

THE TECHNICAL CORNER

BIZARRE STARS

Currently there is much speculation about the possibility of galaxies, in general, having a super massive star or stars at their core. I call them bizarre stars. The first time I was aware of this idea being expounded was in an article I read in my adolescence (around 1960). I have been unable to locate this article so I cannot give credit to the author who also suggested that the self - destruction of these stars would explain some of the observed peculiar galaxies, such as M 82, which look as though their centers have had a great explosion occur in them. This author also suggested that such an explosion would give birth to two new massive stars (daughter bizarre stars) that would proceed off in opposite directions.

In 1969 I attended a lecture by Dr. Halton Arp, who made a convincing statistical argument showing a connection or association between anomalous quasar findings and peculiarly disturbed galaxies. After this lecture it was clear to me that these massive star explosions could explain the association of quasars with peculiar galaxies. In this article I, too, am going to speculate freely about the possible existence and consequences of such stars. I will try to make a plausible qualitative argument that the existence and self - destruction of these stars would qualitatively explain:

- 1) The source of high energy cosmic rays.
- 2) The source of quasars.
- 3) The source of the gravitational lens effect.
- 4) The source of galactic magnetic fields.
- 5) Why viable quasars are relatively nearby.
- 6) Why black holes should not exist.
- 7) The source of high intensity broad band electromagnetic radiation coming from galactic cores.
- 8) Galaxy - wide interstellar gas ionization in some galaxies.
- 9) The source of some globular clusters.
- 10) The source of extended galactic synchrotron radiation.
- 11) The source of observed electron and positron annihilation gamma rays.
- 12) The type, relative age, and evolution of many galaxy types.

I am going to consider a bizarre star mass in the 10^7 to 10^9 solar mass range. A classical gravity field acceleration calculation for such a mass range, assuming a spherical mass of five times nuclear matter density (10^{18} kg / m³), gives an acceleration range of 4×10^{13} earth g's to 2×10^{14} earth g's at the star surface. We have obviously entered the domain of general relativity. However, classical calculations will serve to give qualitative results. A classical gravitational potential energy to kinetic energy conversion for a proton free - falling from far away gives a range of 10 Tev to 150 Tev (a Tev is 10^{12} electron volts energy) at the star surface for the star masses listed above. Free falling electrons from far away obtain a range of kinetic energy of approximately 5 Gev to 75 Gev (a Gev is 10^9 electron volts energy) at the star surface. However, we should not expect simple free fall of free particles. Instead we should expect each particle to make a large number of inelastic collisions on its way to the star surface. If we assume approximate equipartition of energy in the star atmosphere at the star surface, then electron mean energy will be near that of the protons and be in the several Gev range. This in turn would cause a rapid electron loss from the star charging it to a very high positive voltage. However, such a voltage would capture back the electrons. So there must be a state of dynamic equilibrium where there are two diffuse concentric spheroidal charge regions near the star surface (gravitationally captured ambipolar diffusion). The electric potential difference between these two regions should be in the several Gev range. Such a region would be an ultra strong source of broad band electromagnetic radiation (see Figure 1). The top of this net charge displacement region should be an ultra strong emitter of Hydrogen Balmer and Lyman emissions. I am assuming here that a continuous supply of matter is being consumed by the bizarre star. Perhaps several solar masses per year may be common for a bizarre star at the core of a young quasar.

The bizarre star should not be spherical in general. It potentially could have a large angular momentum and be a spheroid as shown in Figure 1. This spheroidal deformation could be large because

this star would have much of the net angular momentum, that 10^7 to 10^9 stars had about the original daughter bizarre star before they were consumed by the bizarre star. This original daughter bizarre star formed the nucleation site for galaxy formation. This formation process will be discussed later.

If the concentric charge regions of the bizarre star atmosphere rotate at the same angular frequency as the star, there will be a substantial net current flow which will generate a substantial magnetic field. The net effective current flow comes from the electrons being further out from the surface of the star and therefore traveling around the star's center at a higher velocity. The strength of the magnetic field will be a strong function of star size, rotation rate, and rate of matter in fall to the bizarre star. This could well be the source of galactic magnetic fields.

In general relativity we are tempted to allow the mass of an object to increase without bound until and beyond gravitational collapse and closure. This I believe to be an error. The problem is that general relativity allows or assumes the possibility of a continuous increase in matter density with no regard to the fact that matter density has to be manifested in actual matter substructure. An example is quarks coupled together to form a nucleus. If there is a density beyond which matter substructure do not exist, then matter may decouple into a photon "gas". And this is what I believe actually happens in nature. If this be true then there is a density (pressure) limit which would limit the size of bizarre star. And it would limit its size in a very violent way as illustrated in Figure 2 and 3 . Perhaps as much as one tenth of the mass of bizarre star may be converted into a photon "gas" whose explosive expansion supplies the kinetic energy for the newly formed escaping daughter bizarre stars and associated expanding plasma and degenerate matter debris. Degenerate matter debris (perhaps neutron stars) of around 10^3 to 10^4 solar masses could, while leaving the galactic core, take with it 10^3 to 10^5 stars in semi - stable orbits which, over a few tens of millions of years, will settle into the apparently nearly stable orbits of stars in observed globular clusters. However, a small percentage of the stars will be consumed by the central "star". These globular clusters formed by this process would initially orbit the galactic core with fairly eccentric orbits.

Some rather large electromotive forces will be generated by the expanding plasma "compressing" the magnetic field of the former bizarre star's surface region. And again when the magnetic field collapses. How many trillions of volts of potential difference will charged particles in the vicinity of a detonating bizarre star experience ? To what kinetic energy will charged particles be accelerated by the changing magnetic field in the region in between the two escaping polar daughter bizarre stars ? An exploding bizarre star could well be the source of ultra high energy cosmic rays.

There are some quasars that are so close together in the sky and so nearly identical that there has been speculation that they are really two images of the same object. The two images being generated by a gravitational lens effect caused by the gravity of intervening galaxies located along the line of sight. However, If the bizarre star self destruction mode has merit, it would seem more likely that what is observed is two nearly identical daughter bizarre stars with many tens of millions of captured galactic core stars (young quasars) traveling away from each other at right angles to our line of sight. The mass of the daughter bizarre stars could contribute a large percentage of the observed quasar red shift through the gravitational red shift mechanism, if the great bulk of the quasar line emission radiation is generated in a nearly equal potential gravitational field region near the star surface (see Figure 1). Such a gravitational field region should exist at the surface of young daughter bizarre stars do to their relatively small deformation do to their relatively small angular momentum at an early age. Such a gravitationally red shifted intense radiation source could then have its light made into a diffuse source by dust scattering of the radiation over the several tens of parsecs of dust surrounding the bizarre star (see Figures 4 and 5). This dust coming from the tens of thousands to tens of millions of stars consumed / dispersed by the bizarre star's gravity field. The other component of the red shift would be of a Doppler nature.

The coupled magnetic fields of the two escaping daughter bizarre stars would explain the extended strong radio sources associated with many galaxies, particularly peculiar galaxies that look like their center has been "blown" out and have two or more quasars or strong radio sources "sandwiching" them (see Figure 3). The changing magnetic field strength in between the diverging daughter bizarre stars would supply the electromotive force and magnetic field needed to drive and confine the charged particles that produce the observed synchrotron radiation. It would also provide the electromotive force to accelerate charged particles in the interstellar media of the galactic plane. This would cause galaxy wide ionization of interstellar gas caused by collisions with these accelerated particles. Also, the matter - anti - matter plasma created in the exploding bizarre star core would explain the electron - positron annihilation

spectra observed with some strong synchrotron radiation sources, as well as supply the 10,000 Gev electrons and positrons required for the observed ultra violet light synchrotron radiation.

Well what if the majority of galaxies do have bizarre stars in their core ? What would be the implications for the cyclic big poof theory put forth in the July 1986 issue of THE UFO REPORT ? The supposed contracting super plasma universe of the cyclic big poof theory would now have another explosive power source. Bizarre stars swarming in the super plasma would gorge themselves on matter and then explode, producing two or more daughter bizarre stars to do the same. As this gorging process continues, the angular momentum of the bizarre star will in general decrease and the angular momentum of successive generations of daughter stars will in general decrease. This means that successive generations of daughter stars will have smaller and smaller angular momentum. When they explode, they will have smaller daughter star offspring until no offspring are created in the explosion except massive neutron stars. This process would substantially accelerate the heating and therefore the beginning of the explosive expansion of the super plasma to give our present universe.

If the bizarre stars are essentially uniformly distributed in the initial expanding super plasma, then they would supply the galaxy nucleation sites for the observed old large elliptical and old large spiral galaxies that are observed today. Each galactic cluster seems to have at least one of these large old galaxies as their dominant (central) member. So, what are the implications for galaxy formation and evolution from exploding bizarre stars at the center of these old galaxies. To answer this question consider the situation depicted in Figure 6. A bizarre star with relatively high angular momentum deformation which has exploded and reformed several times is about to explode again creating two more escaping daughter bizarre stars. An example of this type of behavior can be seen in the ejection jet of the galaxy M87. The bright objects in the jet of M87 do not exhibit quasar line emission because the tidal gravitational star destruction rate is so high that the created relatively dense bizarre star extended atmosphere can not settle down into the configuration shown in Figure 1. These escaping would be quasars greatly perturb the star "orbits" of the mother galaxy and thereby provide new stars available for consumption by and growth of the gravitationally reformed central bizarre star or stars. The "end" result of the ejection of these would be quasars is a line of galaxies on both sides of the mother galaxy. Good examples of this are M87 which is the center of a line of elliptical galaxies of the Virgo cluster and M31 of our local group of galaxies, which has a line of galaxies strung out along its minor axis.

Consider the fate of a daughter bizarre star surrounded by several hundred million stars (a quasar) leaving its mother galaxy. In the course of a hundred million years or so it should have consumed many tens of millions of stars and the remainder of the stars should be in relatively stable "orbits". The star consumption rate has greatly decreased to the point that great variability in intensity are observed implying observation of individual star consumption. During this evolutionary process, intergalactic hydrogen is being gravitationally accumulated in this new galaxy. This gas, along with the gas and dust debris of the stars consumed and dispersed by the bizarre star, should be forming into young stars. Now suppose that this galaxy makes a weak gravitational collision with another galaxy. This would tend to give the new galaxy angular momentum and deformation of extremities towards the shape of a spiral. Could this be what Seyfert galaxies are ? What if the gravitational collision had of been stronger and with an old large spiral galaxy ? In this case there is a significant possibility that large clumps of stars (several hundred million per clump) in the outer spiral arms could be gravitationally captured by the new galaxy. Could this be what some barred spiral galaxies are ? Are dwarf galaxies, and small and large elliptical galaxies, just the consequence of the new galaxies not making significant gravitational collisions with other galaxies ?

Well I hope I have made a plausible qualitative argument that the existence and self destruction of super massive galactic core stars could explain many of the great mysteries of the universe. Again, I ask, I challenge, and I encourage astrophysicists, physicists, and astronomers to contemplate and do calculations on the possibilities I have put forth.

P.S. — I want to thank Dr. Halton Arp for having the courage to keep fighting for the recognition of non - velocity related sources of red shift. His work showing the correlation between the angular proximity of peculiar galaxies and quasars along with his non - velocity red shift work freed me from my belief barrier of Doppler shifts being the only significant red shift source. May you become free too.

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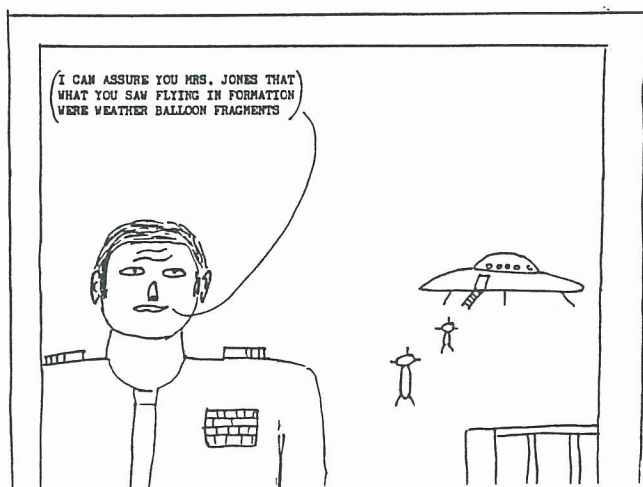
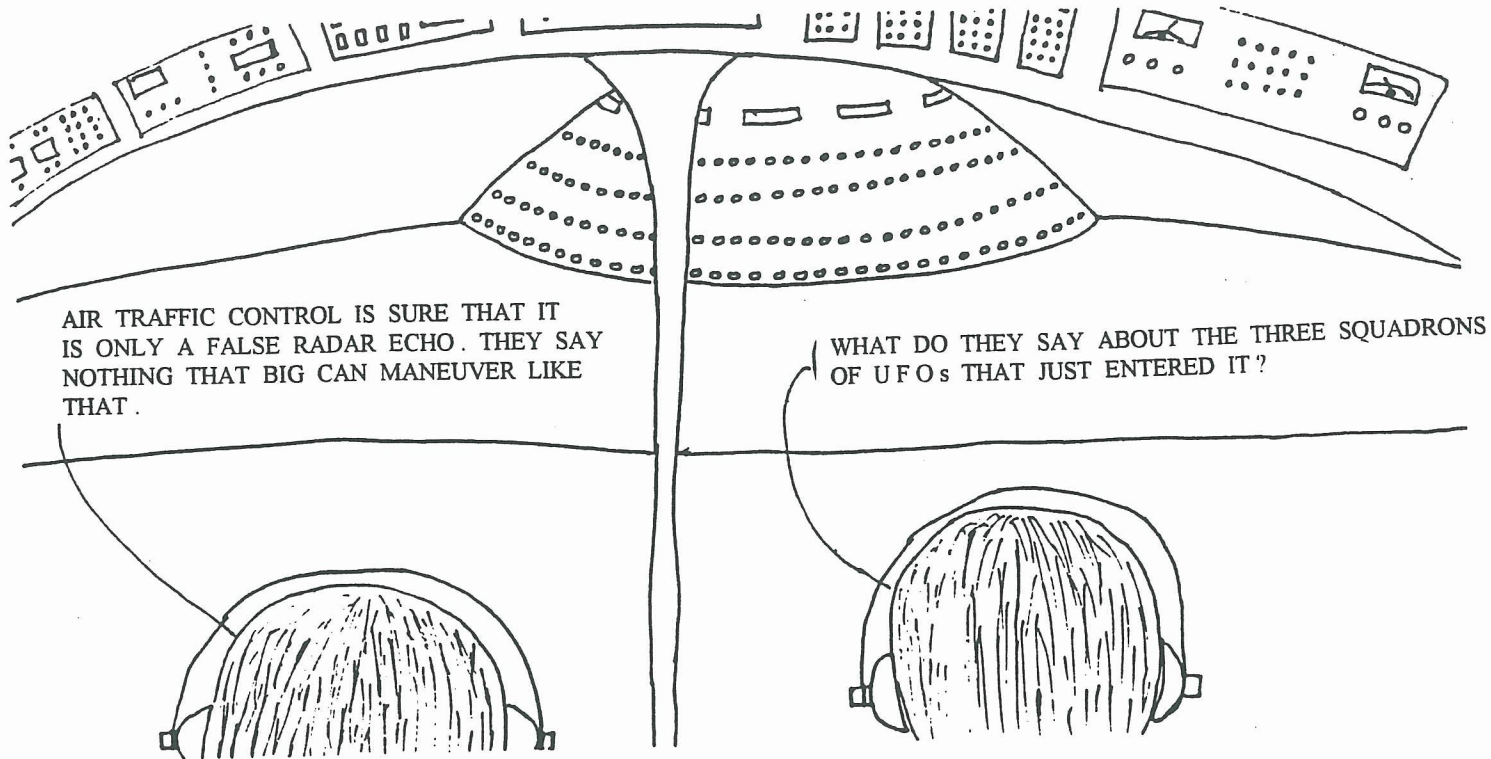


FIGURE 2
EXPLOSION ON GROUND PATTERN

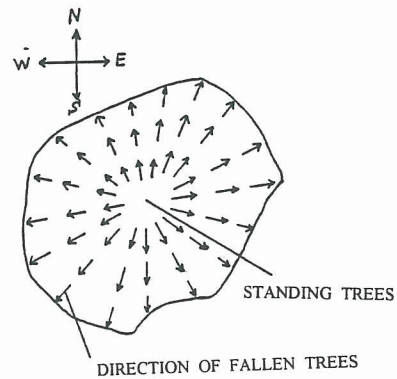


FIGURE 3
PATH FOLLOWED JUST BEFORE EXPLOSION

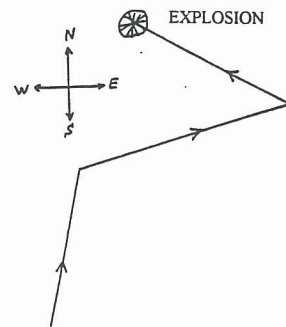


FIGURE 1
FIRE BALL PATTERN

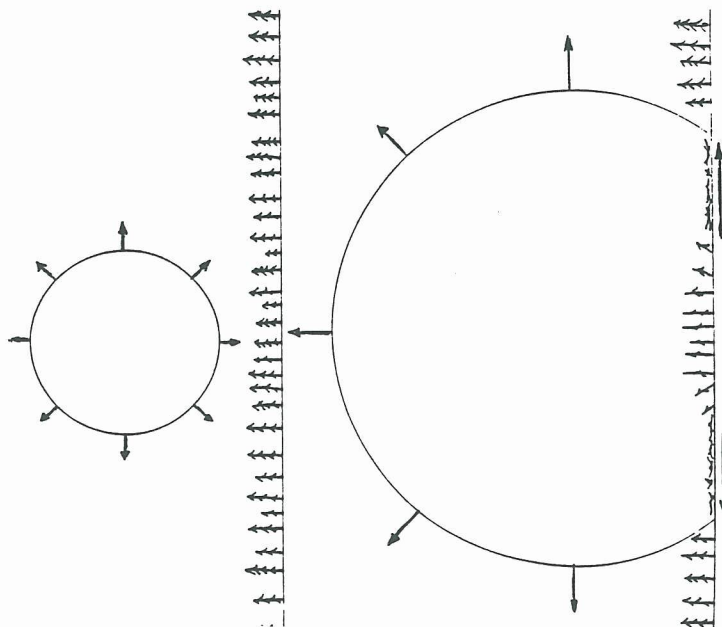


FIGURE 1
ROTATING BIZARRE STAR CONSISTING OF TWO DIFFERENT MATTER STATES

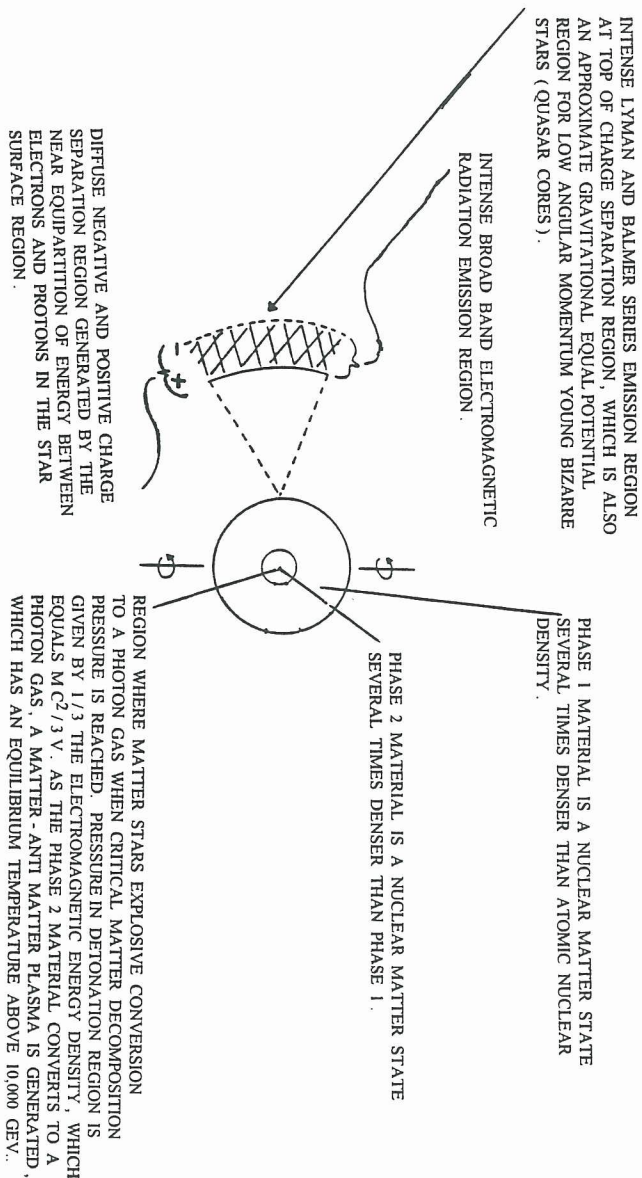


FIGURE 2
CROSSSECTIONAL VIEW OF EXPLODING BIZARRE STAR
AFTER A MASS TO PHOTON GAS CONVERSION

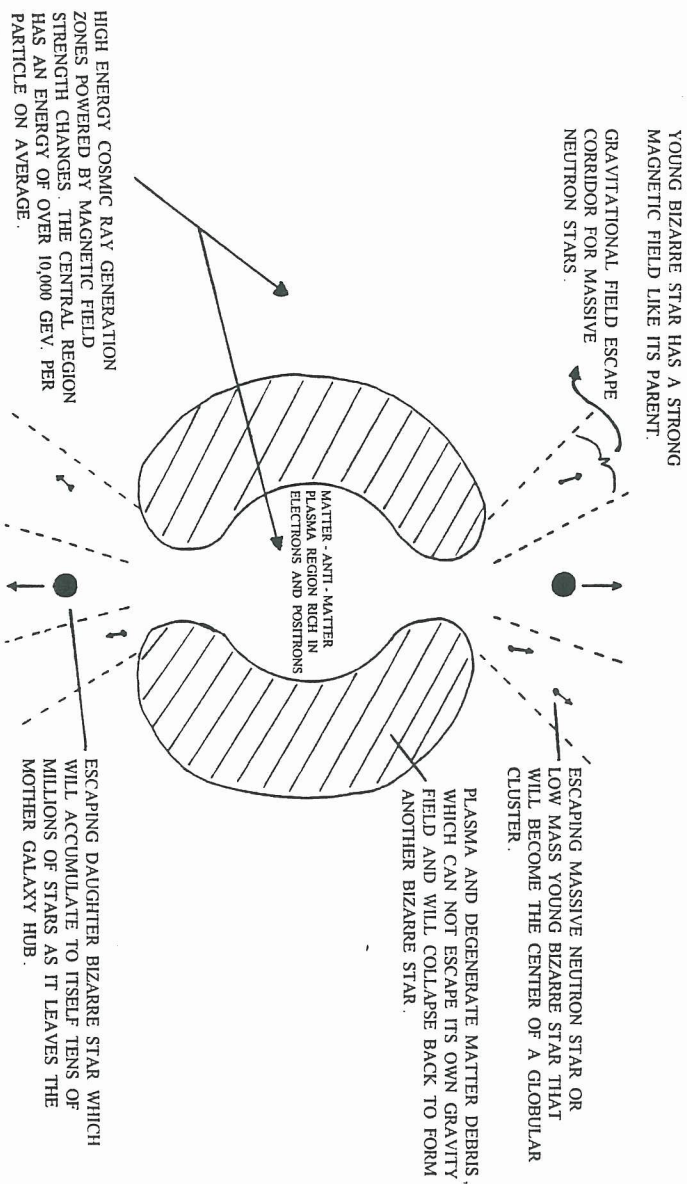


FIGURE 3
THE DEATH AND BIRTH OF BIZARRE STARS

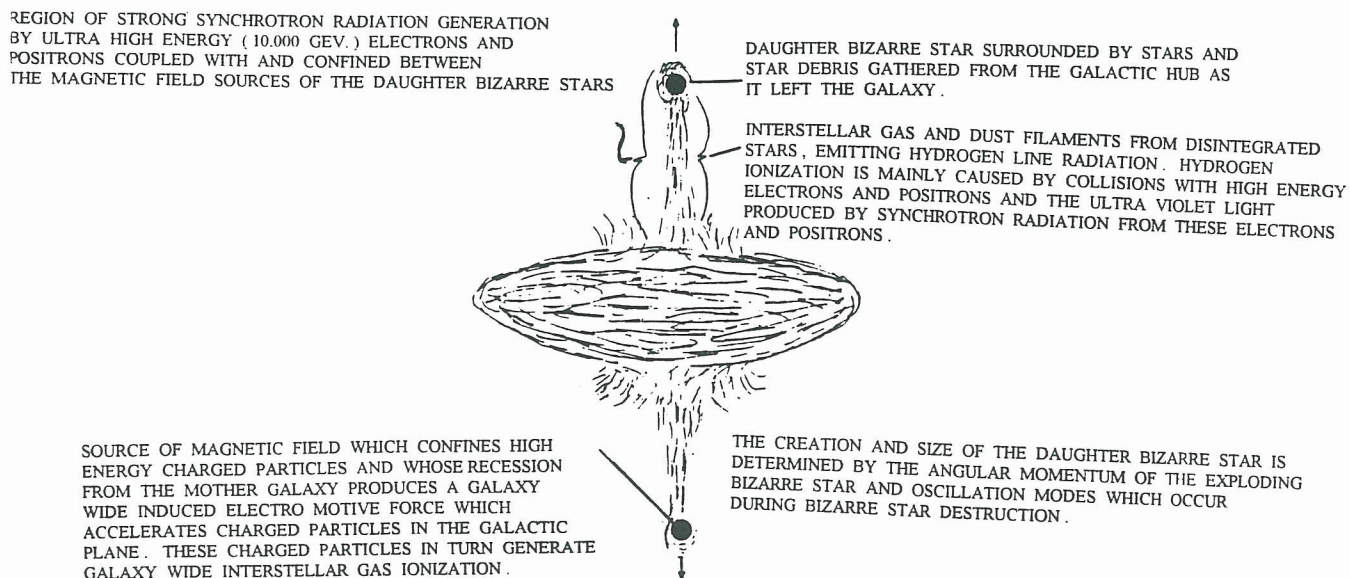


FIGURE 7
LARGE ELLIPTICAL GALAXY SHOWING SIGNS OF BECOMING
A LARGE SPIRAL GALAXY

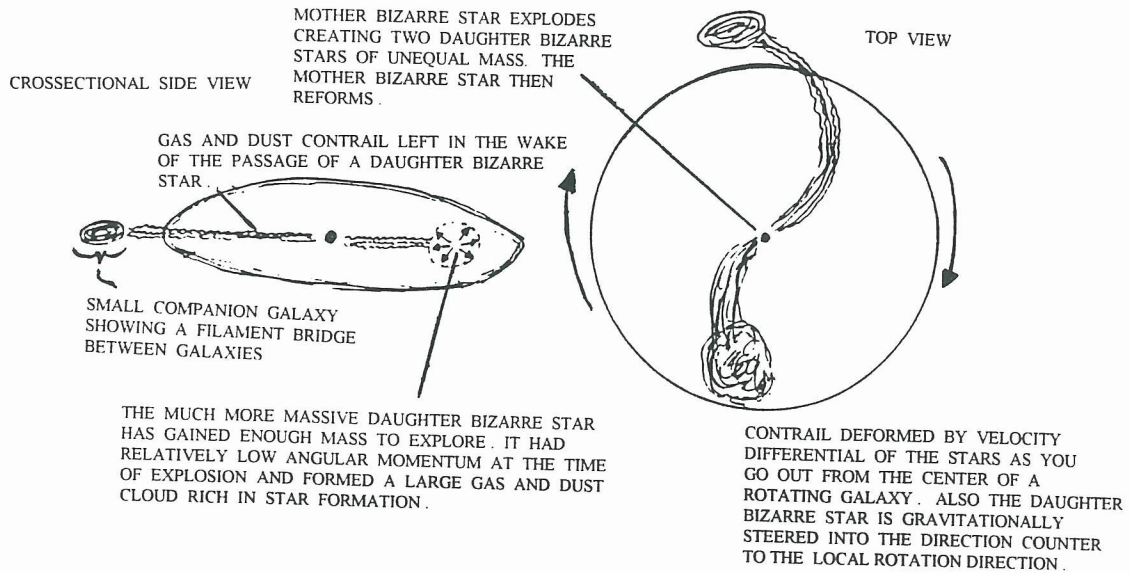
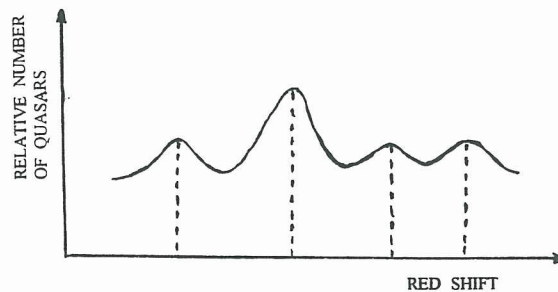


FIGURE 8
SMOOTHED TYPICAL HISTOGRAM OF QUASAR NUMBERS VERSES RED SHIFT



THE PEAK RED SHIFT VALUES IN PLOTS OF THE NUMBER OF QUASARS VERSES THEIR RED SHIFT ARE KNOWN TO FOLLOW A QUANTIZATION OF THE RED SHIFT RELATIONSHIP GIVEN BY: $\log(1 + Z) = A \text{ CONSTANT}$. THIS CAN BE QUALITATIVELY UNDERSTOOD AS AN ACOUSTIC OR MECHANICAL RESONANCE PHENOMENON. THE GROWING VOLUME OF PHASE 2 MATERIAL IN FIGURE 1 THAT IS CONVERTING INTO A PHOTON GAS CAN BE THOUGHT OF AS A RESONANCE CAVITY. THE RESONATING MEDIUM OF THIS CAVITY IS A DENSE MATTER-ANTI-MATTER PLASMA WHICH IS STRONGLY COUPLED TO A SUPER INTENSE APPROXIMATE BLACK BODY RADIATION FIELD. AS THE EXPLOSION RUNS ITS COURSE AND CONSUMES THE LAST OF THE PHASE 2 MATERIAL, A SUBSTANTIAL AMOUNT OF ENERGY CAN EXIST IN THE FORMATION OF LARGE SCALE DISPLACEMENT OF PHASE 1 MATERIAL. THE DAUGHTER STARS CAN BE ESSENTIALLY IDENTICAL OR VERY NON-IDENTICAL OR MORE THAN TWO DAUGHTER STARS WILL BE FORMED. THIS DEPENDS ON THE "ACOUSTIC" OR FLUID MECHANICAL OSCILLATION MODES PRESENT AND THEIR RELATIVE AMPLITUDE AND PHASE AT THE TIME OF THE RUPTURING OF THE EXPANDING PHASE 1 OUTER SHELL. THE QUANTIZED PEAK VALUES IN THE PLOTS OF RELATIVE NUMBERS OF QUASARS VERSES RED SHIFT ARE EXPLAINED BY THE DIFFERENT VALUES OF QUASAR CORE STAR MASSES WHICH DISTRIBUTE THEMSELVES ABOUT CHARACTERISTIC MEAN MASS VALUES DETERMINED BY "ACOUSTIC" OR MECHANICAL RESONANCE PHENOMENON.