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Gooney Ducks and Naked Physicists

Part XII The Cartesian Manifesto

D. and S. Birks
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Editing contributions by Daniel Birks

Abstract: An allegory of modern science.

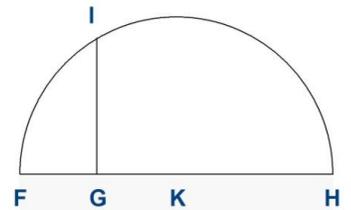
Part XII

Whoa! So all along, Descartes' squaring of line was just number and area squaring in disguise!
 Talk about shaking the tree and upsetting Newton's apple cart!
 Without the ability to "square" line, poof! Theoretical physics is gone!
 Everything's built on nothing! There's nothing left to believe in!

I can almost hear the distant rumble, almost see the walls and towers of Science tumble,
 and crumble into the fine dust of oblivion, leaving no streets, no roads, only rubble and ruin.
 All those dreams and illusions of "squaring" time, mass, and velocity—shattered!

But before I get too carried away, maybe I'd better look at Descartes' second diagram:

If the square root of GH is desired, I add, along the same straight line, FG equal to unity; then, bisecting FH at K, I describe the circle FIH about K as a center, and draw from G a perpendicular and extend it to I, and GI is the required root.



Hmm, line GI as the "square root" of line GH? Descartes also says that finding the mean proportional between unity (one) and some other line is the same as extracting the root.

Ah, so Descartes is using the diagram to express an equation!

Yeah, with line FG as unity (one), line GI is the mean proportional between lines FG and GH:

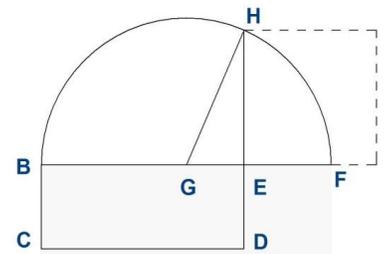
$$\frac{GH}{GI} = \frac{GI}{FG} \quad \text{or} \quad (\text{line } FG)(\text{line } GH) = \text{line } GI^2 \quad \text{or} \quad \sqrt{(\text{line } FG)(\text{line } GH)} = \text{line } GI.$$

Amazing! Like Prince Albert in a can! The concept of a square root in a diagram!

But hold on! Now I recognize this! What a blast from the past! Shades of Mr. Teegarden's geometry class! This equation is for finding the square root of a rectangle: for finding the side of a square (GI) whose area is equal to that of a rectangle (with sides FG and GH)!

I'll surf a little and check. Yep, darn tootin'! There it is, Proposition 14, Book II, Euclid!

Let there be constructed the rectangular parallelogram BD...of the straight lines BE,ED...Let BE be greater, and let it be produced to F; let EF be made equal to ED, and let BF be bisected at G. With center G...let the semicircle BHF be described; let DE be produced to H...the parallelogram BD is equal to the square on HE.



Euclid uses different letters, but basically...peas in a pod! 😊

So, from here on out, it's just the same song, different verse!

Descartes' "square root of line" is just applying numbers to the lines in Euclid's diagrams!

- a) Starting with the concept proven in Euclid—that a line drawn perpendicular from the diameter to the half-circle is the mean proportional of the two line segments of the diameter, and
- b) by defining a line in *his* diagram, FG, as representing unity (the number one),
- c) Descartes converts his mean proportional/square root equation of $\frac{GH}{GI} = \frac{GI}{FG}$ into:

$$\frac{GH}{GI} = \frac{GI}{1} \quad \text{or} \quad (1)(GH) = GI^2 \quad \text{or} \quad \sqrt{(1)(GH)} = GI.$$

And that's how it's done! Simple as do, re, mi! Easy as one, two, three!

By calling the line FG the number one, Descartes makes line FG *appear* to disappear, and line GI *appear* to be the root of line GH! But in truth, line FG always represents one.

So the proportional relationship of the diagram hasn't changed, nor has the proof.

Line GI is *always* the mean proportional of lines FG and GH, and *always* the square root of FG multiplied by GH—the root of the area of a rectangle, not a line!

$$\sqrt{(\text{line } FG)(\text{line } GH)} = \text{line } GI.$$

Wow! So all this time, Descartes' "squaring and square root" of line was just a myth!

And the giant monuments of math? Holy Toledo! The works of Newton, Maxwell, Einstein—the whole ball of wax—all the equations and theories of modern theoretical physics that square time, velocity, mass, and light have all just been based upon Descartes applying number values to the lines in Euclid's diagrams, by calling a line one! Man, calling a line one!

Well, bust my britches! That's what's been gummin' up the works?

That's the earth shaking, mathematical concept that turned the scientific world on its ear? I don't know whether to be astounded or horrified!

Hmm, Descartes' "squaring and square root" of line: *The Original Mathematical Transformers!*
A genuine, honest-to-goodness, sci-fi blockbuster, action adventure extravaganza!

*The fate of humanity at stake! The good Autobots versus the villainous Decepticons!
In search of the life-source of mathematics—the legendary AllSquare—
Descartes' hero, Optimus Prime (FG, the number one), transforms the scientific world by
changing all the lines in Euclid's diagrams into numbers!*

And the rest, as they say, is history...

Twenty-four

Couch potato, lounge lizard, chowhound, hard-nosed detective extraordinaire...
Yeah, I've been called many things before, but never, ever, in my wildest dreams, would I think of myself as a world-shattering iconoclast! An avant-garde radical? A revolutionary? Me?

What was that old Beatles song?

*You say you want a revolution
Well, you know We all want to change the world
You say you got a real solution
Well, you know We'd all love to see the plan*

I might have to change the name on my door: "Blue Sky Investigations/ Revolution Central"!

I wonder what Eva would think? I know she's up for almost anything.
She used to work for a hip hop artist—taking dictation from a dude wearing baggy pants.
But working for a "square" revolutionary? She might draw the line there!

Line? Oh, that's right, I was talking about "squaring" line.

All the hubbub and uproar of the last 400 years! Yeah, without Descartes' "squaring of line" all the squaring of time, mass, velocity, and light are out the window! And all the theories with it! Wow! All Newton's gravity equations, Maxwell's electromagnetic equations, all the equations of astrophysics theory, anything and everything relativistic, spacetime-istic, quantum-istic, and string-istic! Gone! There they go, disappearing into the clear blue sky!

I can't see myself out there pulling down icons, "tearing down the wall,"
but I do hear those walls crumbling.

Holy mackerel!

If you can't square line, can't square time, mass, velocity, or light, what's Science gonna do?
What can it do! Talk about an identity crisis!

So, I guess it's back to square one, back to the drawing board!
Time to write a new chapter in science and math!
Time for a change! Should I count to ten?...Ready or not, here it comes!

Well, you know We all want to change the world.

So why not! There it is, plain as day! If you can't square line... ¡Viva la Revolución!