SUPPOSED HISTORY OF OUR GALAXY

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Looking back with modern instrumentation like that at Westerbork to possible progenitors of galaxies, we find at increasing redshifts active galaxies, radio galaxies, BL Lac objects and quasars. With improving instrumental sensitivity and resolving power, energetic activity is discovered in these objects: ejecta of millions of solar masses, mostly bipolar, were thrown out from the central bodies to hundreds of kiloparsecs at nearly luminal speeds. The rich variety of their structures and energetics is illustrated in a review paper by Miley (1980). Like miniatures of these phenomena, ejections of 10-100 $M_\odot$ with speeds of 10-100 km s^{-1} appear in star-forming regions of our Galaxy.

The powerful "engines" working in galactic explosions are still a mystery. Gravitational sources of energy accumulated in black holes through processes of accretion are considered. However, it is not easy to produce them in an expanding universe on a proper scale of mass, energy and time. It seems more natural to link the ubiquitous explosive phenomena to the general expansion of the Universe: to see the Big Bang as a long-lasting process of gradual explosive fragmentation of the primeval dense matter. In a sequence of "minor bangs" super-clusters and clusters of galaxies would be formed with large voids extending between them. Galaxies could gradually eject protoclusters of stars, beginning with far-reaching massive globulars, ending on small close open clusters and associations. Star-forming regions would still contain explosive seeds of primeval dense matter. Stars themselves could give birth to their planets, and these to their satellites in a similar process.

Thirty years ago Ambartsumian (see e.g. 1980) expressed the idea that expansion and fragmentation are leading processes in the present phase of cosmic evolution. He and his collaborators have found support for this idea in extensive observational studies of non-stationary phenomena in very young stars and active galactic nuclei.

The proposed imaginative scenario does not fit the conventional

H. van Woerden et al. (eds.), The Milky Way Galaxy, 611–612.

model or models of a hot Big-Bang. It calls also for different solutions of some basic problems. To give some examples, let us consider the spiral structure of galaxies. The string-like, mostly bipolar ejecta from quasars and galaxies, directed close along their symmetry axes, are probably aligned with the magnetic axes. Differential rotation, precessional and tidal interactions with the environment may reorient and wind up the arms to the shape of a spiral galaxy. It should be remembered that Pismis has proposed years ago and discussed in a series of papers (see e.g. 1979) a similar mechanism for spiral-structure formation. Strongly inclined, bar-like molecular features, in the bulge of our Galaxy, as well as a small spiral recently discovered in recombination-line studies of the nucleus (Oort, 1985) are examples of different orientations of substructures.

Concerning the chemical evolution of our and other galaxies there is an elaborate theory of nucleosynthesis in stars. Yet, we have to remember that the experimental test of the H-burning rate in the Sun yields a flow of neutrinos considerably lower than expected. There are also difficulties with the theory of formation of heavy elements which are present everywhere, in young and old objects. It seems worth-while to remember some alternative ideas concerning these problems. Mayer and Teller years ago (1950) suggested that the present chemical composition of cosmic matter is a result of two competitive processes: light elements in which lighter, proton-rich isotopes are more abundant were formed through nucleosynthesis; heavy elements with heavier, neutron-rich isotopes in preponderance could be formed through fission of a primordial, superdense "poly-neutron fluid". Could not a chain of nuclear fissions be active in primeval dense matter in the cores of quasars, active galactic nuclei and star-forming regions during their explosive phases?

In the frame of the proposed scenario one may also think of many other difficult or unsolved problems, like the flat rotation curves and dark matter, the origin of cosmic rays or the excessive X-ray emission - in order to encourage the cosmologists to work on models as close to the current observational results as possible.

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https://doi.org/10.1017/S0074180900243246 Published online by Cambridge University Press