the form of in equation named as L, hast inequality given as $O_l \leq 10^{3+\frac{l}{2}}$ where O_l denotes number of oblation with respect to length l . l denotes kunda length in the form of even natural number.

The problem that knock us after looking Table-2 is that if the dimension of 1 hast kunda is 24 angula then why not the dimension of 2 hast kunda is 2x24 i.e. 48 angula why it is 34 angula, same irregularity with all other kunda that not seems to follow any pattern it looks like but actually it follows a definite rule which we are trying to discuss below in Table-3.

Table-3: Relation between types of kunda, area, pattern and its dimension.

Types of Kunda	Area (in sq. Angula)	Pattern	Dimension
1 hast	576	$\sqrt{1(576)} = \sqrt{576}$	24
2 hast	1152	$\sqrt{2(576)} = \sqrt{1152}$	34(approx.)
3 hast	1728	$\sqrt{3(576)} = \sqrt{1728}$	41(approx.)
4 hast	2304	$\sqrt{4(576)} = \sqrt{2304}$	48
5 hast	2880	$\sqrt{5(576)} = \sqrt{2880}$	53(approx.)
6 hast	3456	$\sqrt{6(576)} = \sqrt{3456}$	58(approx.)
7 hast	4032	$\sqrt{7(576)} = \sqrt{4032}$	63(approx.)
8 hast	4608	$\sqrt{8(576)} = \sqrt{4608}$	67(approx.)
9 hast	5184	$\sqrt{9(576)} = \sqrt{5184}$	72
10 hast	5760	$\sqrt{10(576)} = \sqrt{5760}$	75(approx.)

Now we can find a new formula to find area of different kunda of respective lengths, The formula can be given as $\boldsymbol{A_l = l\ A_1}$; A_1 is the area of 1 hast kunda and l must be natural number.

Construction methods for Fire Altars specifically vulvar shaped (Yoni Kunda)

We can construct the Yagya kunda plotted below in 4 steps as:
Step-1: First we will construct a square of measure 24 angula and divide it into 4 squares of same size drawing two lines from East to West and North to South.

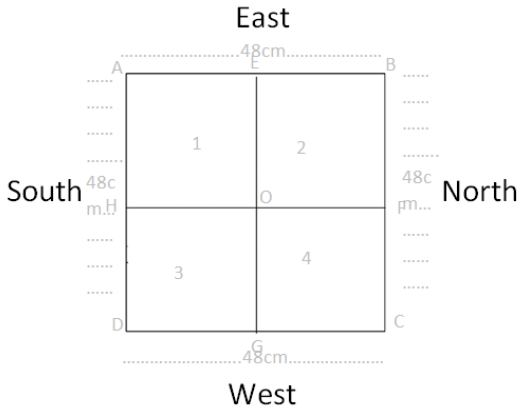

Figure-1: 1st stage of vulvar kunda construction. Where: O = Centre, AB=BC=CD=AD=EG=FH= 48 cm (24 Angula).

Step-2: Now the line facing west to east direction increase it to more $(4 + \frac{4}{32})$ angula from the point E, the distance from centre O of square to the new point P is $(12+4+\frac{4}{32})$ angula. Now join the point F and G with straight line and the point H and G with straight line.

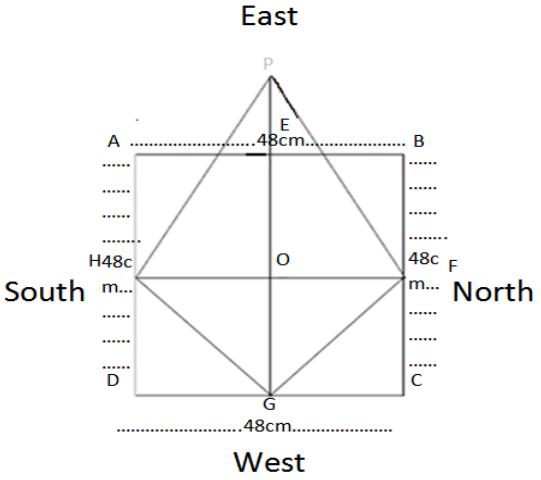

Figure-2: 2nd stage of vulvar Kunda construction. Where: O = Centre, AB=BC=CD=AD=EG=FH= 48 cm (24 angula), EP = $4+\frac{4}{32}$ angula (increment of GE).

Step-3: Now construct two semicircle outward to the square by keeping L and M centers.

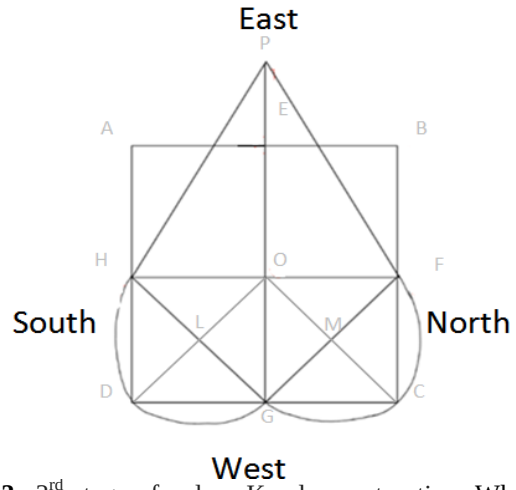

Figure-3: 3rd stage of vulvar Kunda construction. Where: O = Centre, AB=BC=CD=AD=EG=FH= 48 cm (24 Angula), EP = $4+\frac{4}{32}$ angula (increment of GE).

Step-4: Now we will get the exact shape of Vulvar (Yoni) kunda which can be used in ahuti after completing its border by considering border measurements of more three layers which surrounds the main below kunda.

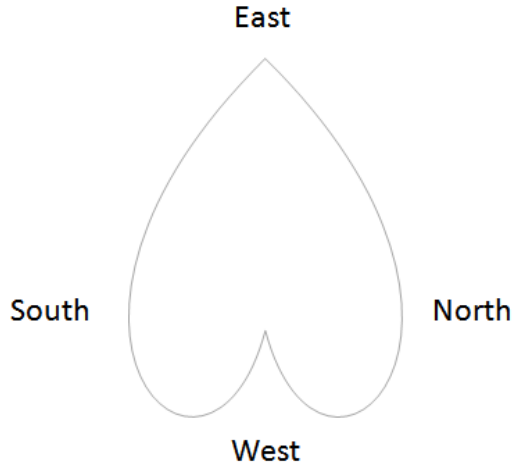

Figure-4: Final stage of vulvar Kunda construction.

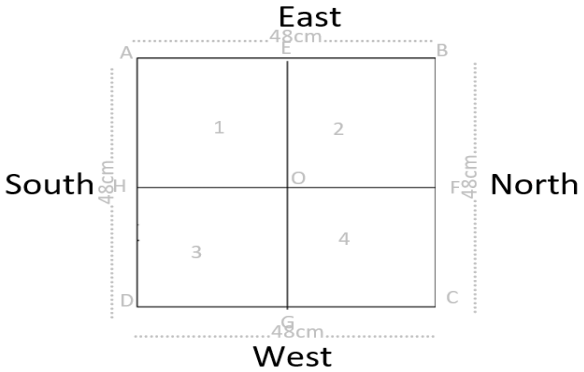

Figure-5a

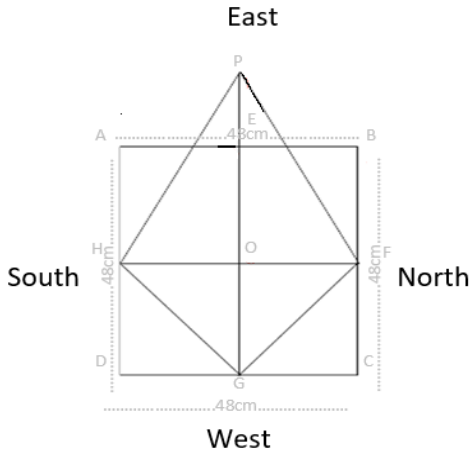

Figure-5b

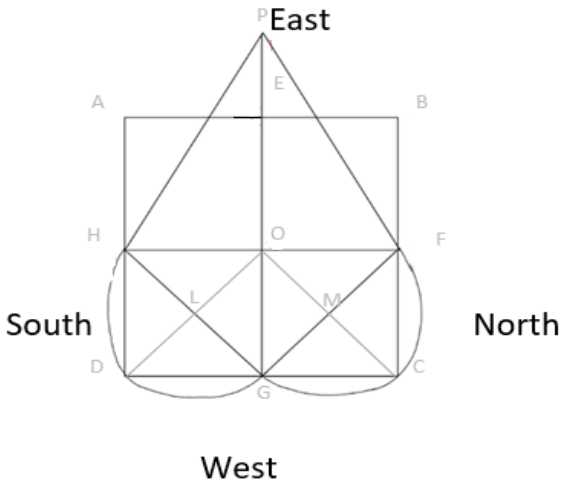

Figure-5c

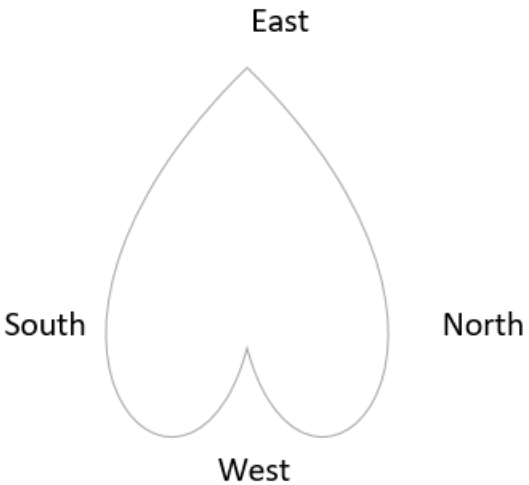

Figure-5d

Figure-5: Final view of vulvar Kunda construction process depicted through these Figures-5a,5b,b5c,5d which gives us the idea to construct it easily.

Conclusion

Yagya is not merely a worship of God but it is worshiped of whole universe which connects us to our life and death so we must perform it with 100 percent accuracy and which rely on mathematics behind it to a large extent. A small effort we made through this article that will sparks us to do more exploration of mathematical geometry of kunda size and shape. In this article we made an attempt to ease the construction pattern of specifically Yoni kunda in very simple way that saves our time and energy while constructing it. Some light also given to a new formula that authors made to find the area of any sort of kunda and a formula to construct huge length kunda in respect to future need. We mentioned how important the work of Maharsi Baudhayana which gave the approx. value of $\sqrt{2}$, π and a base of Pythagorean theorem that Pythagorus used and became immortal in the name of the theorem. Various effort made by modern day Mathematicians and scientists like Gregory, Euler, Machin, Dase and many more to find value of π by using different types of series and we can see the same pattern of series used by Baudhayan to construct the yagya kunda particularly the yoni kunda we have discussed above and ultimately gives the value of π and $\sqrt{2}$. Finally we can conclude that if you want to explore something great then we have to go towards our root, our vedas.

References

1. Kularia D.P. (2004). Sulbasutra a critical study, Maharsi Dayanand University, Rohtak, Haryana. http://hdl.handle.net/10603/44468

2. Muller Max (1860). A History of Ancient Sanskrit Literature. Williams and Norgate, 14. Henrietta Street, Convent Garden, London and 20 South Fredrick Street Edinburegh.

3. Deka R.C. (2005). An analytical study of continuous and chronological development of mathematics in India from the beginning to the nineteenth century A.D.. Gauhati University, Assam, http://hdl.handle.net/10603/66499

4. Samvedam D. (2020). A study of the specialty of geometry as presented in Sulba Sutra of the Kalpa Yedanga, Andhra University, Andhra Pradesh. http://hdl.handle.net/10603/368473

5. Varshney P. (2000). Baudhayana Sulba Sutra mein Nihit Jyamiti Ganit ke prayog ek Samalochna, Dr. B. R. Ambedkar University, Agra. http://hdl.handle.net/ 10603/327587.

6. Trivedi M.S. (2020). Yagya and its philosophy in vedic literature,Maharaja Sayajirao University of Baroda Gujrat.

7. Joshi R., Shriwastav A., Manek V., Tiwari P., Dixit A., Kumar Mishra S., ... & Pandya C. (2021). Advancement of Research on Yagya-National Symposium Consensus. *Interdisciplinary Journal of Yagya Research*, 4(2), 28-39.

8. Devi, R. (2013). Pracheen Bharat mein yagya ki avdharana avam uske badalte aayam, Chhatrapati Sahuji Maharaj University, U.P. http://hdl.handle.net/ 10603/277754

9. Chandel, E. (2022). Mathematical and Scriptural Aspect of Yagya Mandap Construction. *Interdisciplinary Journal of Yagya Research*, 5(1), 20-29.

10. Das, B. C. and Mukherjee B. N. (1987). Higher Trigonometry. Dwijendranath Dhub L.L.B. for U. N. Dhub & Sons private Ltd. 15, Bankim, Chatterjee Street, Calcutta 12, India. pp 130-132. ISBN :978-93-80673-83-7

11. Motlani, J. (2020). The size and shape of Yagya Kund: Mathematical and spiritual aspects. *Interdisciplinary Journal of Yagya Research*, 3(1), 08-14.

12. Goud, V.S. and Kavyatirth, V. (1944). Yagya Mimansa page-2, CC-0. Mumukshu Bhawan Varanasi Collection. Digitised by eGangotri.

13. Sharma, S. (2021). Mandapkundasiddhi, Page-54, Chaukambha Krishnadas Academy, Varanasi, ISBN: 978-81-218-0111-7

14. Katyayana (2000). Mandapkundasiddhi, Chaukambha Surbharti Prakashan. Varanasi, pp 2-35, ASIN: B06XR TTF7V

15. Dani, S. G. (2023). Ancient Indian Mathematics: Sulbasutras–A Mathematical Review. *Handbook of the History and Philosophy of Mathematical Practice*, 1-73.

16. Nayana J., & Samarth, J. (2024). Ancient Indian mathematician-baudhayana and the value of √2. *International Research Journal on Advanced Engineering and Management*, 2(9), 2922-2924.

17. Bansal P., Kaur, R., Gupta, V., Kumar, S., & Kaur, R. (2015). Is there any scientific basis of hawan to be used in epilepsy-prevention/cure?. *Journal of epilepsy research*, 5(2), 33.

18. Jayashankara K. (2007). Sulbasutra a critical analysis, Manglore University, Karnataka. http://hdl.handle.net/ 10603/132298

19. Gadgil M. (2008). The concept of place in vedic ritual, Savitribai Phule Pune University, Maharashtra. http://hdl.handle.net/10603/152811.

20. Kumar R. (2019). Satpath Brahmane Yagya vedi vigyan ka vishleshnatmak Adhayan. Maharshi Dayanand University, Rohtak, Haryana.

21. Bag, A. (1968). History of the development of mathematics in ancient and medieval India. University of Calcutta. West Bengal. http://hdl.handle.net/ 10603/157261