

A FORMULA FOR CALCULATING THE MASSES OF THE PLANETS AND SATELLITES  
OF OUR SOLAR SYSTEM

And the Importance and Origin of the Number 1.23  
In Solar System Body Relationships.

Frank Lee, geologist  
102 Mill Street, Ballarat, Victoria, Australia  
12<sup>th</sup> April, 2011.

Introduction. This was written for the information of an interested academic.

Looking through some papers on the Solar System written some twenty years ago I came across a small piece of paper with two formulae written on it. They were:

$$m = M_{pj} \times 1.23^n \text{ and } m = M_j \times 1.23^n.$$

I had forgotten these formulae as, being early in my study of the Solar System, their significance was not realised; they were just oddities. But the formulae are more than that, as they lead to the explanation of why the Solar System came into being, as the following shows.

Discussion. Consider the formula  $m = M_{pj} \times 1.23^n$ ,

where  $m$  = mass of a planet or satellite,

$M_{pj}$  = mass of all the planets except Saturn;

and the formula  $m = M_j \times 1.23^n$ ,

where  $m$  = mass of a planet or satellite,

$M_j$  = mass of Jupiter.

Then a table can be compiled to compare the calculated masses with the measured masses. See the attached Table.

The planet/satellite values obtained and shown in the table make it clear that the two formulae are basically the same. Why? Because  $2101.11/1899 = 1.10643$ , and this is 0.237% different from  $1.23^{1/2}$ .

I shall go on from here after a brief diversion. There are three Universe constant numbers, numbers that appear again and again relating body values. To two decimal places the numbers are 1.23 ( $1.23^2 = 1.53$ ), 1.19 ( $1.19^4 = 2.005$ ) and a number which is somewhat variable: it may be 1.36 or 1.37, but in our Solar System is almost invariably 1.38 ( $1.36^{-1/16} = 0.981$ ,  $1.38^{-1/16} = 0.980$ .  $1.38^{-1}$  is closely 0.724,  $1.36^{-1}$  is closely 0.735 and  $1.38^5 = 5.005$ . All at one time or another are present in camouflaged form. The three numbers when multiplied together  $1.23 \times 1.19 \times 1.38 = 2.02$ ,  $1.23 \times 1.19 \times 1.36 = 2.00$ . The numbers are mathematically related, for  $1.19^{1.19} = 1.23$ , and 1.23 to the power

	$1.23^2$	=	1.37.
--	----------	---	-------

Table of Measured and Calculated Masses of the Planets and Satellites

Body	n/4	Calculated	Measured	% difference
Jupiter	-2	1894.5	1899	0.24
	0	1899		00
Saturn	-25	576.2	568.6	1.34
	-23	577.5		1.57
Neptune	-58	104.4	103	1.36
	-56	104.7		1.63
Uranus	-62	84.9	86.6	2.00
	-60	85.1		1.76
Earth	-113	6.06	5.98	1.61
	-111	6.08		1.61
© Venus	-119	4.93	4.87	1.23
	-115	4.94		1.44
© Mercury	-169	0.334	0.33	1.21
	-167	0.335		1.52
Ganymede	-185	0.146	0.149	2.05
	-182	0.146		2.05
Titan	-186	0.139	0.136	1.91
	-184	0.139		1.91
Callisto	-191	0.107	0.106	0.94
	-189	0.107		0.94
Mars	-156	0.655	0.64	2.34
	-154	0.656		2.56
Io	-194	0.0916	0.0892	2.69
	-192	0.0919		2.70
Moon	-198	0.0745	0.0745	00
	-196	0.0747		0.27
Europa	-206	0.0492	0.0487	1.11
	-204	0.0494		1.37
Triton	-222	0.02151	0.0214	0.51
	-220	0.02156		0.75
Pluto	-232	0.01282	0.0129	0.62
	-230	0.01285		0.39

© If as previously argued Venus and Mercury did, until the last instant of separation, form one body to give symmetry about the centre of protoJupiter then:

Venus/Mercury	-116	5.19	5.20	0.06
	-114	5.20		00

Note also:  $\sum(m_E + m_V + m_{M_V}) \times 1.23^{-3} = 6.008 (5.98), -4 = 4.885 (4.89), -17 = 0.331 (0.33)$

And so on for other groups.

But back to our two mass formulae. Why are the masses of  $M_{pl}$  and  $M_J$  related to the power  $1.23^{1/2}$ ? The answer is simple but not obvious. Saturn has not yet been considered in full. In my Breakup Origin Theory (46 Solar System body relationships, most shown by simple mathematical formulae, entitle me to say "theory"), a "brown" body having a mass equal to the sum of all the planets and satellites, including Saturn, came into being and moved to an orbit distance of 5.3 AU about the Sun

(orbit speed =  $12.9 \text{ km}\cdot\text{sec}^{-1}$ ). Here it stayed, changing slowly from a near spherical shape to a prolate ellipsoidal shape.

In Hydraulic Engineering it has been known for many years that in the simplest case a spinning mass of pure gas slowly develops into a prolate ellipsoid (in line with the plane of movement) until it reaches what is termed the Jacobi Bifurcation Point when the a-axis of the body is closely  $1.5x$ , i.e.,  $1.23^2$ , the radius of a sphere containing the same mass of gas. At this stage the mass breaks into two parts. The mass division is closely 78%, 22%. Calculate the ratio 78/22. It equals **3.54545**, which is  $1.23^6$  within 2.39%. **That** is why the number is so significant in Solar System relationships. It is the Jacobi Bifurcation Point, the point at which the original gaseous body breaks into two and is internally force balanced. And if it doesn't break up near perfectly, if it is not a pure gas, then the ratio 3.54545 will not be achieved and internal force balance will not occur.

In our Solar System case, summing the masses of  $M_{pj}$  and Saturn (S) gives  $2669.71 \times 10^{24} \text{ kg}$ . The percentages are  $568.6 \times 100 / 2669.71 = 21.3\%$  and  $2101.11 \times 100 / 2669.71 = 78.71\%$ . Note the closeness of the values: 78 to 22 and 78.7 to 21.3. This supports the contention that our Solar System began as the breakup of a single body into two parts. Moreover, the difference between the ratios is just what would be expected if the body of gas was "dirty", with the material of a higher specific gravity slowly, impurely concentrating inwards to form a differentiated shell-structure. On splitting, the purer outer gas shell of the "brown" body would strip off, in our case to form Saturn, and the remainder to form protoJupiter. (See earlier papers to continue the breakup sequence.) Calculating the ratio  $78.7/21.3$  gives 3.69484 or there about and shows that internal force balance was not achieved at this first step in breakup. This brought into play the rule that in a closed force system (or sub-system) total force after change must equal total force before, and as Saturn was as near to a perfect gas as possible protoJupiter had to adjust. It attempted to do this internally but internal separation was such that the gaseous part of the body collapsed, and with such vigour in our Solar System case that internal matter was ejected and force imbalance re-occurred. And so on. The result was the formation of our Solar System as we know it and as described in my earlier papers.

Comments. My chief satisfaction with this work is in finally discovering a physical, not hypothetical, formula that relates Saturn with all the other planets – and satellites! – and not just Jupiter other than the orbit spacing formula  $v = 12.9 \times 1.23^n$ . I had come to the conclusion that I would not be able to find one. Very satisfying!

This makes 47 planetary and satellite relationships expected to appear if the Breakup Origin of the Solar System is correct. And this excludes the meteorites and comets. Most of them are quantitative (formula) relationships. I must be careful in calling them proofs as I was not long ago told by an "authority" that they are "coincidences" yet, no doubt, to be solved by the Nebula "Theory". I certainly wouldn't bet on them being "solved" using *that* "Theory".