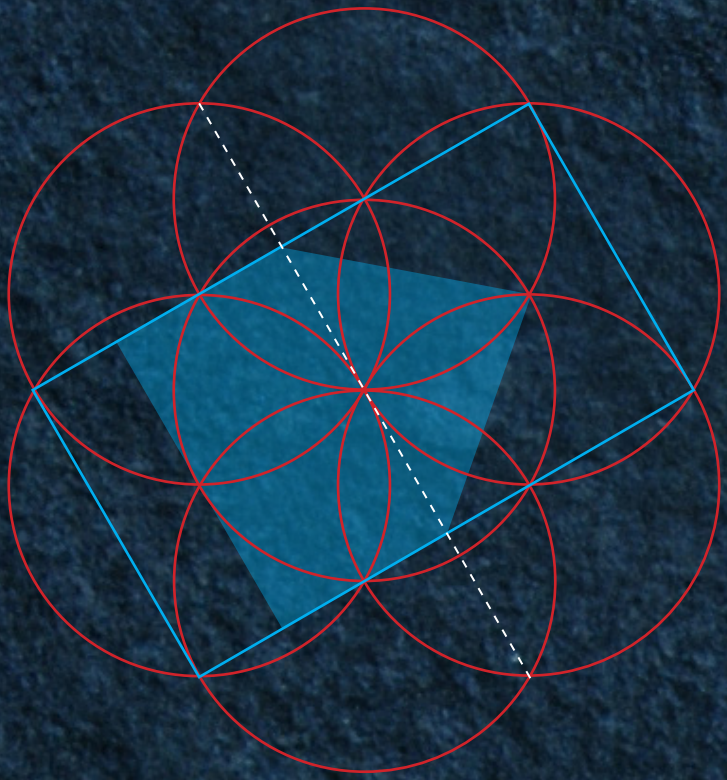
Astrid's House
A Daisy Wheel Frame Design



Laurie SMITH
THEGEOMETRICALDESIGNWORKS

Laurie Smith is an independent early-building design researcher, specialising in geometrical design systems. Because geometry was part of the medieval educational curriculum he uses geometrical analysis to excavate and recover the design methodologies of the past, a process he thinks of as design archaeology. He lectures, writes and runs practical workshops on geometrical design and publishes his work through his website HISTORIC BUILDING GEOMETRY.

LEAFLET DESIGNED for **ASTRID'S HOUSE** / TOUCH WOOD SOUTH WEST

Texts Drawings Photographs Design

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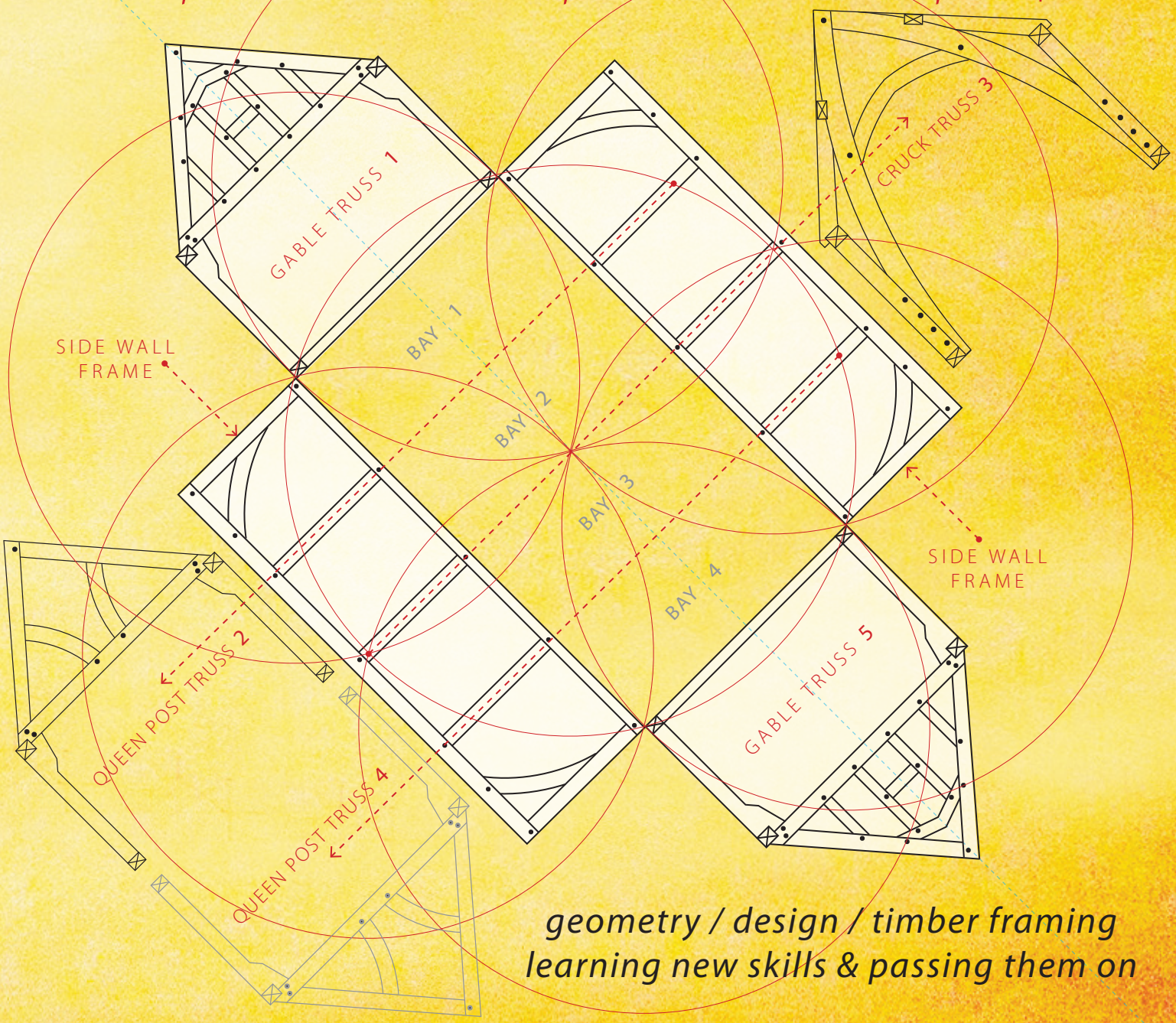
ASTRID'S HOUSE



geometry / design / timber framing
learning new skills & passing them on

Astrid's House

1 Carpentry / The Timberframe

Astrid's House is a mini timber frame house, built according to traditional carpentry methods, that children can assemble and take apart again. It gives them hands-on experience in a wide range of topics including history, architecture, design, geometry, mathematics, traditional craft and building skills: bringing all of these subjects to life. The design is based on Medieval Daisy Wheel Geometry and the frame's timbers use mortice and tenon joints locked together with oak pegs.

2 Daisy Wheel Geometry

Imagine a world without tape measures! The size of the house is based on a medieval measurement called ***The Rod***. This is what carpenters had at their disposal together with a pair of dividers and a long piece of string. The mini house is half a Rod long and all of the other proportions of the house originate from this measurement. Compass drawn daisy wheel geometry gives the house its visually pleasing proportions.

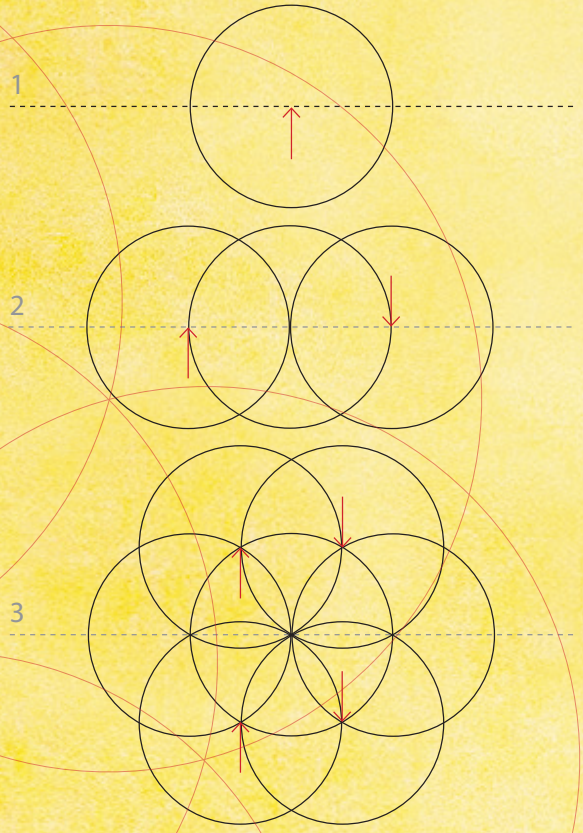
3 Schools

This house will travel from school to school providing workshops / sessions for the children that can be tailored to lesson plans and that tie in with the curriculum.
The project is run in partnership with ***Growing our Future***, a limited company that was established in 2008 and is an Environmental Educational Organisation based at Okehampton College, Devon. It is passionate about ***learning outside the classroom*** and delivers curriculum linked experiential education programmes and community events.

4 Making the House

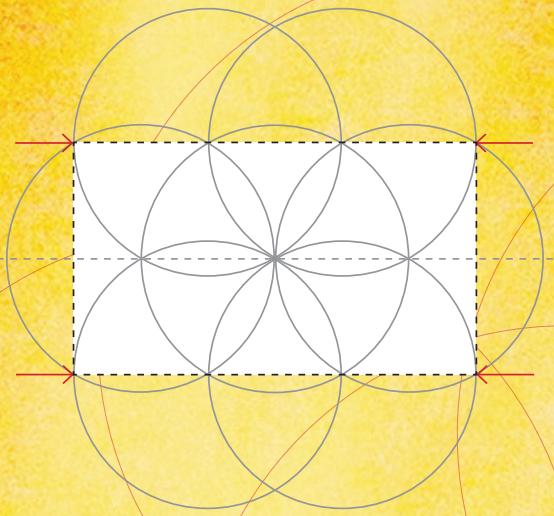
The house will be made during a course that is open specifically to women who are survivors of domestic violence. We are working in partnership with ***SEEDS*** (**S**urvivors **E**mpowering and **E**ducating **D**omestic Abuse **S**ervices), an Exeter based organization founded by Phillipa Chapman in 2005 to empower and educate survivors of domestic abuse. Members are involved in training, raising awareness, giving presentations, participating in consultation events and conducting research amongst survivors. The overall aim is to improve services by learning from survivors' experiences.

MAKING HISTORY

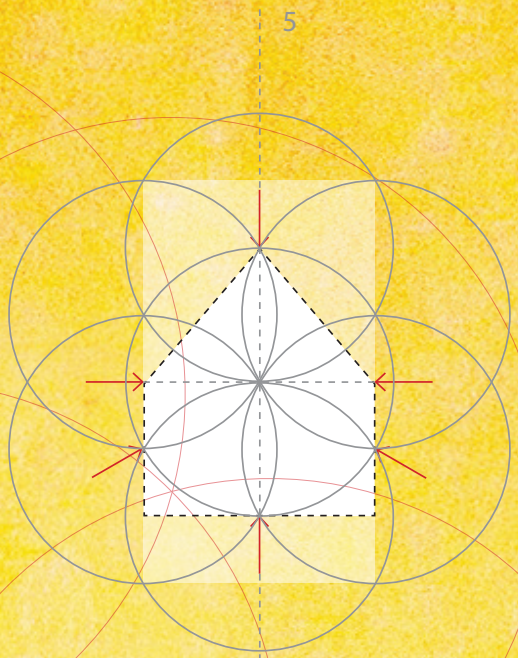


Drawing the daisy wheel

1
First draw a line.
Choose a point on the line for your compass and draw the primary circle.
2
Draw two more circles where the line cuts the primary circle.
3
The three circles intersect at four points, two above the line and two below it.
Draw two more circles above the line and then two more below the line.
All seven circles have the same radius.



FLOOR PLAN

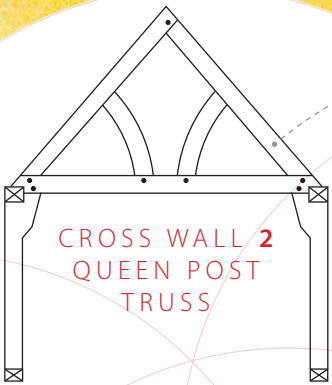


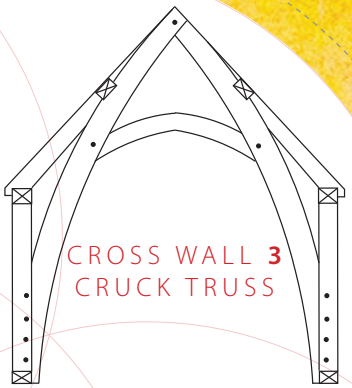
GABLE SECTION

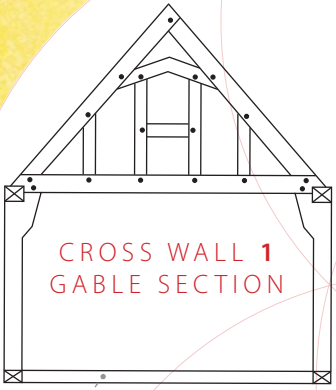
Designing with the daisy wheel

4
The daisy wheel is drawn on a horizontal centre line.
Connecting 4 selected points of intersection gives the building's floor plan.
5
The daisy wheel is drawn on a vertical centre line.
Connecting 6 selected points of intersection gives the building's gable section.

Because the floor plan and section are both designed within the daisy wheel's grid they share the same proportional relationship. This means that they appear visually balanced to the human eye. The daisy wheel grid is a medieval graph paper drawn with circles instead of a modern graph paper's squares.

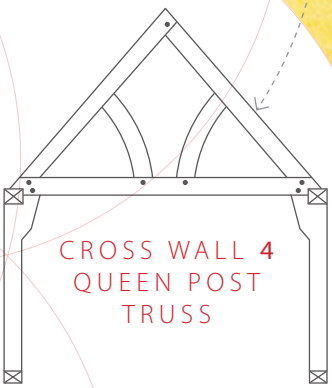


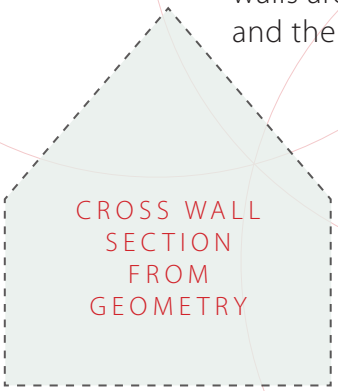


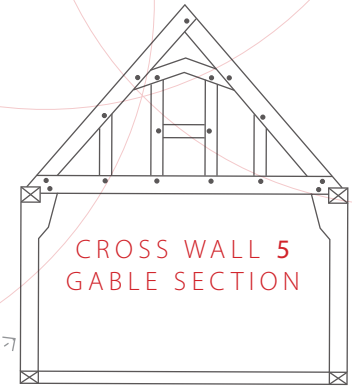


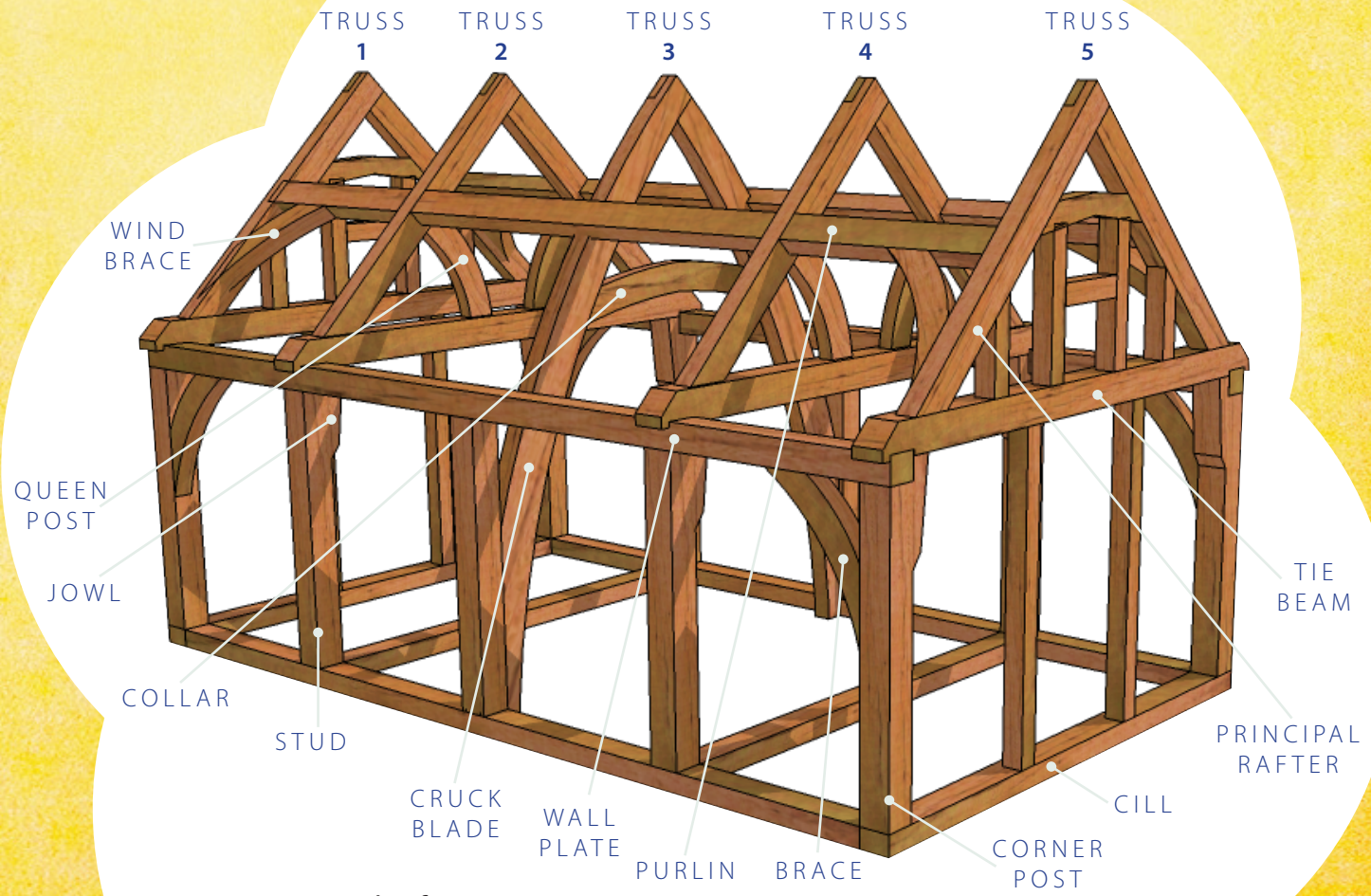
Designing the frames

6
Once the cross wall section has been taken from the daisy wheel the three cross wall frames can be designed. The gable frame is repeated at each end of the frame. The open span of the cruck truss is placed at the centre of the frame. The queen post cross walls are placed between the gables and the cruck, to give 5 cross walls.









Raising the frame

7

The cill beams are laid out first and the long side walls assembled on them up to wall plate level. The trusses are then assembled in numerical order starting with truss 1.

DRAWING
Adrian Canvin

Scale and fractions

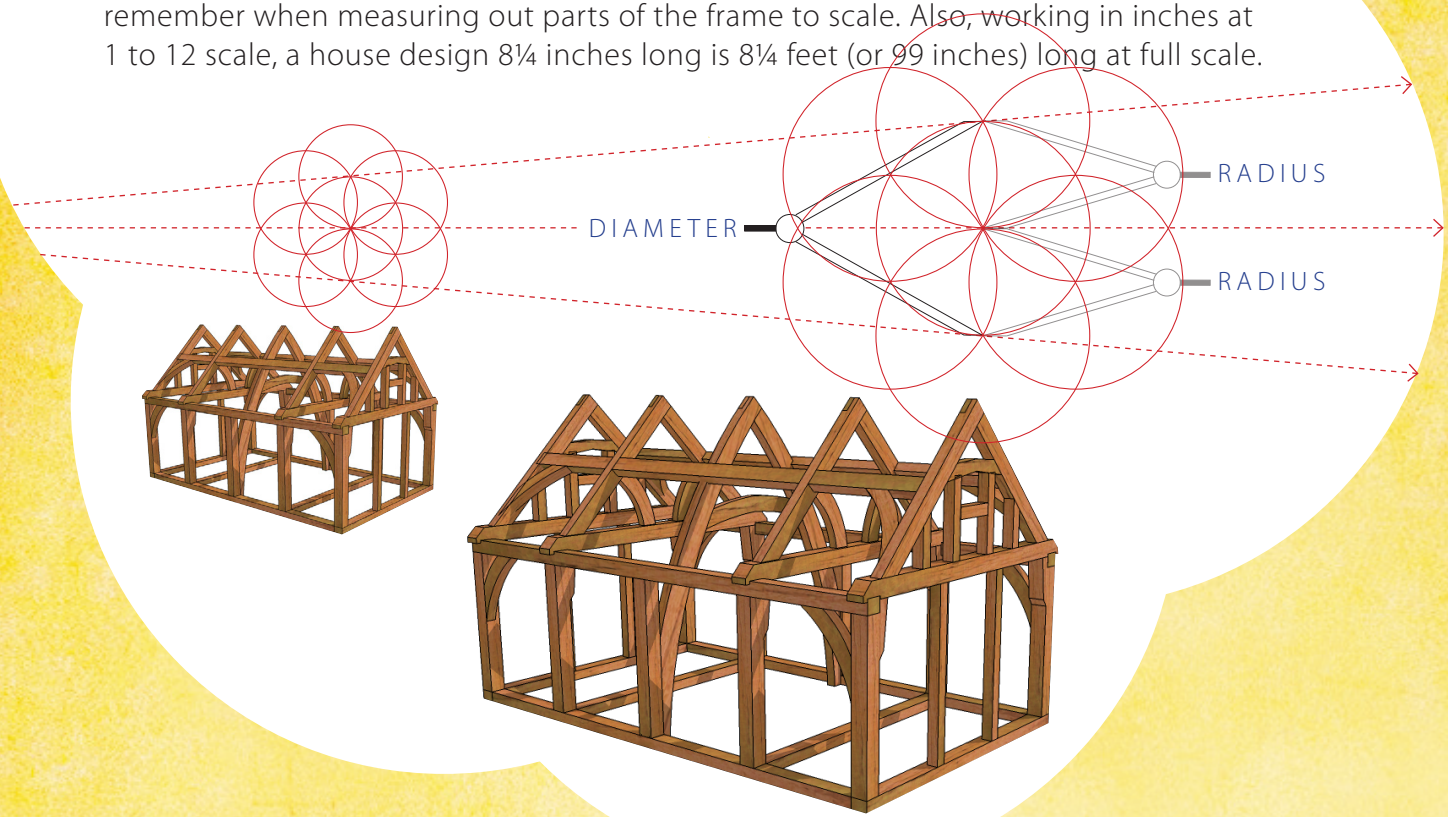
8

Daisy wheel geometry can be drawn at any scale and always keeps the same proportions. Astrid chose the medieval **Rod**, a traditional carpenter's measurement for the design of the house. A **Rod** is 16½ feet in length and the house length is half of this = 8¼ feet.

A **double Rod** = 33 feet, the first whole number in a special series of fractions,

$1^{1}/_{32}$ $2^{1}/_{16}$ $4^{1}/_{8}$ (¼ Rod) 8¼ (½ Rod) 16½ (1 Rod) 33 (2 Rods).

Each fraction is double the next smallest and half the next biggest and this works well with daisy wheel compass geometry where the radius is half the circle's diameter and the diameter is double the radius. Halving and doubling makes the numbers easy to remember when measuring out parts of the frame to scale. Also, working in inches at 1 to 12 scale, a house design 8¼ inches long is 8¼ feet (or 99 inches) long at full scale.



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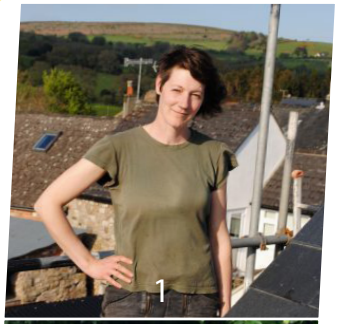

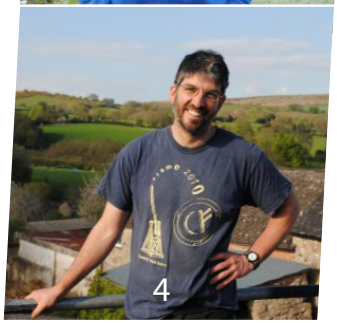

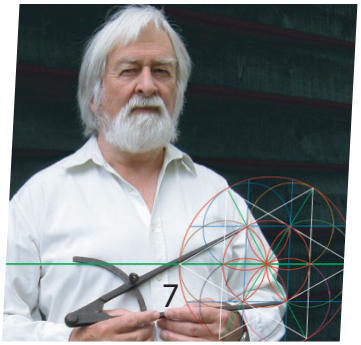

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