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# SCIENCE NEWS LETTER

®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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## Interpolation: the mathematical art of reading between the lines

It begins with the problem "Given certain isolated points: What is happening in between?" Men from Napier and Newton have then proceeded to discover formulas for the most probable in-between points.

Recently mathematicians at the GM Research Laboratories have been looking at new ways to interpolate in three-dimensional space. As a result they've come up with a fresh approach to the mathematical representation of surfaces. It is called *smooth surface interpolation*.

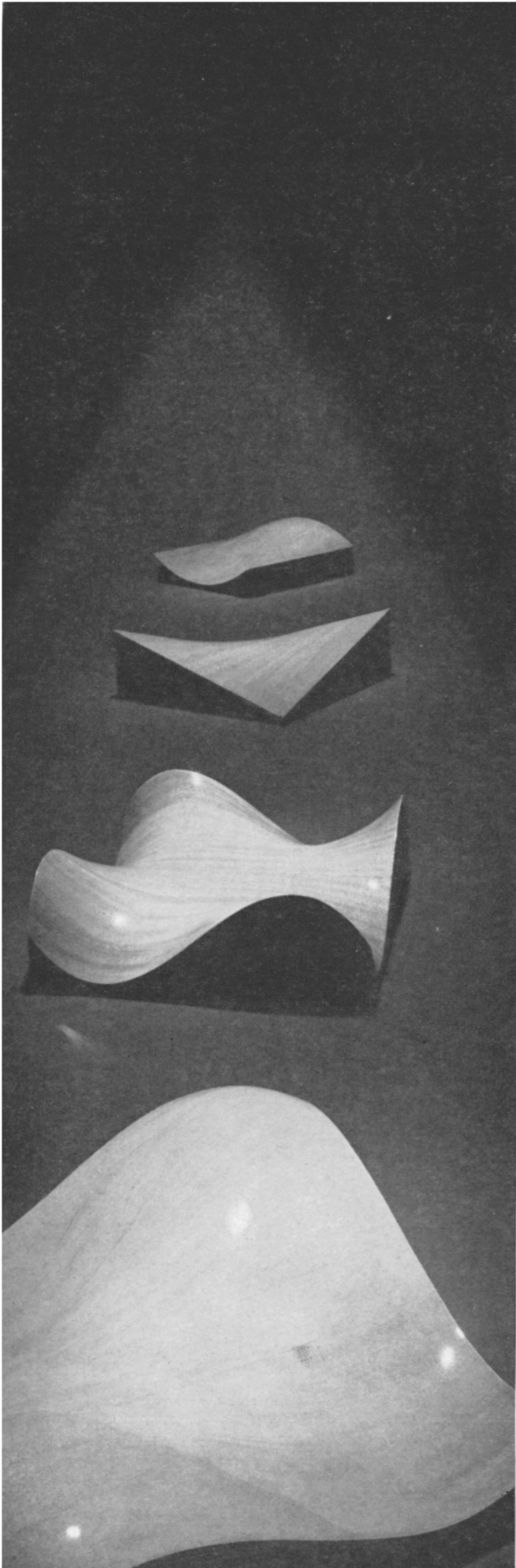
Their new interpolation formula is the sum of twelve terms. Each term corresponds to a way you can deform an elastic plate by bending or twisting its corners. (Four of the ways are shown in our illustration.)

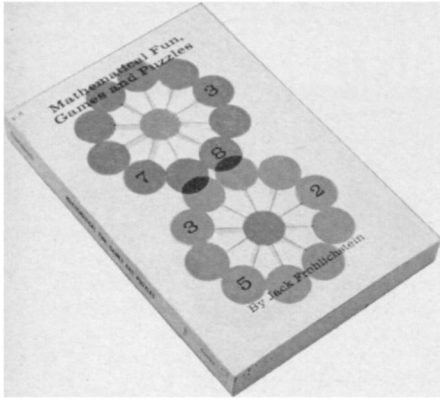
To develop a surface, those isolated points in space are first fitted with a crisscross network of curves using a 3-D extension of shipbuilders' spline interpolation. Each rectangular element of the network can then be interpolated with the new formula so it will join smoothly and without a ripple to adjacent elements. Result: a completely smooth surface. A continuously differentiable surface.

A distinct contribution to mathematical theory, this work has suggested a host of related techniques *and* potential applications to our new advanced mathematics group. We think it typical of General Motors' constant effort to seek and find—A BETTER WAY.

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by Jack Frohlichstein

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formulas, simple equations, parentheses and the simple equation, simplification, factoring, equations in two unknowns, and quadratic equations.

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