Facts of Science Fiction
in Planet of the Cats
by Hans Ness

Rolo on the Planet of the Cats takes place on Earth far in the future (the next book narrows it to the year 2409) with highly advanced genetic engineering, resulting in talking animals, bio-machines, and meat crops. This may seem like comic goofiness, but it is more plausible than most people assume.

Genetically Advanced Animals — In the book, genetically engineered animals have human-like intelligence, vocal tracts to talk, and dexterous paws to use tools. Since we discovered DNA in 1953, less than a century ago, we have learned to genetically modify plants and animals, so imagine how much more we can learn in hundreds more years. While there are ethical concerns about "playing gods", we could in theory modify genes with better precision and purpose than what results from random mutations. With enough time and knowledge, we could eventually design any kind of living organism we want.

Bio-Machines — The book features bio-machines, which are organisms genetically engineered for specific purposes, like vehicles with legs and a Roomba-like device that licks the floor clean. Like animals, these machines use muscles instead of motors to move, and nervous systems instead of chips and wires. But like plants, they have no brains or consciousness, and can sit dormant. And like both, they can heal, reducing maintenance. Bio-motors turn the propellers on airships. While organisms cannot have spinning axles, a bio-motor could have muscles that pull something attached to a crankshaft. All this is theoretically plausible.

Sucro-Fuel — The bio-machines are powered metabolically by simple digestive systems that run on sugar water, called sucro-fuel. This is also plausible. In fact, sugar water is what hummingbirds drink from bird feeders. Most of what animals eat is converted to glucose (aka sugar) through digestion. Sugar-water bypasses the need for such complicated digestion.

Crop Meats — In the book, instead of raising livestock, they have genetically engineered plants that grow muscle tissue for meat, and other animal products like eggs (and probably dairy and leather, though they are never mentioned). Like the bio-machines, this is theoretically possible with enough advances in genetic engineering. It would be much more economical to grow meat as plants than to grow food to feed livestock every day till they're old enough to slaughter.

Super Wood — The airships are made of wood that is genetically engineered to be stronger and lighter than metal, rot-resistant, and fireproof. This is plausible with enough genetic engineering. It would be ideal if these trees grow much faster than natural trees.

No Petroleum — The book has no jets or internal combustion engines. Perhaps the Earth ran out of petroleum, or perhaps they stopped burning fossil fuels for environmental reasons. This explains why air travel is slower. It takes the propeller airship nearly two days to cross the Atlantic Ocean, which is slightly faster than what it took old dirigibles like the Hindenburg.

Electronics — The book does not mention electronic devices. They might be replaced by or combined with bio-machines, which use nervous systems instead of wires and microchips. They use radio waves for communication, like we do now with satellites, cell phones, and radios.

Anti-Gravity — The airships and Aerus City have tanks of "anti-grav" oil to make them float. This oil is matter with negative mass, which repels away from regular mass, so it falls up instead of down as it repels from the Earth. Based on the illustrations and descriptions, the city buildings must have high-density anti-grav oil, because the tanks are not very big. The air-buggies, however, look like small blimps, so their oil must be very low density. Despite looking like blimps, anti-grav oil and helium use very different principles to provide lift. Like real dirigibles, the airships and buildings probably have ballast tanks to adjust how heavy they are. Negative mass is just a theory. All other forces in nature can repel, like magnetism and electrical charges, so there might be an equivalent for gravity, but we have no evidence that it exists. (Unfortunately, anti-matter does not have negative mass.)

Floating Cities — Aerus City is made of several skyscraper buildings, lifted by anti-grav tanks at their tops. This would be technically possible *if* negative mass exists. However, it doesn't seem practical. They would need some propulsion to keep the city from blowing around the world in the air currents. And if a structure cracks, it would fall apart instead of settling, so it would be more dangerous.

NYC Ruins — In the book, New York City is in ruins because of a past war. It is plausible that people would abandon a city if most of it was ruined beyond repair. And without ongoing maintenance, buildings do deteriorate. Central Park has overgrown into a jungle, which is feasible if they have so many genetically altered plants in the future.

Glowing Crystals — The city of Zorx has alien crystals that glow. In nature, some gemstones do have luminescence, plus in nature there is bioluminescent (fireflies, etc.), phosphorescence ("glow in the dark"), and fluorescence. But these all require energy in the form of receiving light, electrons, or food, and they're relatively dim. It's unclear what provides the energy to these alien crystals, especially abandoned underground in the dark. They would need to be extremely efficient at converting radioactive decay into light, or absorbing and converting heat or radiation from the environment. The gems in the blorxian key glow based on distance and direction to the secret portal. This might be technology, or it might be a reaction to a specific radiation from the portal, with polarization based on the direction of the radiation.