

# Découpes géométriques

Bernard Lemaire <sup>1</sup>

**“Celebration of Mind” pour Martin Gardner**

**Kafemath**

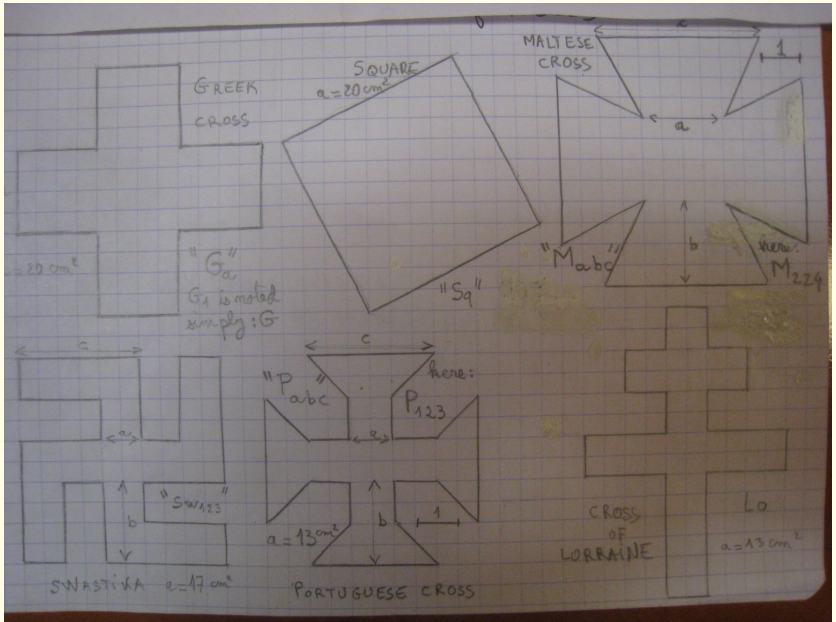
**“Chez Céleste”, Paris 11<sup>ème</sup>**

**jeudi 21 octobre 2010**

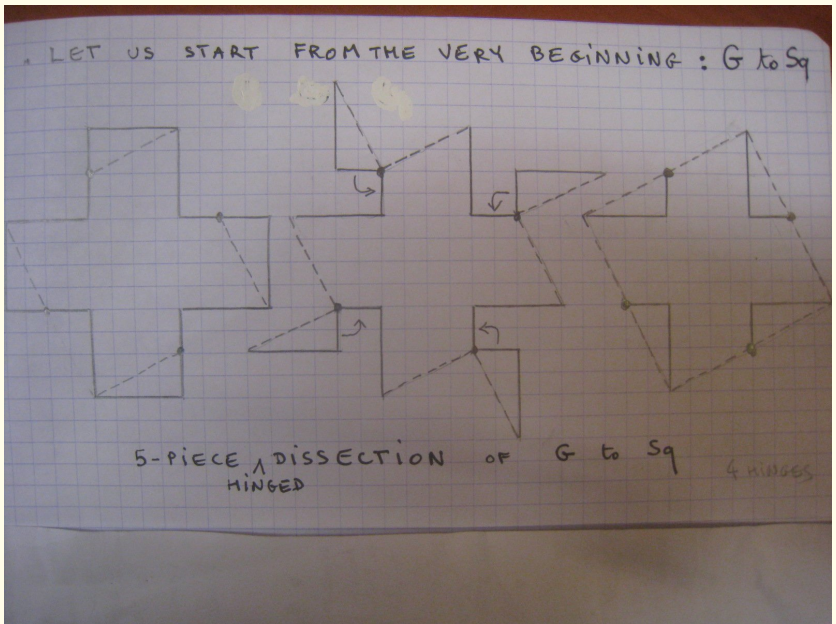
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<sup>1</sup> Professeur au Conservatoire National des Arts et Métiers, Paris.

# Divers types de croix

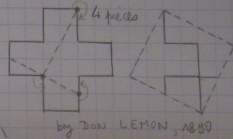
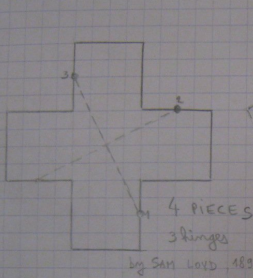


# Assembler un carré à partir d'une croix...



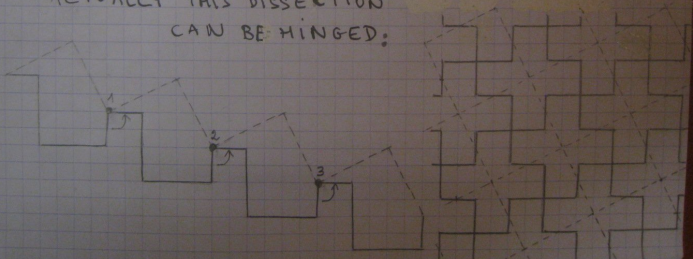
# Mais on peut faire mieux !

BUT ... ONE CAN DO BETTER :



REASON FOR SUCH AN ECONOMICAL DISSECTION: G  
GIVES A PERFECT TILING OF THE PLANE WITH GREEN CROSSES:

ACTUALLY THIS DISSECTION CAN BE HINGED:

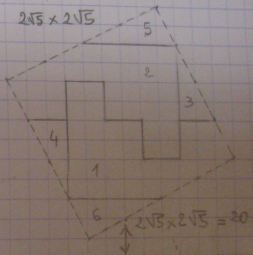
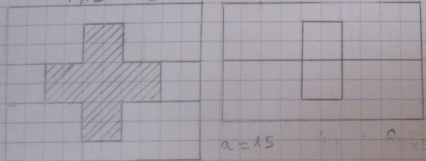


# Rectangles "moins" une croix Grecque

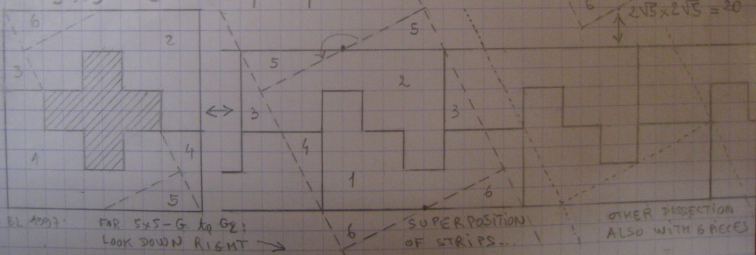
RECTANGLES MINUS GREEK CROSS...  
 (OR --- SWISS FLAGS WITHOUT THEIR WHITE CROSS)

see Sam Loyd

$4 \times 5 - G$  : 4 PIECES TO  $3 \times 5$  RECT.



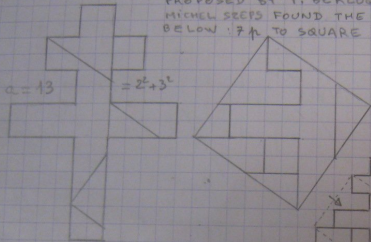
$5 \times 5 - G$  to Sq: 6 pieces



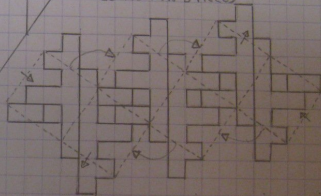
# Croix de Lorraine

## CROSS OF LORRAINE: Lo <sup>Lo1</sup>

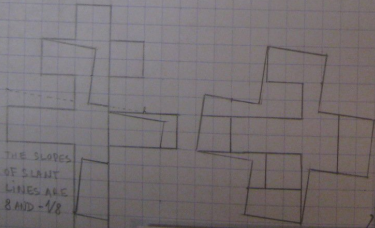
PROPOSED BY P. BERLOQUIN IN 1974,  
MICHEL SEEPS FOUND THE DISSECTION  
BELOW: 7 P. TO SQUARE



GREG FREDERICKSON HAS FOUND  
**WHY** SUCH A NICE AND ECONOMICAL  
DISSECTION EXIST:  
CUT THE TWO RIGHTHAND ARMS OF Lo,  
Lo HAS NOW 3 PIECES



THIS DISSECTION WAS ADAPTED BY B.L.  
FOR Lo TO  $\odot$  USING 7 PIECES:



THE SLOPES  
OF SLANT  
LINES ARE  
8 AND  $-\frac{1}{8}$

DL, 1974

REPEAT THIS OPERATION 5 TIMES,  
REARRANGE THE  $6 \times 3 = 18$  PIECES  
AS SHOWN ABOVE

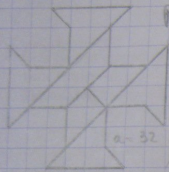
G.F. OBTAINED A TESSELLATION OF  
THE CUBE. ON EACH ONE OF ITS  
SIX SIDES THE ABOVE SQUARE (THE  
TO M. SEEPS) APPEARS: 7x FOR Lo  $\odot$   
NB: EACH SIDE OF THE CUBE =  $\sqrt{13}$



# Croix Portugaises

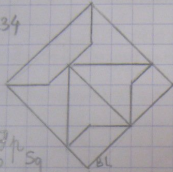
## PORTUGUESE CROSSES

can be seen on boatsails and Portwine bottles in Portugal!

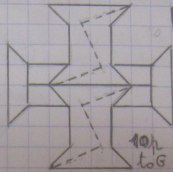


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$a=32$   
7/16  
to 1 Sq



BL

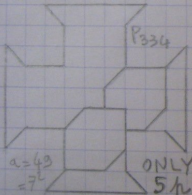


P234

10/16  
to 6



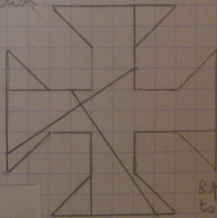
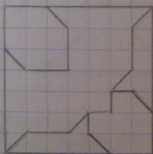
The most economical one (when I was in Lisbon in 2002): 5/16 to Sq  
I sent the shape to Greg Frederickson ... it took him a bit before he found this dissection



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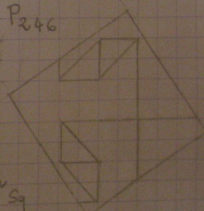
$a=43$   
 $=7$

ONLY  
5/16!



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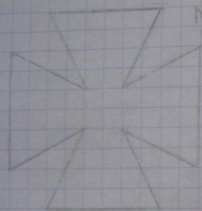
8/16  
to Sq



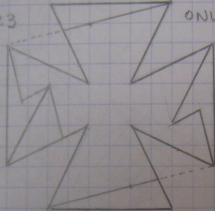
# Croix de Malte

## MALTESE CROSSES

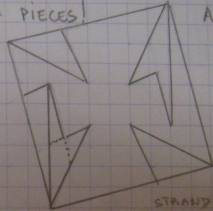
dissected to Sq and/or to G



M<sub>123</sub>



ONLY 7 PIECES!



une perle!  
due à

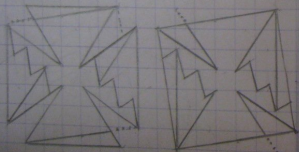
A. H. HILL

1920

published by  
Henry E.  
DODENEY  
in his

"PERPLEXITY  
COLUMN",  
STRAND MAGAZINE,  
LONDON

ITS GENERALISATION BY GREG N. FREDERICKSON TO  $M_{1,n,2n-1}$



M<sub>135</sub>



# de la croix de Malte à la croix Grecque...

