Foods of the Gods

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Submitted for your approval

During the past 400 generations starting about 10,000 years ago the human population has grown from an estimated five million people to the 7 billion today. This explosive growth represents a 3 orders of magnitude increase. By the end of the 21st Century prognosticators say the human population will be around 9-10 billion people. And since there may not be enough useable land they also say that these 9-10 billion will be the maximum this planet can sustain because of perceived food shortages. Simply put, there will not be enough food available to feed more than 10 billion people. This then brings up issues of food availability, biodiversity, and overpopulation. And with 10 billion people the diversity of food stuffs should vary considerably. As the population increases the availability of productive land will be shrinking due to urbanization and perhaps climate changes placing more demand on increasing food resources. If policy makers would pay closer attention to some of our favorite scary films then maybe they may get some inspiration on how to overcome these potential food shortages.

The best way to preserve food resources is to ensure biodiversity, meaning a broad availability of a large variety of food sources. Maximizing land sharing, increased crop yields, and conservation will all play a role. Agricultural communities are generally aware of this but most of the population is not. At odds with this are those groups who push for more development thereby removing available land to support food growth. Like all things in life there will have to be compromises. A loss of biodiversity will alter the functioning of ecosystems and therefore the ability to sustain the billions of people with the necessary goods and foods important for prosperity.

Many habitats are critical for the proper biodiversity of food stuffs. Natural forests, mixed woodlands, farmlands, etc are all necessary. Along with the diversity of food stuffs are the habitats of insects and other animals that are critical to proper plant growth because it is these animals that help such things as pollination. For example, many fruit growers are also bee keepers to help insure all their plants are well polinated.

Overall, approximately 9 million types of animals, plants, protists and fungi inhabit the earth. Globally, there are 500,000 known plant species and man has been able to domesticate only around 100. Of these 100, thirty of these species provide man with 85% of our food and 95% of our protein and calories. 75% of all man’s food comes from only 8 cereal species: corn, rice, wheat, oats, barley, sorghum, millet, and rye. Of the 4,500 species of mammals on earth man has domesticated only 16. So, simply stated, 30 plants and 16 mammals will feed earth's many billions. Other food stuffs should be investigated to see if cheaper and healthier calories can be provided. Also, food stuffs that can grow in harsh environments will be essential as urbanization and habitat reduction of arable land increases. Plants can be genetically engineered to adapt to higher salinity (near salt marshes and mangroves), drier conditions, need fewer nutrients, etc. Also, plants can be genetically engineered for better nitrogen fixation in root nodules which would help insure adequate growth even in extreme environments.

Conservation biology.

Conservation biology is an interdisciplinary subject composed of science, economics, and natural resource management. Earth's biodiversity is studied with the aim of protecting species, their habitats, and ecosystems from erosion, collapse, and ultimately, extinction. Both plant and animal species are included. For our purposes here we are referring to conservation biology as related to population management including food availability to feed the masses. Both benign and hostile factors are involved in proper population management. The underlining concept is to maintain biodiversity and therefore a healthy ecology. This comes from some estimates that over the next 50 years up to 50% of all species currently on the planet will disappear and become extinct. This will, of course, contribute to poverty, starvation, and could permanently change the course of evolution so the concern is real. And some of our favorite SF films have known this for some time and have created plots that do indeed address the global issues of overpopulation and ways and means to feed them.

Integral to proper population management are some strategic species necessary to maintain the right environment. The most important species are called "keystone species" and are the central hub of any ecosystem and their loss will collapse the food chain. Next down the line are the indicator species and these are useful for observing the health of an ecosystem (think of a miner's canary used to indicate the safeness of air). Last are called umbrella or flagship species that cover multiple ecosystems and habitats and are therefore good indicators of sensitive areas.

Man's magical 30 plant and 16 animal species are all integral to population management and could be considered keystone species for man's continued survival. Eventhough there are plenty of backup indicator and flagship species to pick and choose from, if just one of the above species should be taken out of the food chain then much mayhem and global problems will result. Though these are serious and scary issues they are, nevertheless, prime targets for some of our favorite SF films.

All this being said there is a tipping point in which, once crossed, catastrophic collapse of ecosystems will be inevitable. It is the small changes in an ecosystem that leads to such collapse and once collapsed the recovery is painfully slow and difficult, if at all. Just before crossing this tipping point an ecosystem may become increasingly vulnerable to slight perturbations due to the loss of ecological resiliance.

Population biology

Population biology is a blending of other disciplines such as ecology, evolution, genetics, and statistics to provide an overview of how certain populations interact between other organisms and the environment. The overall intent is to understand how populations evolve and how they regulate their size. This impacts on such realities as overcrowding, invasive species, and extinction. Important information is the growth of a given population, the dynamics and interactions of the population (competition, predation, parasitism, and mutualism), food sources to feed the population, and strategies to continue to survive. Key to all this is how the population interacts with the environment. Over time populations will change and evolve to better suit and ensure their continued growth.

To describe all of this in more detail several terms are used to naturally group individual populations. A species population refers to all individuals of a given species. Metapopulation refers to a set of spatially distinct populations among which there may be some migration. A population is a group of individuals that is demographically, genetically, and spatially distinct from other groups. An aggregation is a spatially clustered group of individuals. A deme is a group of individuals that are more genetically similar to each other that to other individuals. A local population is a group of individuals in a delimited area smaller than the geographic range of the species. A subpopulation is an arbitrary subset of individuals from within a given population. Many of our favorite scary films can be placed in these categories.

Under ideal conditions (sufficient food, water, and space) populations of any given species grow rapidly and follow a pattern known as exponential growth. Exponential growth is explosive population growth in which the total number of potentially reproducing organisms increases with each generation. However, populations of organisms will not increase in size forever. Eventually, limitations on food, water, and other resources will cause the population to stop growing. When a population arrives at the point where its size remains stable, it has reached the carrying capacity of the environment. The carrying capacity is the greatest number of individuals a given environment can sustain. Competition for resources among members of a population (intra species competition) places limits on population size. Competition for resources among members of two or more different species (inter species competition) also affects population size.

Human overpopulation is a term that means people's overall numbers exceeds the carrying capacity of their environment or habitat they live in. In simple terms this often refers to the relationship between humans and their environment (read:

Earth). In some cases smaller geographical areas or even countries are referred to so the meaning is flexible. Overpopulation results from an increase in births and/or a decline in mortality rates, excessive immigration, an unstable ecology (such as those who live in extreme environments of cold or heat), and a depletion of available resources. As such, it is possible for sparsely populated areas to actually be overpopulated if the area in unable to sustain life.

Since the Black Death of the Middle Ages (around 1400 A.D.) the population of earth has been continuously growing at an accelerated rate. The most significant increase has been in the last 50 years primarily due to medical advancements and increases in agricultural productivity. Though the population continues to grow the rate of that growth has been declining since the 1980s. Currently, there are around 7 billion humans on the planet. Estimates place the carrying capacity of earth to be somewhere between 4 to 16 billion people so depending on which estimates are used human overpopulation may already have occurred. Somewhere between the years 2040 and 2050 the population is expected to be around 8-10 billion people.

How does a cell know its size?
In many of the plots of our favorite SF films animals are seemingly shrunk (shrinkology) or increased in size. One interpretation of this is that our body's cells themselves are either individually shrunk or increased in size to make the animal smaller or larger. This is physically impossible. By and large all cell types more or less stick to a fairly narrow range of sizes irrespective of being either animal, plant, or other. A sperm cell is dwarfed by egg cells and both are tiny compared to some nerve cells that can be up to a meter in length but even so the range of these divergent cell types among themselves are fairly uniform and consistent. So, if we wanted to either make larger or smaller versions of the same cell type the difficulty could be quite challenging. However, if you simply wanted to make either more (to make larger animals) or less (to make smaller animals) of the same cell types, or even the entire animal for that matter, then an adjustment of hormone levels and nutrient access is all that is really necessary. Burning more calories than taken in each day will result in a smaller animal (read: weigh less). As such, this is a reduction of overall size, meaning a reduction in the total number of cells, and not a reduction of each cell itself. Cell size is a constant though the numbers of each cell type can vary considerably. Skin cells are essentially the same size though an elephant would certainly have many more than, say, a mouse.

Resources for all
No species (or organism) lives in a vacuum. Each species is dependent upon many other species for survival. With humans at the top of the food chain means all those species below us are important for our survival. Each species contributes to the bigger picture. With so many humans, especially during the last century or two, concerns have been raised that the planet may not be able to sustain this many people in a meaningful way. As a result of so many of us this

naturally puts an increased demand on resources such as fresh water and food. Also as a result, many environmental problems such as global warming and pollution are increasing. This also places a strain on the environment that makes everyone suffer. There is starvation and malnutrition in some areas and the consumption of fossil fuels is increasing faster than the rate of regenerating them. What this all suggests is ultimately a decrease in living conditions and the United Nations blames much of this on the waste and over-consumption by wealthier nations.

To limit overpopulation some legal measures have been taken (such as China's one child per family policy) as well as increasing social awareness in educating people about family planning, access to birth control, and settlement in less populated areas. With overpopulation and the resulting physical effects of this then, perhaps unfortunately, governments will step in as in China's case and attempt to apply limits.

Some of our favorite SF films have addressed the need for more efficient food production and population control, though not all of them best suited for the future of mankind. Some of these film plots to increase food stuffs and deal with overpopulation are just downright scary. So, in the world of SF we know there are options above and beyond those found in boring reality. In some of our favorite SF films we have choices. We can make animals smaller so they eat less and therefore have more to go around. We can make food larger so there is more to feed normal sized people. We can make food more plentiful, though the same size (more efficient farming). And, according to some SF films, we can also miniaturize humans and/or increase size of foods (do both?). The best of all worlds would be perhaps to have Lilliput-sized people with Brobdinagian-sized food.

To achieve all this a number of interesting plots have populated our favorite fims. There is radiation induced gigantism, hormonal induced gigantism, and genetic engineering for gigantism. Yes, quality and quantity. Increase the quality by engineering in more nutrients (such as vitamins) and increase the quantity by either making them bigger or more plentiful (or both).

Making smaller: the science of Shrinkology

The Devil Doll (1936)

Synopsis. Lavond (Lionel Barrymore), an escaped convict who was unjustly accused, seeks revenge on the three partners who swindled him and set him up. Lavond happens upon a scientist, Marcel, who has developed a method for making miniature animals and people in an attempt to solve an overpopulation problem. Lavond and the scientist's wife, Malita, enact a revenge plot involving miniature humans and end up poisoning two of the partners. The third partner confesses thereby clearing Lavond's name.

The motivation of Marcel the scientist is honorable with humanitarian concerns. However, as with many SF films, out of high aspirations and lofty goals are sown the seeds of mayhem. As Marcel explains to Lavond, “Millions of years ago the creatures that roamed this world were gigantic. As they multiplied, the earth could no longer produce enough food [note: not true]. Think of it, Lavond, every living creature reduced to 1/6th its size, 1/6th its physical need. Food for six times all of us. Lavond, you know that all matter is composed of atoms and all atoms are made of electrons. Well, I’ve found a way to reduce all atoms in a body simultaneously to any desired degree and still maintain life…” All in all, quite a remarkable achievement that can only happen in an SF film.

Marcel wants to shrink everything to 1/6th its natural size so therefore a six foot tall man would be shrunk down to one foot high. Well, if he can go “to any desired degree”, then why not 1/12th or 1/24th? This would just make even more food available for earth’s population. But what about machinery? Will that also have to be reduced? Even at 1/6th scale then how would a foot tall man operate a car or for that matter work (gigantic) farm machinery necessary to till the soil, harvest full sized corn or make canned fruit to feed all those small people? How about a 1/6th scale man handling the recoil of a full sized rifle? Also, tools will have to be reduced to 1/6th size to be useful for miniaturized people. If Marcel’s invention can not do this then how will such miniature modifications to machinery and tools be done? Also, what would happen if a normal sized raindrop (or golf ball-sized hail) hit a 1/6th scale person? Tornados?...forget about it!

To feed all these 1/6th scale people with normal sized food would require some people to stay normal sized to deal with all the logistics of growing and distributing food to everyone. And who gets to be Brobdinagian to all those Lilliputs? The realities of dealing with all this are scary indeed.

To prove that his invention works Marcel reduced some animals to a smaller scale. First was an ‘inactive’ dog that was reanimated followed by several more different dog species. To demonstrate the reduced need for food Marcel gave just a few crumbs of bread to feed this group of miniaturized dogs. Marcel also reanimated a horse with his device showing its all around utility for any animal.

Marcel and his wife, Malita, have a servant girl who is somewhat dimwitted. Marcel theorized that by miniaturizing the dimwitted girl her thoughts would also be compacted and therefore more like a normal person. (Using this same logic then an intelligent person, reduced to 1/6th size, would therefore become a super genius!) After miniaturizing her the girl did display normal mental responses that seemed to support Marcel’s theories. In SF films one can easily prove one’s theories. With all these miniature people then everyone can live in dollhouses.

Making larger animals
Tarantula (1955)

Synopsis. Chief scientist, Professor Gerald Deemer (Leo G. Carroll), is working on a synthetic growth hormone serum and uses it on several species, including a tarantula, to make them gigantic. An assistant purposely injects the serum into the good professor who, as a result, gets accelerated acromegaly and eventually dies of the disease. Through a lab accident the tarantula escapes and roams the Arizona desert causing the usual mayhem. The tarantula, now up to 100 feet high is finally destroyed by Air Force napalm in a fiery finale.

In his lab out in the Arizona desert, Prof. Deemer is researching a nutrient that can help the food demands of overpopulation. The synthetic nutrient, "3Y" makes rats, rabbits, guinea pigs, and a tarantula larger, but unfortunately gives humans acromegaly. As an example of how well 3Y works, after a single injection a baby rat doubled in size in a few hours. A white rat was seen that had three injections of 3Y and at 12 days old was around 2.5 feet long. A guinea pig, also given three injections of 3Y, though at different intervals than the rat, was around 3-3.5 feet long at 13 days old. A rabbit reached full-grown maturity after 6 days (two injections?). The tarantula was given 6 injections (where do you give an injection in a tarantula?) and on the 20^{th} day was around 4 feet long. After the tarantula escaped he did not receive any more injections of 3Y yet he continued to grow suggesting the synthetic nutrient induced permanent growth changes. It should be noted that the same synthetic nutrient, 3Y, worked across various phylum, animals and insects, so there must be a common growth mechanism involved.

Stephanie "Steve" Clayton (Mara Corday), was doing graduate work in biology and wrote a paper titled, "Nutritional aspects of expanding populations" that eventually brought her to Deemer's lab to spend the summer as she says, "a lab technician, cook, student, the works". The title of her paper is intriguing and very forward thinking for 1955. Expanding populations, irrespective of the species, would have different nutritional demands as the numbers increased. However, it is the (keystone?) species that would be key to such a discussion. Stating the obvious, expanding populations of tarantulas would have entirely different "nutritional aspects" than expanding populations of people.

In describing his work and the nutrient, Deemer says, it's a "completely non-organic food concentrate [note: perhaps the first "energy drink"?]. Medicine has lengthened the life span of people. We live longer, but the food supply remains very static. The world population is increasing at the rate of 25 million per year [actually, much more than that]. An overcrowded world. That means not enough to eat. The disease of hunger, like most diseases, well, it spreads. There are 2 billion people in the world today. In 1975 there'll be 3 billion. In the year 2000 there will be 3 billion, 625 million. The world may not be able to produce enough food to feed all these people. Now perhaps you understand what an inexpensive nutrient would mean." Dr. Hastings (John Agar) then says, "How many of us look that far into the future?" Deemer responds with, "Our business is the future. No man can do it on his own, of course. You don't pull it out of your hat like a magician's rabbit. Well, you build on what hundreds of others have done before you." Needless to say, Deemer's population predictions were quite wrong.

In further describing the nutrient, Deemer says, "It is one thing to develop a formula on paper and another to make it work. So far we've found an almost consistent instability in the material. One batch of nutrient varies sharply from the next." The FDA would find such comments very discouraging and request many more studies to remove "instability in the material". One possible clue to this instability is the use of fictitious "ammoniac" which Deemer says is a radioactive isotope that "binds and triggers" the nutrient. Not sure what this means so it could mean anything. Just so you know "binding and triggering" are common biological responses. For example, the hormone insulin binds to its receptor that subsequently triggers the use of glucose so, according to Deemer, some sort of radioactive isotope binds to a component in 3Y that triggers a biological response that causes extreme growth in the species tested.

Two people were injected with 3Y, Deemer's assistant and Deemer himself. As a result they each got the disease, acromegaly, which is a completely different response from that seen in the other species, though all are growth hormone related. It appears that 3Y enhances growth on many species, such as rodents, rabbits, and tarantulas in a uniform way but does not work in a uniform way with humans since acromegaly results. Acromegaly is a rare disease that happens when the anterior pituitary gland produces excess growth hormone. For most people growth hormone production stops when adulthood is reached but in those with acromegaly growth hormone production continues. As a result of excessive growth hormone production severe disfigurement, often with complicating conditions, results. This disease most commonly affects adults in middle age when growth hormone production has mostly stopped. Acromegaly is a slow progression disease, often years in the making, and difficult to diagnose in the early stages since changes in external features, especially the face are slow to be noticeable. (In this respect Dr. Hastings was correct in challenging Prof. Deemer's claim that his assistant died of acromegaly in just a few days. Acromegaly takes years to develop and not a few days.) Acromegaly only affects some bones and not all so some bones grow out of proportion than others. Typically, the cheekbones expand, the forehead bulges and overlying skin is thickened (sometimes a heavy brow ridge is prominent, called frontal bossing), and the jaw is enlarged. [A good example of this in the world of scary cinema is actor Rondo "the Creeper" Hatton, who was afflicted with acromegaly in real life. The bones of his hands, jaw, brow, and hip continued to grow out of proportion to his other bones. The Rondo Awards are named after Mr. Hatton.]

For Deemer to make edible animals larger to feed more people these animals would need copious amounts of the 3Y nutrient. All of the animal treatments would involve injecting 3Y with a syringe needle so those costs and logistics must be added. As Steve says, "it's (3Y) kept animals alive who have been fed nothing else." Though Deemer called 3Y an "inexpensive nutrient" its global costs could be significant. Since it appears to give humans acromegaly then its use and distribution would be carefully controlled. Since it is unstable then its shelf life is unknown and samples may be active for only a short period of time limiting its usefulness and therefore increasing the costs.

Making larger food

The Beginning of the End (1957).

Synopsis. When locusts injest radiation contaminated food these insects mutate and grow to 8 feet tall and larger. The locusts devour everything available and invade Chicago looking for more food. Through the use of sound a scientist was able to drive the locusts into Lake Michigan thereby drowning them.

This film is another good example of the mantra in SF cinema, ‘the path to hell is paved with good intentions’. At the US Department of Agriculture, Illinois Experimental Station, entomologist Ed Wainright (Peter Graves) is growing large tomatos (about 2’ radius) and strawberries (about 10” in radius). At the core of this is the use of radiation-induced mutations to cause gigantism. Wainright is using radioactivity as a way to mutate certain plants to make them grow larger with the goal of more food to feed the ever growing population. In following a lead a reporter, Audrey Aims (Peggy Castle), askes the editor-in-chief of the National Wire Service if anyone in the area is using radioactivity and he said, “The only people who have been playing around with radioactivity in your vacinity is the US Dept of Agriculture.” Reporter Aims says, “Radiation of some sort might have caused the destruction out there” (referring to the town, Ludlow, IL; population 150, all completely missing, not even bones are left. The implication is some sort of radiation explosion.). Wainright, when showing two large lead pigs containing radioactive samples (probably low level ^{14}C or ^{3}H) to Aims, says, “isotopes aren’t explosive” (correct). As shown, the radioactive material, properly stored in lead pigs in a lead lined container, appears to be of small quantity and not particularly dangerous.

In referring to the large tomatos and strawberries Aims says, “Can you eat them?” Wainright responds, “No, not yet, but we hope to develop one day a hybrid that can be eaten.” This suggests some sort of toxin or mutagen was in the plant making it unsafe for consumption. Perhaps the radioactive atoms in the plant food were incorporated into the plant tissues thereby making then unsuitable for eating. Wainright continues with, “To most of the public these giants are freaks of nature with no practical value.” Aims then says, “How do they get so big?” Wainright responds with, “Well, radiation causes photosynthesis (no!), that is the growing process, to continue night and day. The radioactive isotopes act as sort of an artificial sun. A sun that never sets.” The implication is that the action of radioactivity is such that it provides enough useable energy to continue to power plant growth even at night. Receiving sunlight energy 24/7 would not improve the efficiency of photosynthesis nor would it make plants grow larger. Further discussing the large fruit Wainright says, “This we hope is the future of the American farmer and, for that matter, all farmers everywhere.” Pragmatically, what would be the shelf life of such large foods?

When referring to his assistant Wainright says, “He’s a deaf mute. Working with radiation can be dangerous. An accident last year cost him his speech and his hearing.” The unstated implication is radiation was somehow responsible for his loss of senses. It is difficult to imagine what sort of radiation-induced accident would be necessary to cause someone to loose both speech and hearing. If such a dose of radiation was responsible for this then other parts of his body would have been affected too. To actually loose both speech and hearing his head and neck area would have received a significant dose of radiation (as well as his brain, eyes, blood vessels, nerves, bones, and other tissues).

When observing his assistant tilling some soil of a potted plant Wainright says, “That’s a plant food of essential minerals. Keeps the plants from burning themselves up. They have to be fed constantly. Actually, the fruit would grow much larger if we didn’t limit the stimulation.” This is counter to his earlier statement that “radioactive isotopes act as…a sun that never sets.” With a 24/7 sun that never sets then why limit the stimulation with a special plant food?

Aims says to Wainright, “You’re a scientist. You think in terms of cause and effect. You may see something that the sheriff missed” (in reference to the destroyed town of Ludlow). This is an interesting statement and one that is at the core of any real scientist. Cause and effect are based on known biological, chemical, and physical principles and do indeed require different thinking skills. The sheriff would use a different skill set, one seemingly based on life’s experiences and more pragmatic than a scientist. A scientist and a sheriff would see things from different perspectives so both would be important.

When Aims asked Wainright, an entomologist, why he is working with plants, he responds with, “The existence and development of plants and insects are very closely related. They’re highly dependent on one another. As a plain matter of fact one couldn’t live without the other.” All quite true. In a robust ecological environment many divergent species are all interdependent upon one another and, indeed, one couldn’t live without the other. This is the core of biodiversity.

The killer locusts are “8 feet tall, some even bigger”. As Wainright explains, “Some locusts must have gotten into the lab and they ate some of the plants and the radioactive plant food. Their cell division accelerated immediately. That is, they started to grow abnormally fast. They had to have a constant food supply to sustain this growth. So a couple of months ago they wandered into the grain elevator outside of town (Ludlow). When they grew to this giant size they pushed their way out.” Later, Wainright says, “the giant’s wings fail to develop. They can’t fly.” (earlier, Wainright said that snails, beetles, and grasshoppers, were invading them on a constant basis. Did these insects also eat the radioactive plants and plant food? If so, then did they grow to large size?) Also, Wainright stated earlier that the plant food worked by having radiation constantly stimulate photosynthesis, which is OK for plants, but locusts do not have nor use photosynthesis (they are *not* plants!), so how this worked specifically on locusts is a mystery. Even so, this film is great SF fun.

Lower metabolism and increase life span

The Killer Shrews (1959)

Synopsis. This film is another example of how the path to hell is paved with good intentions. On a remote island, the chief scientist, Dr. Craigis, is trying to create a model to investigate and understand overpopulation. A group of people are trapped on the island by a hurricane. For his research, Cragis' goal is to make people twice as small to help prevent overpopulation. His model animal to prove his theories is the shrew (*Sorex soricidie*) and unfortunately as the giant shrews he created run out of smaller animals to eat they attack the trapped humans.

Shrews are small mole-like mammals that have a long sharp snout, spike-like teeth, have voracious appetites, and unusually high metabolic rates. As Captain Thorn Sherman (James Best) says, "looks like a rat, smells like a skunk." Shrews must eat 80-90% of their body weight every day (in the film, Cragis incorrectly says, "they must eat three times their own weight every 24 hours".) It should be noted that shrews have poisonous saliva and their bite can be fatal to humans. Bitten humans can die of hemotoxic syndrome from shrew saliva.

As Craigis explains, "Think what would happen if you could isolate and identify the inheritant factor in each gene." (It could mean the eradication of many diseases. Also, for you purists, since each gene is its own inheritant factor that sentence is technically incorrect. The gene is the inheritant factor and the inheritant factor is the gene so you can not isolate one from the other since they are both one and the same…a rose is a rose by any other name…) Craigis then adds, "Generally, among mammals, the smaller the size the higher the metabolism and the shorter the lifespan (true). I'm attempting to decrease the size by maintaining a low metabolism and result in a longer lifespan." By genetically mutating a slower metabolism Cragis reasoned (incorrectly) that the organism would therefore grow slower without being more sluggish. To prove all this Cragis is using the shrew as his model. (We never see the vivarium where all their animals are kept and maintained.) When asked for what reason Craigis responds with, "Overpopulation. Not a problem now but it will be in time. If we were half as big as we are now we could live twice as long on our natural resources." Interesting logic. If true then dwarves and other small people should be able to live twice as long as fully grown adults. There is more to longevity than simply altered or slower metabolism. This is the stuff of science fiction. A common falacy in SF cinema is making an extrapolation in which everything is linear. In the real world this is not the case. (It would be a good idea to have

Cragis compare his notes with scientist Marcel (from THE DEVIL DOLL; see above) since they both have the same goal.)

In the film it was mentioned there are 200-300 giant shrews, each weighing between 50-100 lbs, on the island. Craigis says, “they were the size of buckshot when they were born but their rate of growth was abnormal and they continued to grow…they are mutants that inherited all the negative characteristics of their breed. Somehow they managed to escape…” They were doing selective breeding of the shrews and only in SF films can such good deeds be punished. The reason the shrews got so big is due to mutations. As Craigis says, “Any unusual experiment can produce unusual results.” The unusual experiment was selective mutational breeding and the unusual results were the creation of giant shrews.

Dr. Bradford Blaine, a geneticist, says “Very soon, right here in this island, there’s going to be a miniature reproduction of an over populated world. And you’ll see the importance of what we’re working to avoid.” (what happened is the complete opposite of what they were trying to achieve. The path to hell…)

As the survivors are leaving the island Craigis says, “In 24 hours there’ll be one shrew left on the island and he will die of starvation. An excellent example of overpopulation.” And a good example of survival of the fittest.

Recycling food stuffs

Soylent Green (1973)

Synopsis. This film is based on Harry Harrison’s novel, “Make Room, Make Room”. The tag line of the film is, “Tuesday is Soylent Green Day”. In the year 2022 (just a scant two years away) the Earth is overpopulated, New York City has 40 million people, and its natural resources, such as meats, vegetables and fruits, have been depleted. Water is rationed and fresh food is virtually nonexistent. Strawberries cost $150 a jar. Food for the population is now provided by Soylent Industries. A director of Soylent was murdered and the investigation showed corruption and the disturbing fact that (spoiler alert) “soylent green is people!”

Key elements of this film are overpopulation, the problems that causes, and ways to feed the masses. The stated overpopulation has brought about all sorts of ecological disasters. As mentioned in the film, in New York there is a “heat wave all year long” and that “greenhouse – everything burning up”. Sounds like global warming. With the billions of people in the world of Soylent Green then overpopulation issues would be a day-to-day problem, if not an hour-to-hour problem. The carrying capacity of Earth has been exceeded and competition for resources is an extreme. With all these people then many would be dieing on a daily basis, most likely not from old age but, rather, from some problem associated with the overpopulation issues. In deciding what to do with the bodies

Soylent Industries uses their expertise in food processing. After all, as it was explained in the film, Simonson (Joseph Cotton; the assassinated director at Soylent Industries) started in business in freeze drying for commercial food processing and as such he new the technology to process "food" to make freeze dried soylent wafers. While commenting on the Soylent products, Sol Roth (Edgar G. Robinson, in his last film role), said that, while they may be nutritious, they are, "tasteless, odorless crud". (I wonder how they would taste with ketchup?)

In the film there are versions of Soylent and these can be either Soylent red, yellow, or, the more nutritious, Soylent Green, supposedly made from ocean vegetation (plankton) and is in the form of green wafers. Soylent red and Soylent yellow wafers are "high energy vegetable concentrates". Soylent yellow is made of "genuine soy bean". At an open market Soylent crumbs were also being sold. I always thought of their synthetic food as "CHON" (carbon, hydrogen, oxygen, and nitrogen, the main basic four atoms that make up the bulk of earth's life forms). Without giving too much away Soylent Green is nothing more than recycled human parts. According to the film's plot, the plankton in the oceans has been depleted (collapsing an ecosystem, probably through accumulated small perturbations) so Soylent Industries decided to recycle dead humans and use this processed food to feed the overpopulation. When there wasn't enough food to feed the masses the people rioted and the "people scoopers" were called in to dispose of the people.

To process their "food" Soylent Industries took the deceased human bodies to a waste disposal unit outside the city, away from the prying eyes of the masses. When Roth asked, "Why make Soylent green?" The Exchange Leader (Celia Lovsky; she also played T'Pau from the original Star Trek TV series episode, 'Amok Time') responds, "Its easier. I think 'expedient' is the word." Apparently, it is easier to process human bodies than it is to repair ecosystems, not to mention the profit margins in human recycling compared to the lower profits of overhauling complicated ecosystems.

To help explain all of this, Thorn (Charleton Heston) says, "The ocean's dieing, plankton's dieing. Soylent green is made out of people. They're making food out of people. The next thing you know they'll be breeding us like cattle…for food…soylent green is people!" That more or less sums it all up.

Making everything big

Food of the Gods (1976).

Synopsis. This film is based on the H.G. Wells story of the same name. A farmer and his wife discover a natural creamy material oozing out of a rock formation on their property located on a remote island in British Columbia and feed it to their chickens who grow to gigantic proportions. Soon rats, worms, and wasps eat the food and also grow to gigantic sizes. A nearby dam was blown up flooding the area and drowning the rats who could not swim because of their size and weight. The food was seen going downstream, consumed by cows, and ended up in school children's milk drinks.

This ooze, when mixed with some grain, and eaten by newborn animals causes them to grow to fantastic sizes. In the film four diverse species grew to a large size: two foot long wasps (insects), 18 inch long grub worms (classified as an annelid, which are organisms with a segmented body; however, though Mrs. Skinner (Ida Lupino) called them "worms" they looked more like caterpillars because of their two sets of legs, those on the front section and those at the rear section (worms do not have legs like that). Also, worms do not have frontal eyes.), 6 foot tall chickens (birds; both roosters and hens), and sheep-sized rats (mammals). So the FOTG ingredient(s) was common enough to affect insects, annelids, birds, and mammals. Quite a potent concoction by Mother Nature to affect quite a divergent group of animals.

The FOTG itself looked like an off-white creamy substance seen oozing from a rock cropping. It should be noted that nearby plants (and probably some other insects and animals) did not grow when exposed to FOTG. This suggests that FOTG needs some sort of catalyst to activate the main ingredient(s) to make it work in creating larger organisms. Mrs. Skinner noted this and said FOTG only worked when it was mixed with chicken feed. She says, "the chickens won't touch none of it unless we mix it with a meal and the bran." According to Mrs Skinner the chicken feed-FOTG mix affected "only the baby chicks. Nothing seemed to affect the grown ones." Morgan (Marjoe Gortner) then asks, "Nothing happened to the full grown chickens?" Mrs Skinner replies, "They didn't grow none." Morgan asks, "How large do you think those rats will grow if they've gotten into that food of yours?" The answer to that question came quickly.

As noted, in addition to the chickens, worms also ate the FOTG and feed mix as well as rats and wasps. Since only young chicks who ate FOTG grew to giant size and not adult chickens this theory must also apply to the rats, worms, and wasps in which the food only affects the young and not the adult forms. This would not be a particular issue since the gestation and breeding times of these species is relatively short so there would be plenty of young ones around to eat the food.

In another example of the linear extrapolation of life seen in many SF films the giant wasps made an equally giant nest (we only saw one but there could have been more). Its weight must have put a strain on the small tether holding it to a small branch. Also, there were so many giant rats everywhere that this begs the question of what did they eat to achieve such sizes? Their voracious appetites must have been like the Killer Shrews and there must have been significant competition for food. With so many rats they probably eliminated all edible life forms on that remote island and would have destroyed the island's ecology and population dynamics.

Unscrupulous Bensington (Ralph Meeker) says to his wife, Lorna (a "lady bacteriologist"), that FOTG will be his "contribution to the world…starving people? Going to feed them all with big chickens, and giant cows and sheep and ducks and fish and you name it." Lorna then pragmatically asks, "Sounds good but wouldn't bigger creatures have larger appetites?" Bensington replies with, "Convert it (FOTG) to plant food to feed all the big animals with big plants…to feed all the hungry people in the world." In other words, make everything big. Well, why not?

At the end of the film we see a couple of jars of FOTG get washed down a small creek and into a stream where cows are drinking the water. We then see the cows being milked and this milk ends up in small containers that makes their way into a school lunchroom where the children are seen drinking it. The implication is that the kids will drink the stuff and perhaps grow into Glenn Manning-sized Amazing Colossal Children. The problem with this scenario is that the active ingredients of FOTG will first be diluted in water (perhaps significantly so), then the diluted FOTG will be consumed by cows that passes completely through their digestive systems, unchanged (!), and is subsequently excreted in their milk. This milk is then pasteurized (read "sterilized") and bottled. The assumption is during this entire process the active ingredients in FOTG remain unchanged. A mighty tall order. Maybe this process could have created a super-activated form of FOTG that could have withstood all the processing involved (like mad cow disease in which the virus makes it intact through all the meat processing steps and is subsequently consumed by man).

It is tempting to wonder what would happen if someone reduced by Marcel's invention in THE DEVIL DOLL ate some of Mrs. Skinner's FOTG food? Would that person then grow back to normal size? One can easily forsee a situation where people live a 1/6th scale existence to save on all aspects of life but then eat some FOTG, grow to normal size, and then go on vacations, operate machinery (conscriptions like being drafted?), etc. and when done revert back to 1/6th scale. An amusing scenario.

Summary

The films discussed here cover a span of 40 years, almost two generations of time. Even so, the essential elements of dealing with the human population and natural resources are common themes irrespective of when they were filmed. Our Foods of the Gods are really nothing more than a cocktail of hormones that influence growth genes; some make foods bigger, some make humans smaller, and some make humans bigger. Some of these changes are transient and some are permanent. How the hormones were overproduced, either by rays, radioactivity, or recycled nutrients just shows that in some of our favorite SF films many processes can 'trigger' our body's ability to produce and secrete many hormones that affect our physiology and overall growth. And some may even make species grow to fantastic proportions. Also, don't forget, if we were twice as small then maybe we could live twice as long. Or, according to Marcel, using this logic, if we were 1/6th our size then we could live 6 times as long! And, if our food was gigantic, as made by Dr. Wainright, then our supplies would be plentiful for everyone and starvation would be history. Ah, yes, the wonderful world of SF cinema where any and every thing can happen.

Thank you for reading. It's back to the lab for me. Stay healthy and eat right.