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In Memoriam
Ernő Lendvai

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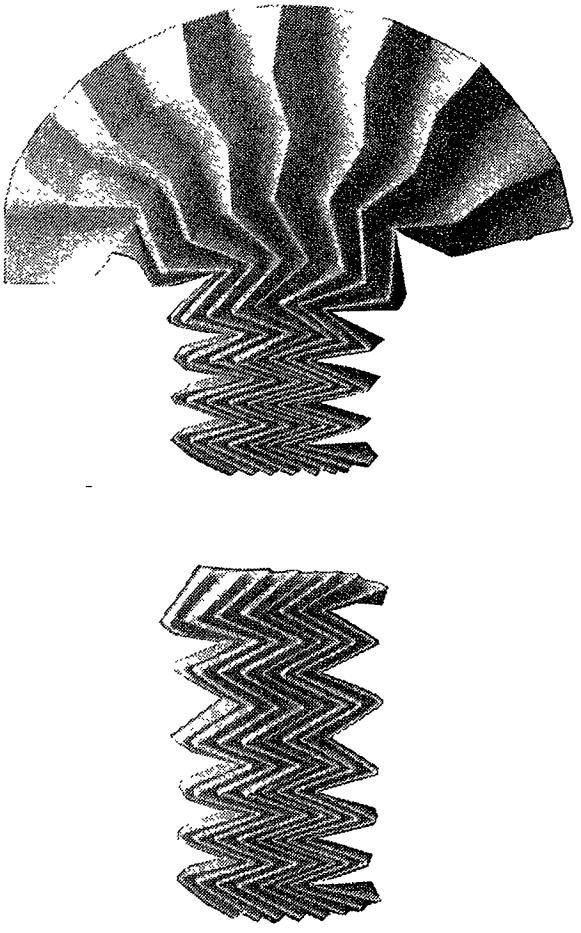

The *Miura-ori*
opened out like a fan

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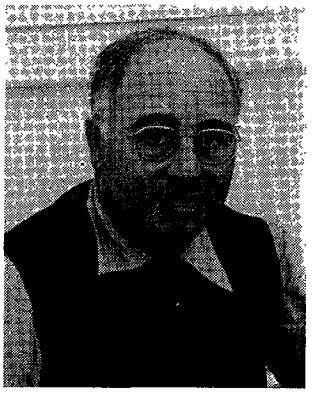
SYMMETRY: SCIENCE & ART

THE GOLDEN FRACTION TAN [(1/2) ARC TAN 2]: A TRIBUTE TO ERNŐ LENDVAI

Arthur L. Loeb

Crystallographer, chemical physicist, visual artist, choreographer
(b. Amsterdam, The Netherlands, 1923)
Address: Department of Visual and Environmental Studies, Carpenter Center for the Visual Arts, Harvard University, Cambridge MA 02138
Fields of interest: Mathematical and systematic crystallography; architecture and urban design; court and country dance; music (performer on Renaissance and Medieval instruments); history.
Publications: Color and Symmetry (1971) New York: John Wiley & Sons; Preface and contribution to R. Buckminster Fuller's *Synergetics* (1975) New York: Macmillan; *Space Structure, their Harmony and Counterpoint* (1976) Reading, MA: Addison Wesley Advances Design Science Collection; *The Design Science Collection* (series editor); *Crimson Heather: twenty-one Scottish Country Dances* (written for the Harvard Scottish Country Dancers).



The Golden Fraction ϕ is defined by the equation

$$\phi = 1/(1+\phi) \tag{1}$$

This fraction, approximately 0.618 and its reciprocal $(1+\phi)$ were of special interest to Ernö Lendvai. An Interesting symmetrical solution to equation (1) is:[1]

$$\phi = \text{TAN}\,[\,(1/2)\,\text{ARC TAN}\,2] \tag{2}$$

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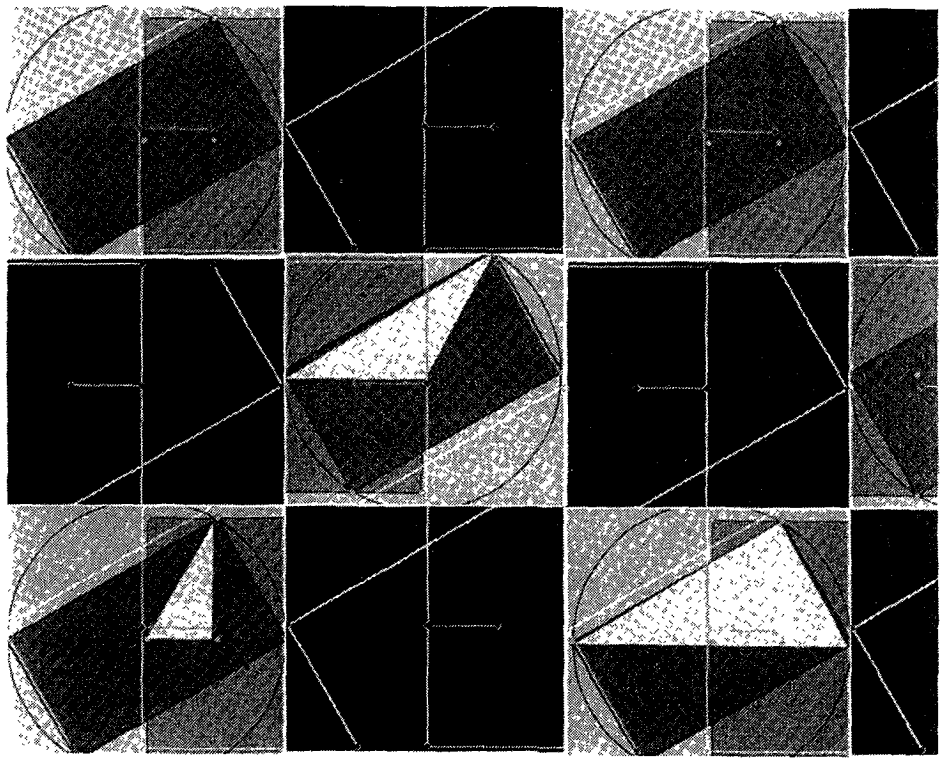
[1] Loeb, A. L and William Varney: "Does the Golden Spiral exist, and if not, Where is its Center?", in *Spiral Symmetry*, Clifford A. Pickover / István Hargittai (eds.), Singapore: World Scientific, (1992) 47-61.

This solution is used graphically in Figure 1, a visual tribute to Ernő Lendvai.

The grey panels show a slanted golden rectangle, whose sides have lengths in the ration equal to the golden fraction. In the lower right-hand grey panel a right triangle is highlighted whose smaller acute angle equals (arc tan ϕ). In the lower left-hand grey panel a right triangle is highlighted whose larger acute angle equals (arc tan 2).
The central grey panel shows that (ARC TAN 2) = 2 ARC TAN ϕ
in accordance with equation (2)



$$\tan [(1/2) \arctan 2]$$

The black panels display the initials L(endvai) E(rnő). Comparison of the grey and black panels shows that the initial L is constructed of two adjacent sides of the golden rectangle, whereas the initial E is constructed from a 2 by 1 rectangle. The all-over design (discounting the highlighting) has twofold symmetry, and continues indefinitely to the eternal glory of Ernő Lendvai whose memory we honor.