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TRACKS OF THE SLEDGE
(An agricultural approach to rug lay-outs)

Presented by

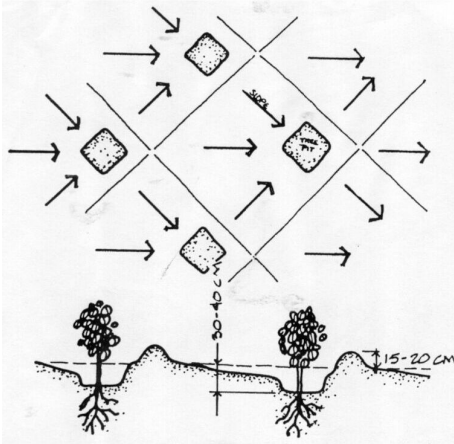
Markku Lemmetyinen, Finland

TRACKS OF THE SLEDGE

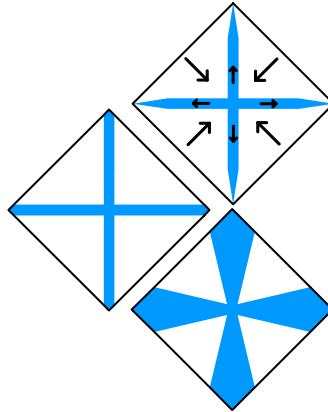
(An agricultural approach to rug lay-outs)

This presentation contains some of my discoveries¹ about the geometry of rug patterns and their probable connection with ancient dry land agriculture. I have organized my discoveries in chronological order.

Fifteen years ago I worked in the field of development co-operation. In Kenya I became familiar with certain reforestation experiments utilizing a water harvesting technology with the so-called micro-catchments. The system utilizes a 3-dimensional soil surface. The water is collected to the roots of tree seedlings as illustrated in Img 1.



Img 1. Water harvesting by using micro-catchments²



Img 2. Some new ideas to distribute the water

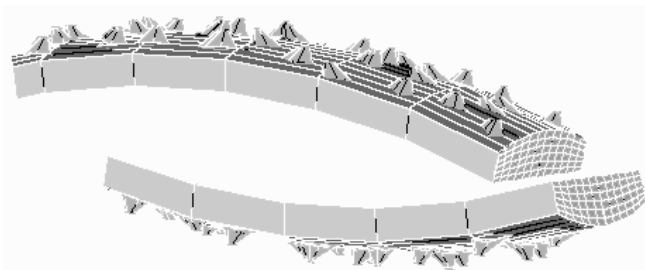
I got some new ideas about the distribution of water, so that larger micro-catchments could be used. I presented my ideas at an experts' conference in Finland³, where my initiative was encouraged. However, my boss was not too enthusiastic about them: he gave me the sacks.

In that situation I had no chance to pursue the program as a normal research project. I had to create my own ways; these included the exploring of Biblical texts and putting them into a form of microcomputer models.

That way I combined the oldest and the newest technologies. I started by exploring Biblical texts, since the micro-catchment patterns have some Biblical shapes (Img 2). Furthermore, I remembered that archaeologists had found certain ancient water harvesting systems in the Negev desert in Israel.

According to the texts of Isaiah and Jeremy it is evident that

- Water pools were used for cultivation.
- These contained agricultural plants and trees together; in our time this is called agro-forestry ...desert becomes a fertile field, and the fertile field seems like a forest. (Isaiah 32:15)⁴
- Obviously the cultivations were made by an animal (oxen) drawn tool called a sledge, which had sharp grasping teeth: ...leaving a trail in the mud like a threshing sledge. (Job 41:30)²



Img 3. I thought the tool might look something like this.

15 "See, I will make you into a **threshing sledge**, new and sharp, with **many teeth**. You will thresh the mountains and crush them, and reduce the hills to chaff.

16 You will winnow them, the wind will pick them up, and a gale will blow them away. But you will rejoice in the LORD and glory in the Holy One of Israel.

17 "The poor and needy **search for water**, but there is none; their tongues are parched with

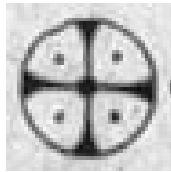
thirst. But I the LORD will answer them; I, the God of Israel, will not forsake them.

18 I will make **rivers** flow on barren heights, and **springs** within the valleys. I will turn the **desert into pools of water**, and the parched ground into springs.

19 I will put in the desert the cedar and the acacia, the myrtle and the olive. I will set pines in the wasteland, the fir and the cypress together. (Isaiah 41:15-19)²



Img 4. This is a symbol for the sun god on an Assyrian stone sculpture from about 850 BC. This sign was one of the attributes of the national god Assur.⁵



Img 5. Wheeled cross with four dots

In my view the Biblical texts also suggest that the cultivation method is portrayed in (respected) images and fancy stories are attached to them. I started to explore what those images might be.

- If a micro-catchment has the shape of a saucer, it must have outer edges and four arms to distribute the collected water, I concluded.

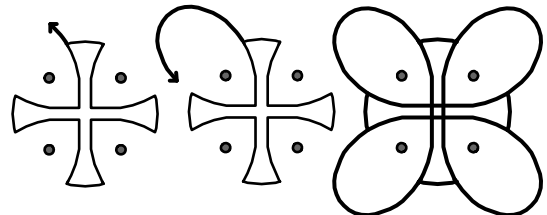
A wheeled cross as illustrated in Img 5 started to interest me, since it matches the above criteria and has enjoyed much respect. In the Catholic era in Finland only the highest

bishops invited from Sweden were allowed to paint the patterns on the walls of medieval stone churches, until Martin Luther considered it to be pagan. Anyway the patterns seem to be contemporary to the texts of Isaiah (Img 4).

Quite often the pattern has four dots. First I didn't get any sensible meaning for them. Then I used the following approach:

If I were the driver of the sledge where should I continue my drive (image 6a)? Since the path seems to be turning left, it is better to follow that line (Image 6b). This way I got the endless knot driving path. In Scandinavia we call this pattern a "Hans Knot" or a "Northern Knot" (Image 6c).

Where to continue ?

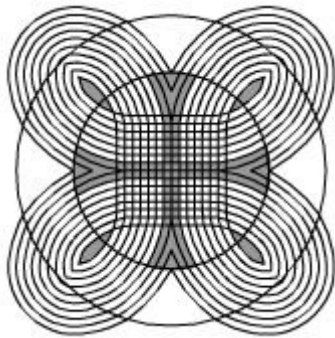


Img 6a.
Finding the
right path

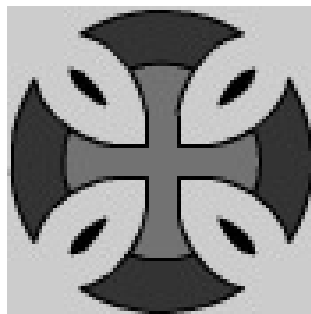
Img 6b.
First turn

Img 6c. Endless
Knot Trails

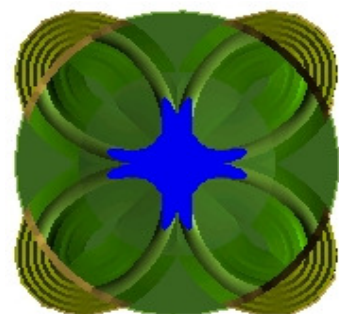
When we drive parallel paths as in image 7, we get a rational explanation for the dots (Image 8).



Img 7. Parallel driving paths

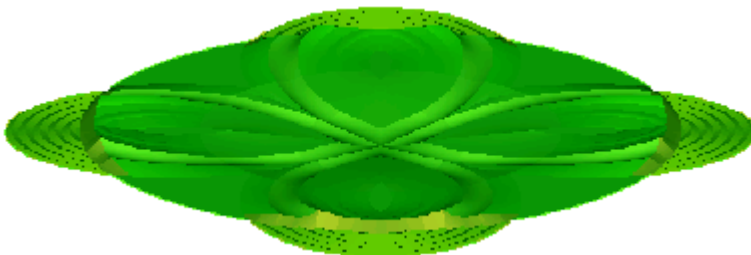


Img 8. Explanation for the dots



Img 9. Raising water in the basin

Then I concluded rational 3-dimensional shapes for the micro-catchment. The idea is to move soil from the center to the area between the circles and make four arms to distribute water (images 9-11).

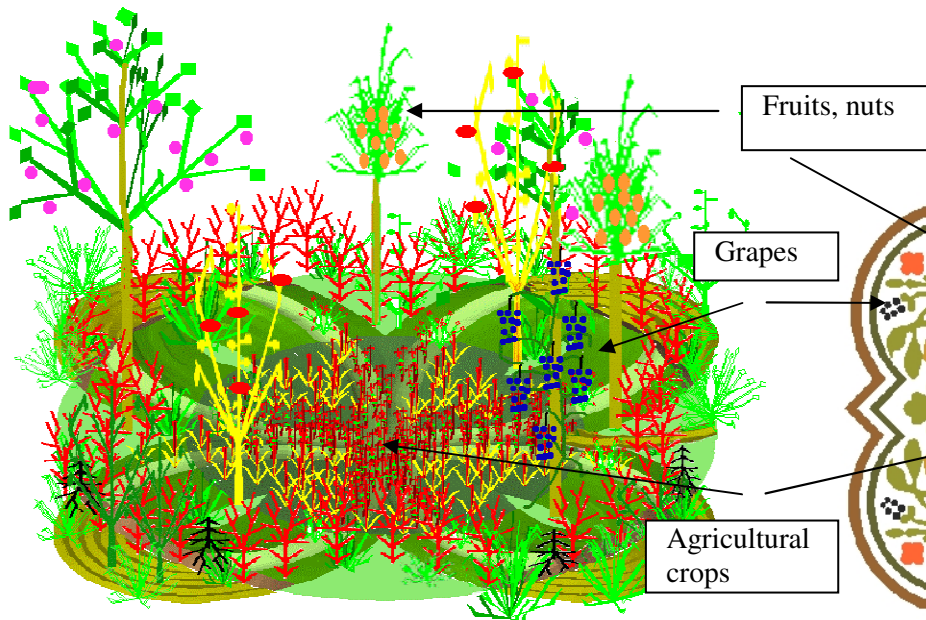


Img 10. 3-D shape of the Namescope micro-catchment

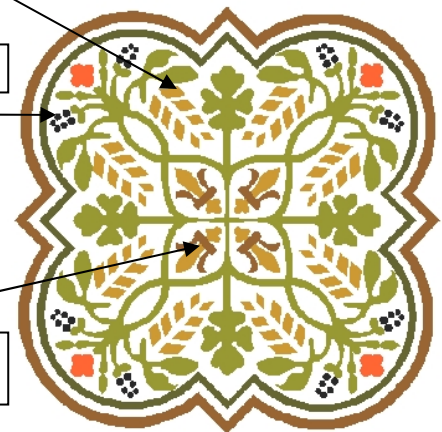


Img 11. The same micro-watershed in full water phase

In the center area of the basin we can cultivate agricultural plants. Trees protect them from heavy sunshine. The surrounding bush zone defends the cultivation from dry winds and arrests wind blown particles of humus. So the cultivation conditions become continuously better in the basin, while in the normal flat land cultivation conditions weaken every year due to the loss of topsoil. During dry season the vegetation enjoys soil moisture, since the capillary system moves infiltrated water upwards. Some part of the stored water forms fresh ground water to restore springs and wells.



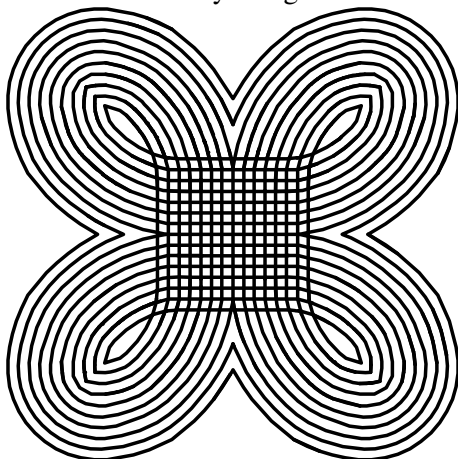
Img 12. Namescope cultivation in a micro-watershed



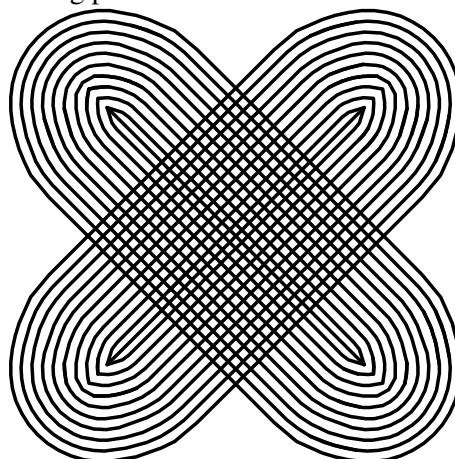
Img 13. An interesting clip-art

Image 13. has surprising similarities to the Namescope structure: The quadrifoil shape, Hans Knot, and the vegetation is organized in the same way as in the Namescope cultivation. I found the image in the Corel Clip-art Gallery. It would be interesting to know more about its background. Doesn't it look a bit like a Mandala symbol? Harappan civilization (in Baluchistan) near Indus River developed rainwater harvesting around 2600 BC. Ponds are used 600 BC.⁶ Baluchistan button seals from Mehrgarh, (3300 BC. - 2800 BC) have nice quadrifoil/cross/swastika/hans knot combination layouts⁷.

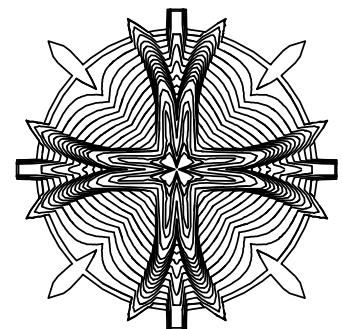
Faster driving paths we can achieve by driving as in image 14b. In Scandinavia we call this type of pattern an "Osman knot". The most rational driving mode might be by starting to drive Osman knot paths and then finalize the basin by using Hans knots as driving paths.



Img 14. Hans Knot driving paths

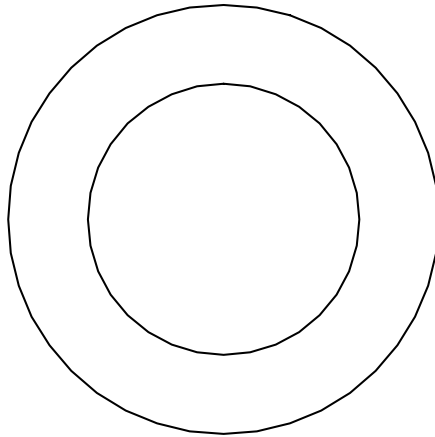


Img 14b. Osman Knot driving paths

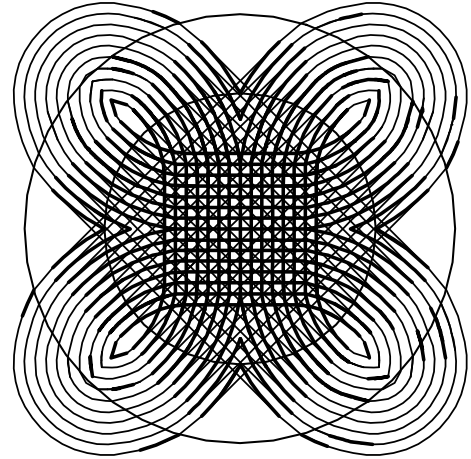


Img 14c. Water rising zones

If we combine these 3 elements we get a grid similar to image 14d. I call it the Namescope Grid. It has around 1600 elements and it can produce millions of patterns. If we also combine the water rising zones, which are presented in image 14c, we get even more patterns.

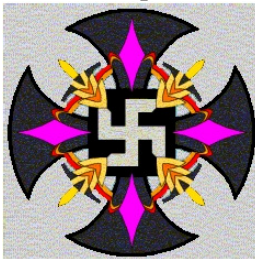


Img 14d. Circles

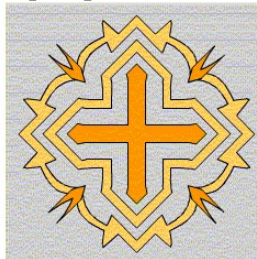


Img 14d. Namescope Quadrifolia Grid

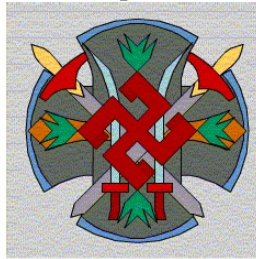
Some pattern examples picked from the Namescope Grid



Img 15 a.

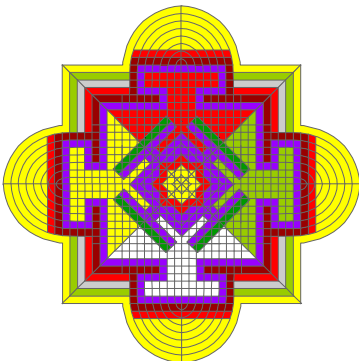


Img 15 b.



Img 15 c.

Images 15 a-g present some patterns picked from the Namescope Grid. Many kinds of crosses, swastikas, stars etc. can be picked from it. Some of the patterns look familiar from other contexts. Normally we find that these patterns have nothing to do with agriculture, but my approach suggests otherwise.

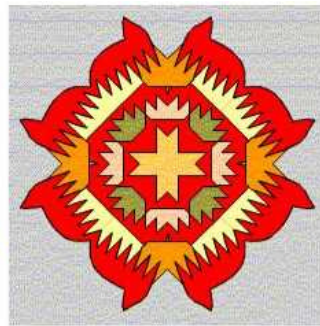


Img 16. Namescope "Mandala-Yantra"

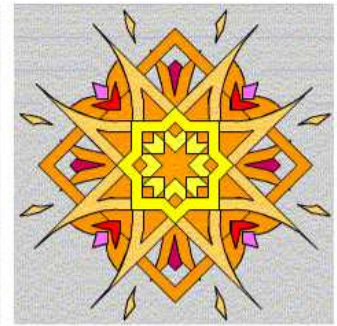
Img 15d



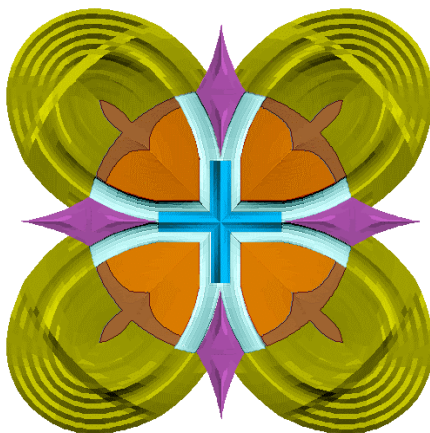
Img 15 e.



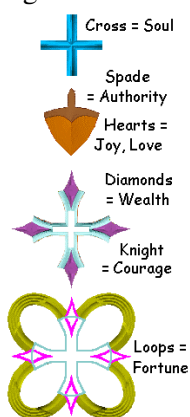
Img 15 f.



Img 15 g.



Img 17. The Namescope Oracle Game Plate



example, if we put the name Clinton on the plate we get a seal layout as illustrated in image 20. According to their form the seals can be divided into 54 groups.

Similar types of images are nowadays connected to Christianity. In the Bronze Age quite similar patterns to those in Img 15e were produced in India and Baluchistan. The Namescope "Mandala-Yantra" in image 16 has an outer part, which resembles the (Buddhist) Mandala and an inner part, which is a bit like the (Hindu) Yantra pattern. Since the Namescope Grid contains also numbers and alphabets, I designed a fantasy game called "The Namescope Oracle". It is a bit like a horoscope. Instead of planets it has 6 suits and the Namescope Plate (Img 17). Alphabets (Img 18.) can be rotated around the plate origo. As we put them on the plate we can produce so-called Namescope Seals. For



Img 27e. Serrated rug pattern



Img 27f. Differently serrated rug pattern



Img 27g. Eight-pointed stars and octagons



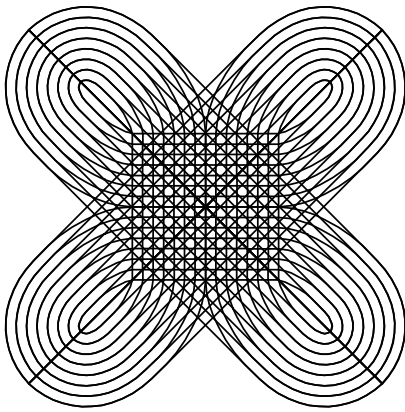
Img 27h. Octagons

Some analogous structures having rug patterns (27e-27h)

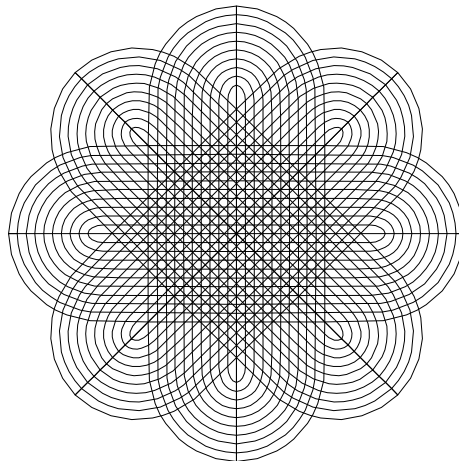
It appears that geometric rug patterns and the Namescope Grid employ similar types of grid angles: Horizontal, vertical, 45 degree angles; and they are constructed from parallel lines. That can be best seen in serrated objects, stars and octagons. (Img 27a-g).

In image 29 the whole watershed is made by using Osman knots. The Rounded Octafolia layout in image 32 looks like a flower.

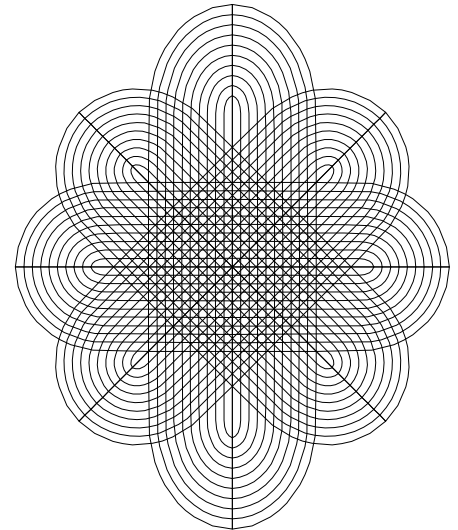
Namescope Grids for a single water basin



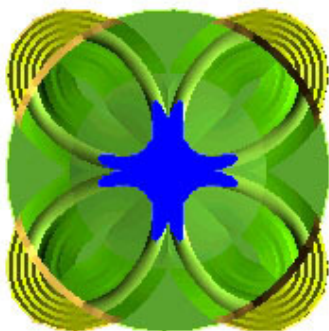
Img 28. Quadrifolia (Arabesque) Grid



Img 29. Rounded Octafolia Grid



Img 30. Oval Octafolia Grid



Img 31. Guadrifolia water basin



Img 32. Rounded Octafolia water basin



Img 33. Oval Octafolia water basin



Img 34. Corner standing square



Img 35. Edge standing elements

An even more rational way is to use the Oval Octafolia shape (image 30). It gives more cultivation area. An island is to the left of the center of the watershed. That way we can decrease the soil move and distribute the water by using a circular form as in image 33. All of the presented Namescope Grids have similar center grids: a

square lying on its side and a square standing on its corner. Together they form an eight-pointed star. Compare them to images 34-35.

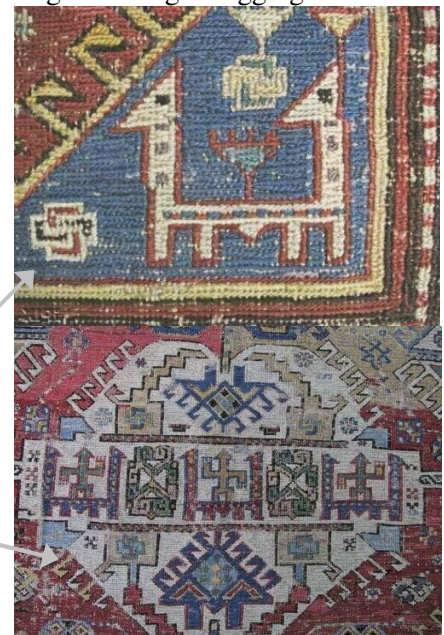
Images 36-41 may give some indication as to what kind of a tool might have been used to make watersheds. The details in images 37-38 are picked from image 36. The rug contains also nice Osman knots.

It seems that the animals in image 37 are dragging some kind of a triangle instrument with spikes. In image 38 somebody seems to be walking behind the unit. In images 39-42 we can see similar types of triangle units picked from other rugs. In image 40 the triangle seems to be performing some sort of scratching. In image 41 the triangle stays at the end of the trail and has some teeth.



Img 37. "Sledge drivers rug"

Img 36. Sledge dragging animals?



Img 38. Sledge drivers detail



Img 39. Dragging animals?



Img 40 Scratching?



Img 41 Sledge?



Img 42 Sledge?

By using the Namescope grid we can form huge amount of rug patterns, simply by selecting proper elements (image 43). By increasing or decreasing the included grid elements we can move from one pattern to another.

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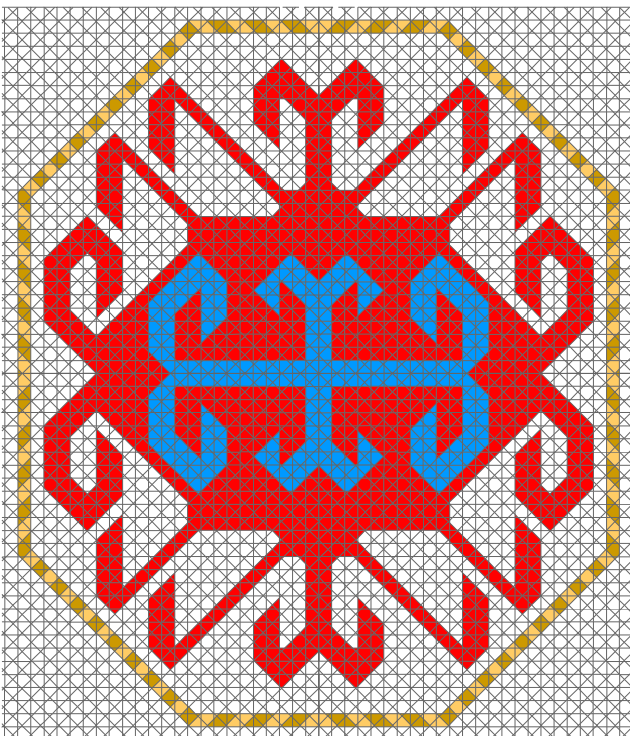
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*So it is quite tricky to say which of them are independent basic patterns. (e.g. medallion - eight-pointed star - square - line - grid elements of the line).



Img 43. Namescope Grid over a rug pattern



Img 44. Colored Namescope Grid elements

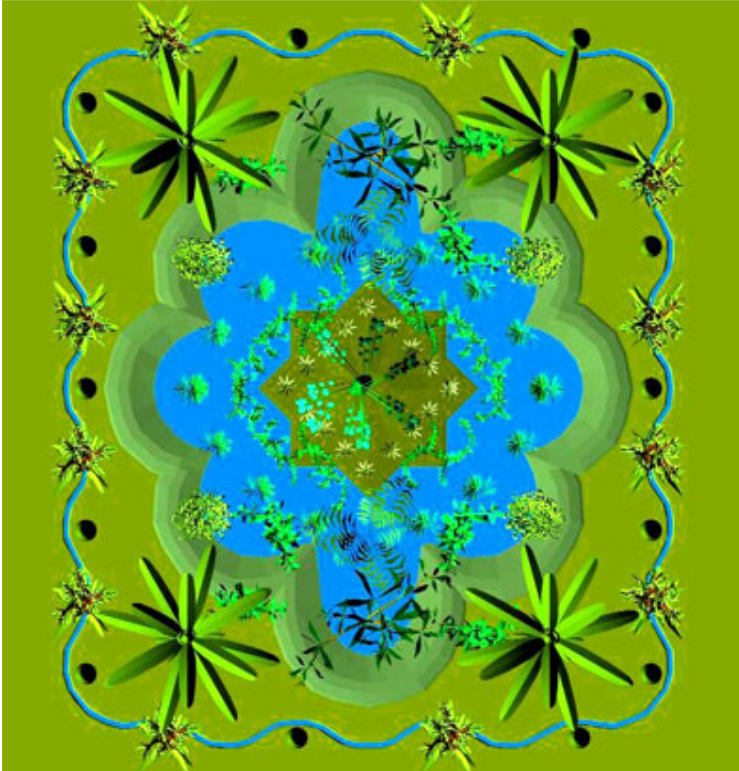


Img 45. Similar type of rug pattern

Image 44 shows another example how we can pick geometrical rug patterns from the Namescope Grid. It demonstrates how the rug patterns follow horizontal, vertical and 45 degree directions. If the sledge is 2 feet wide (60 cm), the whole pattern would be around 53 feet (16 m) wide.

Image 46 shows the oval micro-watershed. If we compare it to the rug layout in image 47 we can see many correspondences: The blue water area, the island, the coastlines, and the vegetation.

In my view the rugs tell us how ancient people have cultivated dry areas. The basin provides various moisture and shade levels. In the best cultivation practices different plants protect each other with minimum competition. As people need various types of plants I expect there might be a hundred good cultivation layouts stored in rugs, plus several hundreds of variations with minor modifications. Evidently the most productive cultivation methods have been developed in the course of centuries through practical cultivation by trial and error. Quite naturally the best layouts were marked down to transfer the knowledge to the younger generation or to friends and relatives living in the next village. This type of cumulated practical traditional knowledge is very valuable even today to find feasible methods for desertification control.



Img 46. Namescope cultivation with vegetation symbols



Img 47. Similar type of rug lay-out



Img 48. Vegetation map rug layout example?



Img 49. Another plant spacing map?

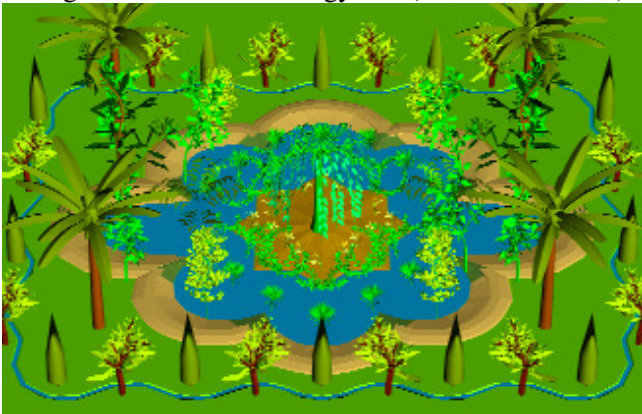
To me it appears logical that there are map rugs (images 48-49) and attached legend rugs (as in image 50). Nowadays a garden/photo album rug is understood as an independent object. Originally it may have explained what plant species each spot in a map rug meant.

In earlier times the best cultivation layouts may have been sold at marketplaces and even taken to other countries. An economy class plan may have contained 1-2 rugs. A complete luxury class agro-forestry engineering plan may have contained several rugs to give details. For example:

1. Soil management tool construction (images 36, 39-42)
2. Soil moving plan, (images 37, 53-55,65)
3. Water distribution plan (images 46, 47, 54, 56, 57, 58, 62,65)
4. Vegetation spacing map (images 48, 49, 63)
5. Vegetation species legend (image 50)
6. Vegetation view after 10-40 years (image 60,64)
7. Additional (side) views: soil management, water management, vegetation, animal ecology etc. (51, 52, 54, 62,64)



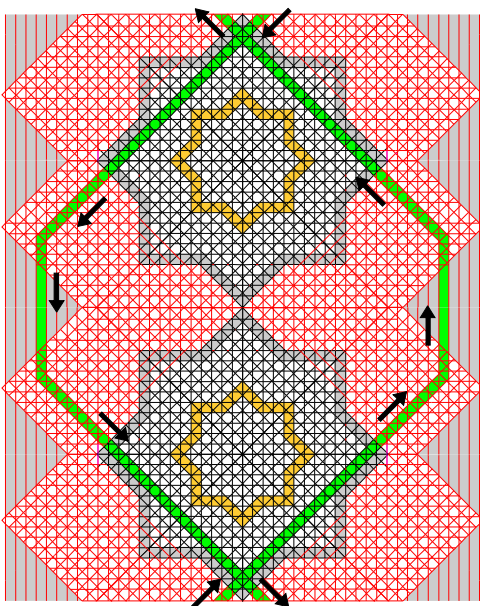
Img 50. A legend for a map rug?



Img 51. The Oval Namescope cultivation viewed from a different angle.



Img 52. Side view from the end of the oval micro-catchment



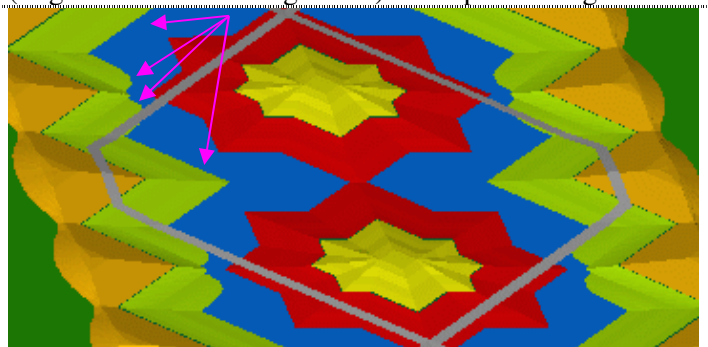
Img.54 The driving paths of the Zigzag-8 grid (chained watershed system)

1.10.2007

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The chained micro-watershed 3 D model

Note: The corner is cut away to enable water distribution (large–small–small–large teeth). Compare to img 56.



Img . 53. Computer 3 D model from the previous image with little water. Note also the grey driving path example

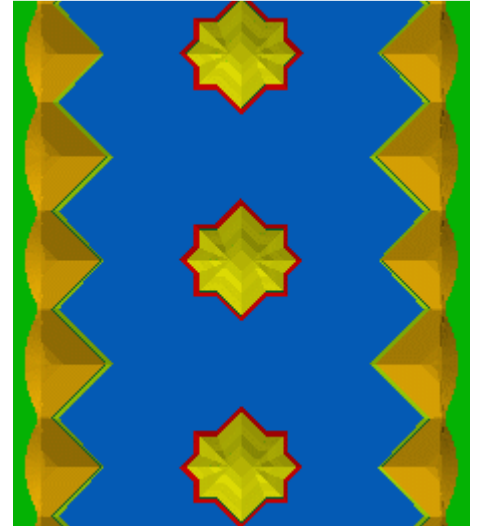
Nowadays new rugs quite often seem to have an artistic approach combining options 2-4. However some (e.g. Tabriz, Isfahan, Lavar, Cashmir) rugs quite often represent option 4.



Img 55. Some sledge tracks are still visible on a brand new chained micro-watershed?



Img 56. A chained micro-watershed cultivation with some water? Compare to img. 54, 57



Img 57. The chained 3 D model in full water phase. Compare to images 54, 56, 58, 60-62

In larger cultivation projects it might be most rational to employ a chained watershed system as in image 53-54. I call it the Zigzag-8 grid, since the driving path resembles the number 8. The moving of earth is carried out by heaping it into islands, which form eight-pointed stars. The second place for the relocated soil is on both sides of the micro-watershed.

The rug in image 55 seems to have a similar structure. It looks like a brand new chained micro-watershed; some sledge tracks are still visible. Compare the structure to image 37, which suggests "sledge drivers".

The rug in image 56 appears to have a similar type of cultivation with some water. Observe that the triangles on both sides have serrated edges, which suggest that sledge trails go over them. The sides follow a large–small–small–large triangle layout. The computer model suggests an explanation for that. If we raise the water level in the micro-watershed, we get an outlook resembling images 57, 58.

A few years later, after the vegetation has matured, the agro-forestry cultivation might look like the rug in image 57. In image 58 the computer model has been placed over the rug. We can conclude that:

- The islands fit exactly to the rug layout
- Trees are surrounding the islands and they are situated on the irrigated zone
- A planted row of trees/bushes covers the side banks. The fruits/berries/seeds of the trees attract birds, followed by hunting animals.
- Some lions are going downwards to the basin area
- Other lions are resting and enjoying the shade under the trees around the island. The backbones of the cats are towards nicely warm heaps.



Img 58. The full water phase? Compare to images 57, 60-62

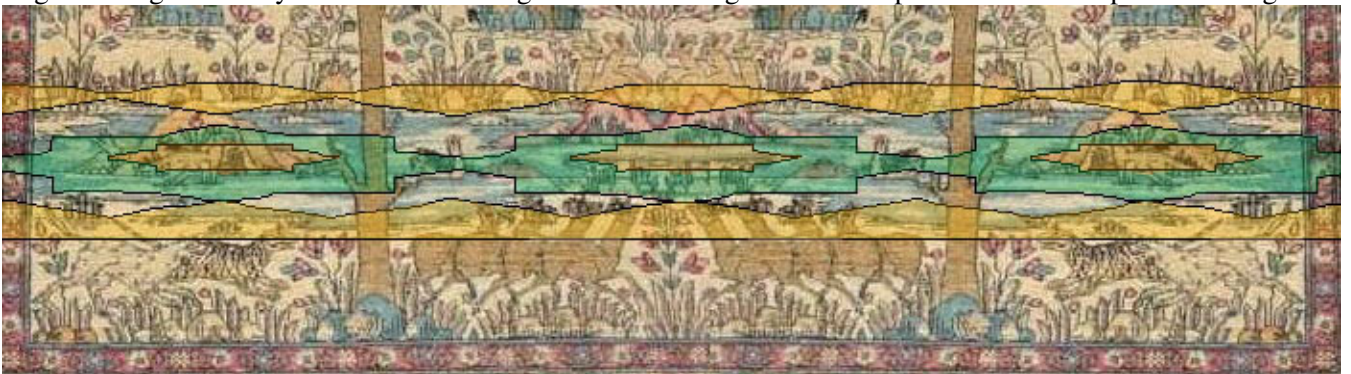
In image 58 the computer model has been placed over a Kerman Lavar rug detail (image 59). The islands and side banks fit nicely to the rug layout. The structure of the water-basin is quite the same as in image 58. The basin is full of water; three artificial looking islands are similarly situated. The banks seem to have triangular corners at equal distances from each other. Some remains of the triangle heaps can be seen on the opposite bank. All this suggests that the pond is man-made. The pool appears to attract animals, since it provides food and water. Two animals are standing in the pond; so it must be shallow. The birds seem to be in their normal place: just below the rug medallion center.



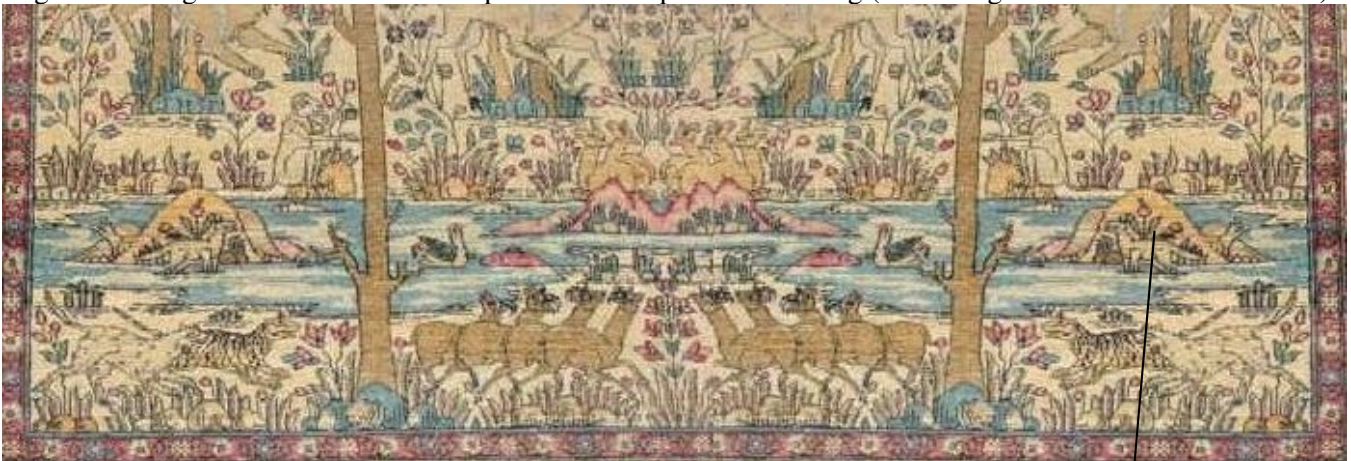
Img 59 An agro-forestry cultivation with vegetation?



Img 60. The computer model + the previous image



Img 61. 9 % angled side view of the computer model is placed over a rug (The background is the same as below)



Img 62. A nice (man-made) pond - a chained micro-catchment in full water phase?

The islands at both ends have small plants, which would appear to be pomegranate seedlings. The highly appreciated pomegranate fruit trees are frequently portrayed in rugs. Quite often they appear on mounds; this detail suggests a rational explanation for it. Pomegranates stand poor soil and can take considerable drought, but for good fruit production they should be irrigated. The stems/root collars of the larger trees seem to have protection formation made by stones; this fact suggests that trees belong to cultivation.

The side banks of the pool can be better seen in the other Ravar rug slice in image 64.

If soil surface and water conditions allow, we can apply horizontally and vertically chained micro-watersheds as in image 65. This cultivation method may be the basis for the so-called “all over design” rug layout.



Img 63. The island with a planted pomegranate seedling? A standing animal.

Img 64. Another side view of the water basin



3 islands with matured trees

Water pool

Side banks

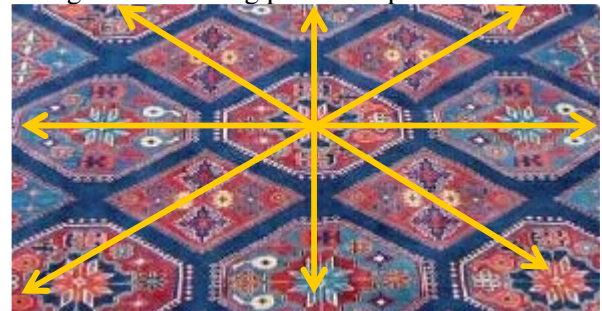
Broadleaved herbs as in image 62

Recently an article in *A Newsletter of the International Drought Information Center* suggested⁸:

"Using flash floods/surplus rainwater for artificial recharge of ground water to augment the dwindling water table is the need of the hour... Growing crops, fruits, trees, and grasses in various combinations minimizes the risk of crop failure."

So, the illustrated cultivation method would be viable even today. In addition to food production and soil conservation the system produces fresh ground water. We can harvest snow-melting water, surplus rainfall, seasonal streams etc. for artificial boosted recharge of ground water to form underground reservoirs. Nowadays the stored water can be lift by pumps. Traditionally it has been exploited by using wells or the ancient Persian “qanat” system. It consists of a deep underground gravity feed tunnel, which conducts the stored ground water to the villages for drinking and homestead irrigation throughout the year. That way ancient people were able to overcome droughts of several years.

Straight lines driving path example



Img 65. Horizontally and vertically chained micro-watershed system

The Asian continent contains some 1.7 billion hectares of dry sub humid, semi-arid, and arid land reaching from the Mediterranean coast to the shores of the Pacific⁹.

UNCCD (The United Nations Convention to Combat Desertification) is presently starting an action program in Asia; in this program also traditional knowledge will be appreciated. This will offer a great challenge for the Rug Society to provide all feasible data for the program. At the same time a better understanding on rugs and their cultural heritage can be advanced.

¹ More information, presentation web page: www.namescope.com

² Tree Plantings in Semi-Arid Regions. Edited by Peter Felker 1986

³ Sourcebook on Institutes and Agencies in Desertification Research. University of Helsinki, Institute of Development Studies, Report 17, 1988.

⁴ The Bible. New International Version (NIV)

⁵ (SYMBOLS '98 Encyclopedia). <http://www.symbols.com>. HME Media, Stockholm, Sweden.

⁶ Rainwater harvesting as an adaptation to climate change. Deep Narayan Pandey, Anil K. Gupta and David M. Anderson, Indian Institute of Forest Management. <http://www.ias.ac.in/currsci/jul102003/46.pdf>

⁷ <http://www.cloudband.com/gallery/gotz/indus/>

⁸ India's Arid Region and the Current Drought. A Newsletter of the International Drought Information Center and the National Drought Mitigation Center Summer 2000, Volume 12

⁹ <http://www.unccd.int/regional/asia/menu.php>

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