The Turbulent History of Fluid Mechanics

by
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It all started with Archimedes, way back in BC,
Who was faced with an interesting problem, you see…

The king came to me, and this story he told:
I am not sure if my crown is pure gold.
You are a wise man, or so it is said,
Tell me: is it real, or is it just lead?

I paced and I thought, and I scratched my head,
But the answer eluded me, to my dread.
I sat in my bath, and pondered and tried,
And then…"Eureka! Eureka! I found it!" I cried.

As I sat in my tub and the water was splashing,
I knew suddenly that a force had been acting.
On me in the tub, it's proportional, see,
To the water that was where now there is me.

Of course, Archimedes caused quite a sensation
But not because of his great revelation;
As he was running through the streets of Syracuse
He didn't notice he was wearing only his shoes.

The great Leonardo – oh what a fellow…
No, not diCaprio, DaVinci I tell you!
He did more than just paint the lovely Mona,
He also studied fluid transport phenomena.

Then came Pascal, who clarified with agility,
Basic concepts of pressure transmissibility.
Everyone knows how a barometer looks,
But he figured out just how it works.

How can we talk about great scientists,
Without mentioning one of the best:
Sir Isaac Newton, the genius of mathematics,
Also contributed to fluid mechanics.

One thing he found, and it's easy as pie,
Is that shear stress, τ, equals μ dv/dy.
His other work, though, was not as successful;

His studies on drag were not all that useful.
He thought he knew how fast sound is sent,
But he was way off, by about twenty percent.

And then there was Pitot, with his wonderful tubes,
Which measure how fast an airplane moves.
Poiseuille, d'Alembert, Lagrange and Venturi –
Through his throats – fluid pass in a hurry.

Here is another hero of fluid mechanics,
In fact, he invented the word "hydrodynamics".
It would take a book to tell you about him fully,
But here is the short tale of Daniel Bernoulli:

Everyone thinks is just one Bernoulli…
It is not so! There are many of us, truly.
My family is big, many scientists in this house,
With father Johan, nephew Jacob and brother Nicolaus.

But the famous principle is *mine*, you know,
It tells of the relationship of fluid flow,
To pressure, velocity, and density too.
I also invented the manometer – out of the blue!

Yes, Bernoulli did much for fluids, you bet!
He even proposed the use of a jet.
There were others too, all wonderful folks,
Like Lagrange, Laplace, Navier and Stokes.

Here is another well-known name,
A mathematician and scientist of great fame:
He is Leonard Euler, I'm sure you all know,
His equations are basis for inviscid flow.

He did more than introduce the symbols π, I, e,
He also derived the equation of continuity.
And with much thought and keen derivation,
He published the famous momentum equation.

Those wonderful equations and diagrams you see?
They are all thanks to Moody, Weisbach and Darcy.
Then there was Mach, and the road that he paves,
After studying the shocking field of shock waves.

Rayleigh studied wave motion, and jet instability,
How bubbles collapse, and dynamic similarity.

He was also the first to correctly explain.
Why the sky is blue – except when it rains.

Osborne Reynolds, whose number we know,
Found out all about turbulent flow.
He also examined with much persistence,
Cavitation, viscous flow, and pipe resistance.

In the discovery of the boundary layer
Prandtl was the major player.
It's no wonder that all the scientists say,
He's the father of Modern Fluid Mechanics, hooray!

It is because of Prandtl that today we all can
Describe the lift and drag of wings of finite span.
If it weren't for him, then the brothers Wright
Would probably never have taken flight.

And so we come to the end of this story,
But it's not the end of the tales of glory!
The list goes on, and it will grow too
Maybe the next pioneer will be you?

Archimedes	287-212 B.C.
Sextus Julius Frontinus	40-103 B.C.
Leonardo daVinci	1452-1519
Galileo Galilei	1564-1642
Evangelista Torricelli	1608-1647
Edme Mariotte	1620-1684
Blaise Pascal	1623-1662
Sir Isaac Newton	1642-1727
Henri de Pitot	1695-1771
Daniel Bernoulli	1700-1782
Leonard Euler	1707-1783
Jean de Rond d'Alembert	1717-1783
Antoine Chezy	1718-1798
Jean Charles Borda	1733-1799
Joseph-Louis Lagrange	1736-1813
Giovanni Battista Venturi	1746-1822
Pierre-Simon Laplace	1749-1827
Claude Louis Marie Navier	1785-1836
Augustin Louis de Cauchy	1789-1857
Gotthilf H. Ludwig Hagen	1797-1884
Jean Louis Poiseuille	1799-1869
Henri Philibert Darcy	1803-1858
Julius Weisbach	1806-1871

William Froude	1810-1879
Robert Manning	1816-1897
George Gabriel Stokes	1819-1903
Ernst Mach	1838-1916
Osborne Reynolds	1842-1912
Lord Rayleigh [John William Strutt]	1842-1919
Vincez Strouhal	1850-1922
Edgar Buckingham	1867-1940
Moritz Weber	1871-1951
Ludwig Prandtl	1875-1953
Lewis Ferry Moody	1880-1953
Theodor von Karman	1881-1963
Paul Richard Heinrich Blasius	1883-1970