GALAXY AND QUASAR SUPPORT FOR THE SINGLE BODY BREAKUP ORIGIN OF THE SOLAR SYSTEM

Introduction. The following is the major part of a letter to Dr. H.C. Arp, astronomer, pointing out suggested mathematical relationships of quasars, including their redshifts, and the breaking up of galaxies based on the Single Body Breakup hypothesis the writer has developed for the Solar System and as outlined in earlier papers at this website. The development supports Dr. Arp's contention that the redshift of quasars and certainly some galaxies is an intrinsic property of the bodies, i.e., the redshift is principally non-velocity redshift – is not due to movement of the body away or towards our Solar System.

The information is given here as it supports the origin of the planets and the origin of proto-Jupiter and Saturn as developed in the Single Body Breakup hypothesis.

Letter. The important thing for your field of astronomy [qasars and galaxies], as I see it, was that while investigating and testing the mechanism and sequence [deduced from my hypothesis for the origin and development of our Solar System planets and satellites] I came repeatedly upon the numbers 1.23, 1.19, and 0.724 (which latter can be written 1.38^{-1} or 0.98^{16}). The numbers 1.23 and 1.19 occur in Universe formulae, as you pointed out, and 1.37 or 1.36 is less common but present. (Note that $1.23 = 1.19^{1.19}$, $1.38 = 1.23^{1.23^2}$, $1.364 = 1.23^{1\,1/2}$; and 1.23 x 1.19 x 1.38 = 2.022 [closely 1.19^4], while 1.23 x 1.19 x 1.366 = 2.0.) The same three numbers for the Solar System occur in mineral crystal axes and molecular relationships. (See Advert. 5 on the web site.) This close similarity of the numbers in Solar System and in Universe relationships caused me to write in 1997, "There is a rule of thumb in Archaean structural geology to the effect that the macro-structure of a formation is reflected by the micro-structure of that formation. In this case the Solar System is the micro-structure and shows the same general characteristics – its four (sic) numbers and their relationships – that can be related to origin as does the Universe, which is the macro-stucture. This leads to the conclusion that the Universe and Solar System both came into being in the same way. [This, in effect, is the unconscious application of Fermat's principle of least action. 2003] However, the Universe is currently argued as coming into being by a "Big Bang", and the Solar System is currently argued as having come into being by the differentiation of a nebula disc about a protostar. If the systems began in a similar manner as argued above then three conclusions follow. They are: either (1) the Universe did not form by a "Big Bang"; or (2) the Solar System did not form from a nebula disc; or (3) neither formed as the present popular postulates argue. There is ample evidence to show that the Universe did not develop from a nebula, and the stability of the Solar System (even ignoring my development of cold-body break-up, strongly suggests it did not develop as an explosion. Therefore it must be concluded, on the basis of similarity of numbers and formulae reflecting a like beginning, that neither Universe nor Solar System formed as the presently popular postulates state."

And now we come to the galaxies and quasars. On the basis that the conclusion given above is correct, what would be the expected development of a galaxy? I see it something like this. A single entity formed, or a number of smaller entities formed at different times or a once single entity formed followed by a perpetual series of smaller ones. I shall describe only one taken as a general case. Existing matter would begin to "collapse" inwards to an increasingly dense centre; but spiralling so as to conserve angular momentum. Mass would build up, and momentum increase until, in the final stages of concentration, even light would be dragged in. (A black hole??) Material matter would break down under the extreme pressure at the centre of the body so that even protons and electrons probably altered to denser states – energy waves?-. Towards the end of consolidation the body would gradually become prolate ellipsoidal. Whether the b- and c-axes of this ellipsoid are equal (as I assumed for proto-Jupiter) or unequal (as Lamb quotes Darwin – grandfather or father of Charles? – see Lamb) the body would finally reach the Jacobi bifurcation shape referred to in Lamb's brief discussion of a rotating gas cloud. In the case of b and c being equal, bifurcation would be about when the a-axis equals 1.5 ($=1.23^2$)R, where R is the radius of a spherical body containing the same volume as the ellipsoid. For Darwin's slightly tapering triaxial ellipsoid the axis ratios to R are a/R = 1.8858 (1.23^3 and 0.724^{-2} closely), b/R = 0.8150 (1.23^{-1}), and c/R = 0.6507 (1.23^{-2}). At this stage the body would relatively slowly break into two unequal volumetric parts of about 1.23:1.

Evidence? Well, ellipsoidal galaxies from near circular to quite elongated exist. Would an elliptical surrounded only by old stars be almost the end case? Obviously an elliptical galaxy beginning to display arms would be at break-up. Why not measure length and breadth of such bodies, selecting bodies as near as can be guessed as side-on to eye-line as possible, and determine the ratio? It should range somewhere between 1 (end on to a prolate ellipsoid), more usually 1.25, to a maximum of about 2.9. I measured some sixteen images, some with dark inner ellipses and grey outer ellipses, in your book B (See references at end of this paper.) and found a reading of 1.11 (disturbed galaxy), the next 1.25 as minimum and 2.61 as maximum. I believe some exist at 3.2.. Most values of the twenty three measurements lay between 1.4 and 1.6.

What would be expected of an elliptical divided shortly after the Jacobi bifurcation? Two bodies, one larger than the other forming and drifting apart, something like protoJupiter and Saturn did. And let me add, probably inclined to one another; so galaxies should be at various tilts to our sight. Surely the barred galaxy shown in Fig. B 3-29 is such a case? One would expect barred galaxies. (See later in the letter.)

The above process could be repeated; it would depend on the size and contained angular momentum of the original body. But a stage would be reached when the galaxy break-up would behave as protoJupiter did, due to force imbalance in a closed field. This could be one of, or in both of, two ways: as a series of pulses of strings of small bodies in one direction (see below) and as pairs of larger bodies ejected diametrically opposite to one another from very near the centre of the galaxy. The bodies large and small, I suggest, are the quasars. Why do quasars have different redshifts which tend to cluster about definite values? Here a guess. The redshift values from higher to lower represent a step by step change of state of metastable matter, ejected from deep within a large body, to an environment of very low density. I pointed out to you some years ago that the "preferred" values are related by a simple $y = a \times 1.23^n$ formula. (See web site.)

Can something be deduced about the quasars using Solar System geometry? Yes! Shortly after commencing reading your book A a few weeks ago it occurred to me that if the latter part of the development of the galaxies is similar to that which was undergone by protoJupiter then the distances of quasars from the centre of the originating galaxy probably obey a similar (or same?) rule as for the Solar System when determining planet spacing. I think that formula was the first of the many formulae I found for Solar System relationships but, as a better formula using orbit speeds was found the simple formula was pushed aside and almost forgotten. It is: $y = 2 \times 0.724^n$, where n is a + or – integer and distance is in AU. (I now know why this formula fails for Mercury, Neptune, and Pluto.) It is a relative formula and if distances are measured on a photograph in millimetres then the formula still applies – in mm. This I did on some of the figures in both your books and the following are brief comments on some of what was discovered. The simplest first. (Fig.A.3-7 indicates book A then figure number in the book.)
Fig. A.3-7, p.41 shows ejected radio material from radio galaxy 3C303. Measuring from the optical position of the galaxy nucleus G gives running distances 12.5, 25.5, 40.0, and 73.5 mm. Applying the formula and using n = -5¾ gives 12.81, -7¾ gives 24.44, -9¼ gives 39.67, and –11¼ gives 75.68. A sequence appears here but not of n integers. But it is suggestive. The calculated values are quite close to the measured, except for n = 11¼, which is nearly 3% different. Measure from the other end of the line and no sequence occurs. Therefore it is not the point of origin.

Fig. A 5-8, p.122 is another simple case. Taking M87 as the parent galaxy, we have measured distances of 14 mm(M89), 19.5 (M84), 16 (M86), 10.5 (quasar east of M89), 19^- (quasar W of M87 at M84), both the latter two near the dash line. Comparing these distances with values from the formula gives, respectively, n = -6 (13.9), -7 (19.2), -6½ (16.3), -5 (10.1), and –7 (19.2). A suggestion is that M89, M84, and the two quasars are closely related to M87. If M86 is related to M87 it came into being at a different time to that of the galaxies and to the quasars. The quasar south of M87 n = -6) is probably related to it.

I find the quasars of galaxy NGC1097 (fig. A 4-3, p.51) fascinating. There are apparent straight-line relationships between some of the points, but when the "radial" distances of the points are measured from the galaxy and compared to n values for the formula 2×0.724^n, where n is in half integer steps, a circumferential symmetry shows up. The attached table shows the working. [The table is not given here.] The points can be grouped into slightly larger sets having n = integer ± ¼ and showing remarkably close values to the group averages. Of the 43 points, 32 cluster as follows: n = -3¼, -5¼, -7¼, and –9¼ as groups of 3, 7, 11, and 11. This symmetry seems to me to be unlikely to be accidental. In addition, six other points occur at n = -8¼. Only point 35 shows no fit to the sequence, while points 1 and 2 have a tenuous link. Points 24 and 26 are probably related.

My interpretation of fig. A 4-3, using the Solar System as a guide, is that there have been a series of ejections of strings of quasars (of relatively small size?) similar to the satellite ejections of proto-Jupiter, e.g. Callisto-Titan-Ganymede, but the ejection impulses being of similar strength (because the bodies were of similar density and size?). As an aside, I would point out that using $y = 2.022 \times 0.724^n$ gives closely the same result as above, and as $2.022 = 1.19 \times 1.23 \times 1.38$ then $y = 1.19 \times 1.23 \times 0.724\text{-}^{(n+1)} = 1.19^{2.19} \times 0.724^{(n+1)}$ are variations of the formula. Others can be formed. Other relationships can be tested with this figure, such as the pairing of the quasars (see below concerning a redshift relationship which should be used to aid this), but I shall not pursue them, here.

You will have recognised by here that if the relationships given above actually are real – and only measurements taken of more examples and on photos known not to suffer distortion will determine this – then it is mathematical support of your work that says quasars *are*, in many case, near objects and intimately related to galaxies (and at least some become galaxies). But there is even more proof.

For the Solar System I claim that Earth and Uranus were simultaneously ejected in opposite directions from proto-Jupiter followed by Venus and Neptune – but with the remainder, Mercury, following almost immediately. Proto-Jupiter was at 5.3 AU from the Sun. Applying the formula GMm/d^2 to each of the four ejected bodies, where M is the mass of proto-Jupiter and GM x powers of ten is written as k we obtain:

for Uranus $F_U = 86.6k/(19.182 - 5.3)^2 = 0.44938k$; $F_E = 5.98k/(5.3 - 1)^2 = 0.323418k$;

and the ratio F_U/F_E is 0.719698^{-1}, which is 0.60% from 0.724^{-1}.

for Neptune $F_N = 103k/(30.058 - 5.3)^2 = 0.168037k$; $F_V = 4.98k/(5.3 - 0.723)^2 = 0.232470k$;

and the ratio $F_N/F_V = 0.722833^{+1}$, which is 0.16% from 0.724^{+1}.

We can therefore say that two simultaneously ejected bodies, ejected in opposite directions, have their masses in the ratio of the square of their distances from the origin, times a constant. That is, $m_1/m_2 \times S = d_1^2/d_2^2$. If quasars originate similarly to the planets as suggested above then it can be said that when two quasars are ejected in opposition then their sizes will be different and the difference will be related to their distances from their source times a constant. Obviously I have no proof of this for galaxies (yet) but I have seen one suggestive figure in your book B, one in which there has been a splitting of a body similar to protoJupiter/Saturn.

Fig.B E-1, p.280 gives two quasars, probably originating from a Seyfert galaxy and diametrically opposite to each other. The quasars have redshifts of 1.417 and 1.285, and their distances from the Seyfert are 27 mm and 31 mm respectively. I would expect the quasars to be similar in composition to one another and, compared to bodies in the Solar System, nearer in type to Neptune and Uranus than to Earth and Venus. Unlike ejection pairings in the Solar System gave a force ratio of 0.722. Assume for like pairings the ratio is 1. Also, because of the similarity to Neptune and Uranus, look for a mass relationship between the quasar pair of 1.19 or a power of this number, because $M_E/M_V = 1.23$, $M_N/M_U = 1.19$.

Firstly, using the formula $y = 2 \times 0.724^n$ gives 26½ (compared with 27 mm) for n = -8 and 31 (31 mm) for n = -8½. Therefore the bodies are probably related to the Seyfert, with the latter the source. In this case
$m_1/m_2 = d_1^2/d_2^2 = 31^2/27^2 = 1.31824$ ------ (a)
Divide (a) by 1.19 (trial and error gave this). This gives 1.10776 (closely $1.23^{½}$) ------ (b)
But redshift_1 divided by redshift_2 gives 1.417/1.285 = 1.10272 ------ (c).
The numbers (b) and (c) are only 0.46% different. Is this accidental? Or are the masses of the two quasars related by the formula $(rs_1/rs_2) \times 1.19 = d_1^2/d_2^2$? Test using other examples.

Fig. B 3-26, p.85. If the concentrated centre at the northern edge of the square is the quasar (the arrow does not point to it) then: $d_1^2/d_2^2 = 39½^2/37½^2 = 1.10951$ (= $1.23^{½}$ within 0.04%), divided by 1.19 gives 0.93236. $z_1/z_2 = .305/0.323 = 0.944272$. The difference is +1.2%.

Fig. B 2-4, p.40. $d_1^2/d_2^2 = 12^2/10½^2 = 1.30612$ (= $1.19^{1½}$ within 0.61%), divided by 1.19 gives 1.09758. $z_1/z_2 = 0.325/0.307 = 1.05863$. The difference is +3.6%. Note that $12^2/11^2$ gives 1.00007, the difference being –5.9%. It is clear that the distances must be accurately measured and this cannot be done here with the data available.

Fig. B 2-5, p.41. Comparing QSO with BL LAC. $d_1^2/d_2^2 = 25^2/19½^2 = 1.64366$ (= $1.232^{½}$ within 2.04% and $0.724^{-1½}$ within 1.26%), divided by 1.19 gives 1.38122 (=0.724^{-1}). $z_1/z_2 = 0.334/0.136 = 2.45588$. The two values are quite different. Thus one cannot compare unlike bodies. (Unless for comparison between these two different types of objects the constant is 1.23^2?)

Note that for B 3-26 d_1^2/d_2^2 x z_1/z_2 = 1.04767 (= $0.724^{1/8}$ within 0.62%)
For B 2-4 this = 1.38270 (=0.724^{-1} within 0.11%)
For B 2-5 this = 4.03650 (= 1.19^8 within 0.38%)
Other suggestive combinations are also present.

However, the above formula can only be considered suggestive, as distance measurements are critical. Only testing several more examples with accurate distances will determine the significance of the formula.

As the bodies move away from the origin will they evolve (increase) in volume in steps due to metastable change of internal matter indicated by steps in the decrease of their redshift values – each step resulting in increase in molecular matter and a decrease of wave matter? Do the two bodies develop synchronously or at different rates? Does it mean that the relative sizes of pairs from consecutive ejections can only be given qualitatively and not quantitatively? I have not looked for answers to the above questions.

I must confess that the last half of this letter has been written as I have been developing the ideas. This is because, as I looked through your two books (I have only read book A to the end of chapter 4.) for examples to test on the earlier ideas, I have realised that more and more data can be used to show relationships between bodies. Please forgive the length and stiltedness of this letter but it, like Topsy has "just growed". It is set down because it seems significant. I shall end with one other suggestion, dabbled with before the immediate above, to show how I believe the Solar System yet again can suggest a way to investigate the galaxies.

According to my concept of Solar System origin all the planetary and satellite matter was once a single body and this first broke into Saturn and the remainder. This remainder, protoJupiter, before it began to break up had a volume of sphere radius 74007 km. Thus the radii ratio of this body to Saturn's = 74007/60000 = <u>1.23</u>345. (Jupiter to Saturn is <u>1.19</u>833.) The back cover of book B shows a body (E galaxy Arp 105) with two cores plus a filament to a small ("red") body. Consider just the "cores". I am going to attempt to show that a single body should have – and has – broken up to give the two cores shown. To do this I shall need Darwin's ratios given earlier in this letter, i.e. a/R = 1.8858 (=1.23^3), b/R = 0.8150 (=1.23^{-1}), and c/R = 0.6507 (1.23^{-2}) but I shall give measurements in diameters because that is how I have measured them. For example a/R is 2a, R is 2R(=D). The ratios are the same as long as only one is compared with another of the four dimensions.
Large ellipse (L): a – 14, b – 11, c - ?
Small ellipse (S) a – 12, b - ?, c – 7
Assume that the two bodies were originally one body, with the Sc7 an extension of the La14. Note that $11\text{x}1.23^{-1}$ = 8.94 and that $11\text{x}1.23^{-2}$ = 7.27, suggesting L 14, 11, 9 and S 12, 9, 7. Test for such ellipsoids.
Determining the radii for these two ellipsoids gives R_L $(14\text{x}11\text{x}9)^{1/3}$ = 11.15 and R_S $(12\text{x}9\text{x}7)^{1/3}$ = 9.11 and using these values gives R_L/R_S = 1.22393, within 0.49% of 1.23. Remember, protoJupiter to Saturn was 1.23345.

The conclusion from the above is that a galaxy (S-type?) body possibly broke into two parts as for protoJupiter/Saturn as required of a body reaching an ellipsoidal shape equivalent to the Jacobi first bifurcation point. If we assume that the original body had its a-axis equal to a_L+c_S = 21 then the original body would have dimensions a – 21, b – 11, and c – 9. R for this body would have been $(21\text{x}11\text{x}9)^{1/3}$ = 12.76 and a/R = 1.64577, b/R = 0.86207, c/R = 0.70533. But this result does *not* give Darwin's ratios, although there is obvious similarity. However, if the a-axis was 26 the values would be: R = 13.70, a/R = 1.89781 (0.64% different to Darwin's), b/R = 0.80292 (1.50%), c/R = 0.65693 (0.91%). Are these the dimensions of the original body? Possibly, for no account has yet been taken of the third body of the system, the northern body (body N) connected to the other two by the blue filament. That body has a poorly formed elliptic plan – breaking up at the southern edge? – and must have some depth as its southwestern part contains yellow lighting. The axes of an assumed ellipsoid for this body are 11½ x 6 x ?
If the original single body was 26 x 11 x 9 its volume was: Vo = 4/3 x π x (26x11x9) = 4/3 x π x 2574.
The volumes of bodies L and S are: V_L = 4/3 x π x (14x11x9) = 4/3 x π x 1386
V_S = 4/3 x π x (12x9x7) = 4/3 x π x 756 Sum = 4/3 x π x 2142
and the difference is Vo – (VL + VS) = 4/3 x π x 432.
Thus if the body N is ellipsoidal its c-axis would be: c = 432/(11½ x 6) = 6.26.

But if this body N was originally sandwiched between those of L and S, as the dimensions 11½ and 6 suggest, then its original shape would have been more like a cylinder of elliptic cross section, so that:

c = 4/3 x π x 432/8 divided by π x 11½/2 x 6/2, where the number accounts for the spheroid axes as x rather than, correctly, x/2. This gives c = 4.17.

It can therefore be argued with confidence that the a-axis of the original single body would have been *at least* 25; and this does not take into account any loss of material at break-up, such as the material making up the filament.

I had intended comparing ratios of the various parts of the galaxy to those of the Solar System but it means too much writing so I am omitting them.

The above shows that a most unique event has been captured on film. It can be reasonably argued from an analysis of the photo that there once existed a rotating prolate ellipsoidal body which elongated until the axes attained dimensions that resulted in the body becoming unstable as predicted by Maclaurin and by Jacobi, and that at this "Jacobi first bifurcation point" the body broke up. The axial dimensions at this moment relative to the radius of a sphere of equal volume were as predicted by Darwin for such a break-up. It broke up near perfectly - not quite as theory predicted. A small central part of the body detached and was ejected to give the northern body shown.

It can be further argued that body N has begun to break up, for with axes a = 11½, b = c = 6 (giving a sphere radius of 7.45), the ratios $a/R = 1.23^{2.095}$ and $b=c/R = 1.23^{-1.048}$ and these mark a Jacobi bifurcation point. This value is the same as used for my protoJupiter break-up.

Further, if one measures the a (which can only be done approximately) and b axes of the outer edge of the blue casing surrounding body L the value 46/30 = 1.533 or closely 1.23^2.

Note the two small yellow bodies to the south of body L and still within the red zone. These are equivalent to my prediction of satellite ejection from protoJupiter prior to planet ejection.

Finally, I have shown for Saturn separating from protoJupiter that its axial tilt is calculable using that of Jupiter – approximately equals protoJupiter (See web site, Advert. 4.). Thus in this galaxy system a tilt of body S would probably take place. And the photo shows it certainly has, and about that of Saturn. Roughly measured, from a straight line drawn from the southern and northern yellow dots in the photograph (the line passes closely through the centres of L and S), the tilt is 20°. This tilt may be a primary property of initial break-up as it is near that of Saturn.

The description of this galaxy is another example of what I wrote just before beginning the description. One begins to explain a simple property and at once it just presents more and more evidence to the eye. It just grows.

I must end here or I shall never stop. I hope what has been written has not been a waste of time for you should you have read it; rather that it has been of value to you.

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