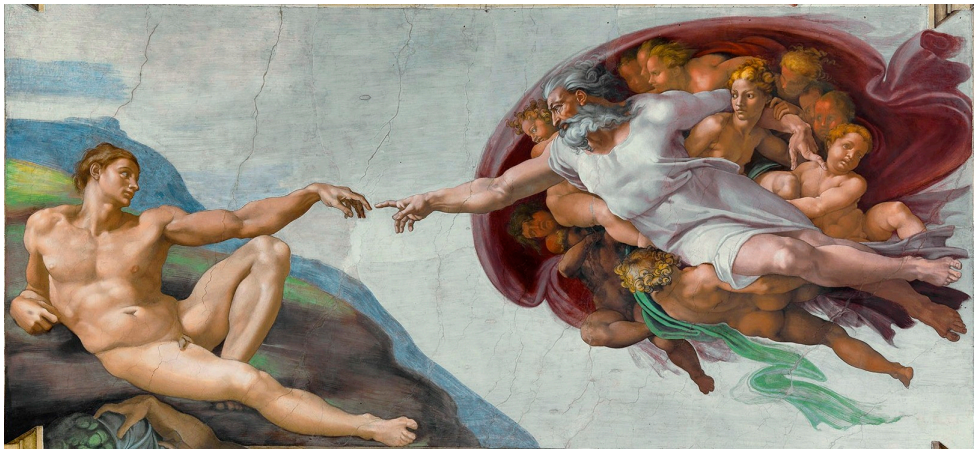
Made, Not Born

By Mark C Glassy, Ph.D.

The Beginning

'Made, not born' is a concept that Man has understood from the very beginning. In the Second Book of Genesis, God 'made' Adam from "dust of the ground" so he was not born (Genesis II, 7). After Eve appeared then all future mankind has been "born of woman". Without trying to put too fine a point on this distinction this even extends to Jesus, who was "begotten, not made", so Man has gone out of his way to clarify this division. However, once Man developed an imagination and began to look beyond then he created ways to better understand the world around him. At this time other images were "made" without being born and the first people to fully grasp not born scenarios were the ancient Greeks and they were the first ones who incorporated made, not born concepts into their everyday lives.



God 'made' Adam by Michelangelo; detail of Sistine Chapel ceiling

Greek Mythology

For much of what we consider scary we can blame these ancient Greeks since their mythology is at the core of what is considered unknown and mysterious. According to Greek mythology their gods are responsible for all that man has done and will do. These gods control man's destiny and they do their best to keep us pesky humans under their thumb.

Talos, the first robot

Those who first thought of various mechanical men or automatons were these ancient Greeks. The first such character was Talos, essentially a bronze robot

powered by ichor, the “blood” of the gods. According to the myth, Talos was created by Hephaestus, the god of invention, to guard the island of Crete. Talos was envisioned to be a man-like metal machine that behaves and acts like an ordinary human and able to move on his own. Many Talos images survive on painted vases and coins. Talos first appears in art during the early 5th Century B.C. so he has been around for some time.

Model of Talos built and painted by author. This version of Talos is from the Ray Harryhausen film, *Jason and the Argonauts*.

Hephaestus is also credited with making metal armor as an early example of artificial human enhancements. These contributed to the concept of making some sort of artificial man.

Galatea

In Greek mythology Galatea is known as "she who is milk-white", the name of the statue carved of ivory by Pygmalion which subsequently comes to life. This is an example of made, not born where an inert object, ivory, was brought to life and this is dramatically shown in the famous painting by Jean-Leon Gerome (1824-1904).


Pygmalion and Galatea by Jean-Leon Gerome

To quote ancient Greek, Pindar's, seventh Olympic Ode, 50-54:

> The animated figures stand
> Adorning every public street
> And seem to breathe in stone
> Or move their marble feet

This Ode suggests the ancient Greeks imagined all their statues can come to life so the concept of made, not born was well integrated into their lives.

Made, not born consists of two major forms, mechanical and biological.

Mechanical

Automatons

Automatons and mechanical devices were first imagined by, once again, the ancient Greeks. The word, "automaton" comes from the Greek, αὐτόματον, *automaton*, "acting of one's own will". An automaton is a self-operating machine. Though automatons were first used to describe myths, gods, and heroes, this word was first used by the Greek, Homer, to describe an automatic door opening. These early automatons had mysterious, ill-defined "working" mechanisms such as ichor. It wasn't until much later when inner working mechanisms were devised that real examples were made. A type of an early automaton is a bellstriker for mechanical clocks that appears to act on his own power.

Automatons – the original robots ("acting of one's own will") - are self-moving mechanical devices powered by gears and springs (first steampunk?). The first

automata were clocks, first powered by water then later by mechanics. At the time, for the most part, automatons were used to demonstrate the glory of divine creation. These automatons were made of the same stuff and tools that man uses to make other ordinary items which was much debated by philosophers at the time. If automata are made of ordinary materials and tools then they too must be ordinary and possibly not of divine creation.

Other examples of automata in Greek mythology include Daedalus who used quicksilver (liquid mercury) to install voice in his moving statues and King Alkinous who used gold and silver watchdogs. Water was used to power some automata such as to sound a whistle or make an owl move (like Bubo in the film, *Clash of the Titans*). The famous Trojan horse is another example of man's ingenuity of made, not born. It did not take long but automata were eventually used as tools, toys, religious idols, or prototypes for showing certain basic scientific principles. To use a familiar term these animated statues were thought to have "black box technology", meaning it did not matter what powered the statue as long as it moved human-like.

For automata mechanical engineering principles were established that truly mimicked the living statues that breathe and move as envisioned by the ancient Greeks. Automata essentially made myth a machine reality. Maybe not art imitating life but certainly machine imitating life. Though this only went so far. Philosophers of the time had endless discussions of automatons and whether they had intelligence (thinking and pondering) or instincts (natural, non-thinking). The famous philosopher, Rene Descartes (1596-1650) distinguished automatons from real humans with his celebrated comment, "I think, therefore I am". Automatons cannot think and therefore are not human. And as the thinking went if they are not human then they have no soul.

In the film, *Jason and the Argonauts*, the 'children of the dragon's teeth' are animated skeletons, in theory, unstoppable automaton warriors, that are also made, not born. These skeletons are seemingly made from the dirt from which they sprang catalyzed by the slain Hydra's teeth.

One of the earliest known mechanical devices of the 'made, not born' variety is the Antikythera mechanism, from 150–100 BC, which was designed to calculate the positions of astronomical objects and eclipses. This is the earliest known analog computer, has 30 gears, and is about the size of a briefcase.

Fragments of the Antikythera mechanism are kept at the National Archaeological Museum in Athens

Medieval automata

Medieval automata took many forms and combined natural knowledge with the mechanical essentially combining art and nature. The concepts and prototypes of real working automata originated in the Islamic world, before the 9th Century. The myths of the ancient Greeks in automata came to life and were made real by the Islam engineers. Many sumptuous palaces had mechanical devices like water clocks, rotating figures, and self-playing musical systems as well as toys. One particular example of life-sized musical 'automaton' figures seemingly going about playing their instruments is from the film, *The Abominable Dr. Phibes*. Such things existed in the palaces of Sultans.

Mechanical automata use many processes and materials and were meant to be seen, wondered at, and experienced. In addition to gears and springs physical processes like hydraulics (pumps, siphons) and pneumatics (compressed air; pressure) were used in the making of automatons so it was, once again, the ancient Greeks who introduced these mechanical principles into automatons and it was the Islamic world who made these functional and practical.


Al-Jazari – An Islamic Automaton Musical Toy

In mid-12th Century, Charlemagne visited Constantinople and marveled at the automata he saw there and commented, “that you would have believed they were actually alive.” Soon these made, not born automatons were introduced into Europe and developed even further.

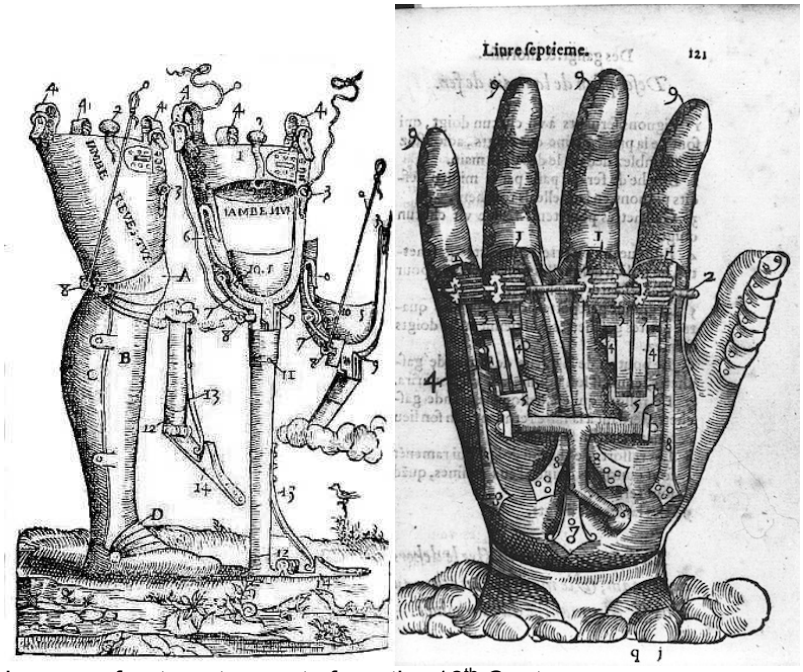
DaVinci’s robot
Leonardo DaVinci (1452-1519) designed and constructed an “automaton knight” in 1495. This robot knight was a medieval armor figure that could stand, sit, raise its visor, had an anatomically correct jaw, and could independently move its arms. All of this was operated by a system of pulleys and cables.


Model of Leonardo's robot with inner workings, on display in Berlin

Once automata began to become prevalent in Europe many forms were devised and created in an attempt to emulate and perhaps improve on what man can do.

At this time puppetry was developed and these puppets, all made, not born were created to also emulate and mimic human life. (As a child in the 1950s I once thought Howdy Doody was alive so the power of puppets imitating life should not be underestimated.)

Here are two images from the 1500s showing, almost Rube Goldberg-like, ways in which an automaton leg and hand can be fabricated and move. These are essentially anthropomorphized automatons to resemble humans and made to imitate human life.



Images of automaton parts from the 16th Century

Victorian era automaton that can sign his own name. The open back shows the complex gear mechanisms.

The Steam Man of the Prairies

Author Edward S. Ellis (1840-1916) wrote, *The Steam Man of the Prairies*, in 1868, which was the first US science fiction dime novel. In this dime novel, Ethan Hopkins and Mickey McSquizzle meet a colossal, steam-powered man in the prairies. This made, not born steam man, was, according to the story, created by Johnny Brainerd, a teenage boy, who used this robot to accompany him on many adventures.

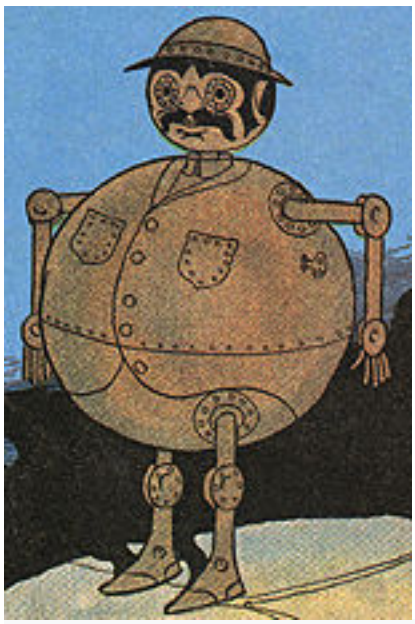
Cover of *The Steam Man of the Prairies* by Edward S. Ellis (1868)

Tik-Tok

Tik-Tok is a mechanical man from L. Frank Baum's Wizard of Oz franchise. Tik-Tok first appears in Baum's book, *Ozma of Oz* (1907), where Dorothy Gale discovers him locked up in a cave, immobilized. He eventually becomes Dorothy's servant and protector. Tik-Tok has been termed "the prototype robot," and along with the steam man of the prairies are widely considered to be one of the first robots to appear in modern literature, though the term "robot" was not used until the 1920s when the word was coined (see below).

Tik-Tok (sometimes spelled Tiktok) is a round-bodied mechanical man made of copper, that runs on clockwork springs which periodically need to be wound like a wind-up toy or mechanical clock. He has separate windings for thought, action, and speech. Perhaps Tik-Tok was modeled after the steam man of the prairies

(who came first) since both have their round torsos. Tik-Tok and the Steam Man are possibly early examples of what is now referred to as Steampunk.



Tik-Tok as he appears in *Ozma of Oz* (1907)
illustrated by John R. Neill

Robots

Though we all know historically what robots are and what they can do, especially all those in SF cinema, the actual word, “robot”, is a fairly modern invention. The word, robot, came from Karel Capek (1890-1938) who wrote the play, R.U.R. (*Rossumovi Univerzální Roboti - Rossum's Universal Robots*) in 1920. Robot comes from the Czech word, *robota*, which means “slave” or “forced labor”, indicating a strong link between robot and slave or servile class.

In the broadest sense a robot is a programmable self-moving automaton machine that automatically carries out a series of actions guided either externally or internally with the ability to collect, interpret, and respond to data. Physically, robots have many configurations from the clearly humanoid to industrial and from nano-size to macro-size.

As mentioned above, the first robot (using the now modern term) was Talos, a self-moving device, who was made of bronze. Such a concept was not possible until the Bronze Age (bronze is an alloy of copper and tin). Further robot automaton development was not possible until underlying technology was established. As horological innovations in clock mechanisms began to be developed, such as bell strikers for large clocks, these gears, springs, and wheels were dual used as the core parts of automatons so real working automatons could not be developed until the mechanics were available. And so

goes it with all future automaton/robot development in that when new technology is available it is quickly used in other applications. Realistically, there is nothing special in making automata since they are made of the same stuff and tools that man uses to make other items.

As automatons, robots are unaware of their origins and are not self-aware. Perhaps there will come a time in the not too distant future where robots will become self-aware (so say those of SkyNet and *Terminator* ilk). Another feature of robots is that their parts can be easily replaced. Think of C3-PO with his different lower leg or perhaps replacing a *Westworld* robot arm with another. Once a robot part fails then a replacement is used so the robot's actions can continue. This is naturally difficult to do with humans.

In modern times, robots have been anthropomorphized to mimic human actions and/or form and have taken on an almost human like quality. Many of these robots have a lifelike appearance and seemingly real movements that may convey a sense of intelligence. So much so that 'laws' have been fabricated to deal with this.

Asimov's Laws of Robotics
These laws were introduced in author Isaac Asimov's short story, "Runaround", from the March 1942 issue of, *Astounding Science Fiction*.

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Asimov later added his "Zeroth Law" or fourth law: a robot shall not harm humanity. (Note: many of the ancient Greek robots clearly violated the first law)

What is frightening and scary to many is though automatons and robots are logical often this logic is devoid of moral values and emotions. Like the Terminator robot where there is no evasion; he "will not stop, will not quit, will not be bargained with" in his quest to fulfill his programs. Robots do what they are programmed to do. They are mindless emotion-less machines with no subjective feelings. These robots feel no pain and need no sleep. This is an anthropomorphized concept in many SF film plots. Like Gort in the film, *The Day the Earth Stood Still*, who certainly would not stop or be bargained with.

Pinocchio's problem
In the story of Pinocchio his maker, Geppetto, wants to transform his wood puppet into a "little boy". So goes the world of robots in which their makers, Geppetto-like or like Galatea/Pygmalion, are trying to transform them into

humans. To build robots that more and more appear to be human-like with human mannerisms and speech. All this started with Hephaestus who tried to use man-made technology to enhance artificial beings. Geppetto and all those after him use man-made technology to enhance human capabilities and to make their “little boy”.

Biomechanical

In addition to the mechanical and biological made, not born forms there may be a third form, a blending of the two, to make biomechanical forms. In the world of biomechanical prosthetics, including but not limited to implants, organ transplants, and replacement limbs, there is a melding of human and machine. For example, in the world of SF cinema, Luke Skywalker has a prosthetic hand. And the Terminator robot has a metal skeleton but flesh and blood to cover it. All biomechanical.

Non-human robots

When most people think of robots a human like form usually comes to mind, such as C3-PO. Most robots are certainly not human and a few examples of some that are not include fake animals such as therapy animal robots, drones, medical and surgical robotics, even something as mundane as a Roomba, a robot that cleans house. In the broadest sense home detection devices, even baby monitors, among a myriad of other devices, such as an “Alexa”, can be considered robots. All these devices are programmed to perform certain tasks, repetitively.

Hallmarks of humans

Consciousness, intelligence, learning, reason, and speech are hallmarks of humans. Robots can be programmed for each one of these but to be truly human requires independent thought. Artificial intelligence (AI) is getting close. Afterall, there are now computer programs that can beat humans not only at chess but also at go. Soon, AI will resemble positronic brains that mimic human hallmarks.

Robots of Fame

There are too many robots in SF cinema to list them all in one article (that would require a large book or two) so for our purposes just a few will be mentioned. Afterall, most of them have more in common than not so while trying not to be redundant here are a few of some famous made, not born robots yours truly especially likes.

Maria, from the 1926 film, *Metropolis*. Maria was created to wreak havoc and is patterned after the ancient Greek, Pandora. Maria, cinema’s first robot, is the mother of all to follow.

Gort, a member of an intergalactic police force, who made ‘the day the earth stood still’.

Robby, fabricated using ‘Forbidden Planet’s’ Krell technology and instructions.

B-9, a companion for the Robinsons who were ‘Lost in Space’.

Westworld, everyone is a robot including the Gunslinger.
C3-PO and R2-D2. We all know “these are not the droids you’re looking for”.
Terminator, an unsympathetic biomechanical cyborg killing machine.
There are many other examples, too numerous to list, but one standout favorite, though not humanoid, is the KITT (Knight Industries Two Thousand) car from the TV series, *Knight Rider*. Essentially a made, not born robot car that thinks.

Biological

The Prometheus Spark of Life

According to (again) Greek Mythology, Prometheus is the one who made mankind. According to the creation myth he made humans by mixing earth and water and shapes the mud/clay into the first man and woman. Essentially inert matter brought to life. This is called ‘biotechne’ – life by craft. Prometheus also gave humans the gift of fire and other tools. This is one of the reasons why Mary Shelley subtitled her 1818 Frankenstein book as, *The Modern Prometheus*, meaning Frankenstein is a modern (for early 19th Century) Prometheus as one who makes a new mankind, essentially a modern maker of men.

Art of craft

It is a fine line that separates biological from biomechanical. The technology for TV’s Bionic Man (Steve Austin played by Lee Majors), someone who’s body parts have been replaced with more enhanced versions that are better than the original part, is essentially here now. This is considered artificial human enhancement. Just about all body parts, except the brain, can be replaced. In some instances a transplant of an organ or any other body part could be considered made, not born and real or artificial, is essentially a biological enhancement.

We can now ask questions like when does mechanical cross the line and become human and when does human cross the line and become mechanical? Another way of looking at this is how many non-human parts does it take to make an android? The *Terminator* robot from the eponymous 1984 film is in the middle of this mix and difficult to tell if he is more human than robot or more robot than human. Is he an android, a cyborg (a *cyb*ernetic *org*anism), robot, bionic man, or a biomechanical? It is a long made, not born list. Perhaps the Terminator is a combination of all of these.

Also, even something like *Donovan’s Brain* could be considered a biomechanical robot. Yes, there is the functioning human brain, but there are also a myriad of support items that help to keep the brain alive. These support items are all mechanical so combined with a brain in a tank would make all of this biomechanical.

Biological life forms that are made, not born have life’s fluids coursing through their bodies and not gears, hydraulics, and pulleys. When biological fluids are

depleted from biomechanical forms then this could be life-threatening whereas in mechanical forms perhaps replacing the faulty part is enough to keep it moving and operating.

There are body parts that look mechanical and those that appear biological. For example a prosthetic leg can look like a leg or can resemble the materials it's made from. A peg-leg can look like a wood stump or it can be covered to make it look like skin.

Replicating Nature

How might a replica of nature be made? Is the intent to mimic what is in Nature or to improve on it? To mimic then the intent is to duplicate or make a facsimile, a copy. To improve implies a broad range of opportunities. Due to unfortunate war casualties the field of prosthetics has developed a large array of body parts that are supposed to mimic as close as possible the original body part. Most of these are limbs, arms and legs, and are meant to duplicate. To improve, ala Six-Million Dollar Man's, Steve Austin, would require a different set of tools and biomechanics. That world is on the horizon.

Natura Artifex

Natura Artifex or Nature the Artisan is a Medieval concept used to convey Nature's role in creation. These creation themes were a three-tiered system combining the works of Nature, Man, and God. In many Medieval images Nature is depicted as a finely dressed woman using the tools of a blacksmith, a hammer, anvil, and forge, to make people. At the time, this was a motif of a new philosophy, suggesting man's ability to improve upon the materials of nature as provided by God.

Natura artifex. Natura using a hammer, anvil, and a forge, makes people out of body parts. *Roman de la Rose*, France, 15th Century.

Golem

In Jewish folklore, a Golem is an animated anthropomorphic being created from clay or mud, essentially 'made, not born' and a religious example of lifeless material brought to life. The word golem occurs once in the Bible (Psalm 139:16) and is used to mean an amorphous, unformed human being. The most famous golem involves the 16th Century rabbi of Prague, Judah Loew ben Bezalel, whom the 1920 silent film is based on. For 'made, not born' scenarios there are many tales differing on how the Golem was brought to life and afterward controlled.

Revive or Create

There is a difference between reviving life and creating life. Reviving life implies prior life so this does not fit well with a made, not born scenario. Also, most of the techniques, procedures, and equipment used to revive life are different from those necessary to create life. To take this a step further creating life could be at the DNA or genetic level or, like Dr. Frankenstein, create a body or a body part like Pretorius did with a brain.

The Monster and his Bride

Both Frankenstein's monster and his bride are made, not born. They are so iconic that when asked about artificially created life in SF cinema many respond with the monster and/or his bride. Both were artificially created so in one sense they can be considered artificial life. Frankenstein essentially stitched together the bodies, grafting stolen body parts, of both his monster and his mate while Pretorius made the bride's brain "from seed". It is interesting in that in Shelley's book, Victor Frankenstein spent two years building and making his monster, part by part.

Biomechanical

Like SF robots there are also many examples of biomechanical made, not born creations that are too numerous to include here and would require a book to do it justice. These examples have biomechanics or biomechanical body parts. Some of my personal favorites include, *Colossus of New York*, *Terminator*, *Star Trek the Next Generation's* Data, *The Time Traveler* (making bionic humans or humanoids. A personal favorite because it features our favorite Ack-editor, Forrest Ackerman, the editor of the magazine *Famous Monsters of Filmland*, who has a cameo role in this film with his line, "getting things squared away", but I digress…), Replicants from *Blade Runner*, Bishop from ALIENS ("I may be synthetic but I'm not stupid", says Bishop), and the Thetan ('Architects of Fear' episode from *The Outer Limits* TV series). No doubt others have their favorites but the point is there are many and whether made in part or in whole they are all made, not born.

Instigators

In SF cinema it is usually the mad or annoyed scientist who creates our made, nor born creatures. Leaders in the made, not born field include Drs. Frankenstein, Moreau, and Herbert West (from the film, *Re-Animator*). Of these it is perhaps Moreau with West a close second for who made the most not born creatures. One man's body could be another man's brain.

Once made then what rights, if any, do such things have? Frankenstein and his bride were made and what rights do they have? Can they vote? Get disability insurance? And then there are Moreau's beasts so what rights do they have? Can the Panther Woman draw social security?

In the story, *Do Androids Dream of Electric Sheep*, by science fiction author, Philip K. Dick, he discussed the many aspects of androids combining the biological with the technological. (The film, *Total Recall*, is based on this story.) An android is essentially a mobile robot in human form. A shortened version of android is now, 'droid', thanks to the Star Wars universe.

Flight

Though aircraft are obviously not born but made there may be an interesting interpretation here. How about a temporary situation where a man flies wearing a 'flight suit' or is hand gliding? A modern day Icarus. Once wearing the 'wings' then a flying man is made, not born. This could also extend to human-powered flight. A man flying wearing a jetpack is another temporary situation so this begs the question of how much technology and mechanics can man 'wear' and still be considered not made? If such things as wings and jetpacks can be put on and removed then are there any biomechanical body parts that can also be put on and removed? Once put on the person is now biomechanical and not so when taken off.

Plantimals

Plants that walk are featured in some of our favorite SF movies. Two of these in particular, the human-like plantimal in the film, *The Revenge of Doctor X*, and the human-plant cross breed seen in *The Freakmaker* (aka, *The Mutations*) are all made, not born creations so this concept also extends into the botanical world.

Mutations

Though biological mutations, changes in DNA or genes, could be considered 'made, not born' they essentially start as some sort of life form before they were "made" or mutated so they do not qualify in a strict interpretation of the concept of made, not born. Mutations are what happens after life has been born (or at least started at the embryonic stage) and are made at the DNA or gene level. By nature, such mutations do not have internal mechanisms or anything manufactured. In addition, mosaic mutations in which many changes have been made, either naturally or by forced mutation, are not part of made, not born. Furthermore, the jury is still out deliberating whether genetic engineering is a

made, not born option (an example here is genetically engineered drought resistance or parasite resistance in crops; both born and made).

Summary

In the made, not born world there are those that are human and those non-human, natural and not natural. In human history much has been made to distinguish that which is made from that which is born. It started at the beginning when Adam and Eve were made out of mud and a rib. Made, not born covers the mechanical (robots), biological (Frankenstein's monster), medical (the Bride's brain), and botanical worlds (plantimals). Man's hubris brought about his attempt to challenge Nature and make things more human than human. Not only to replicate life but to improve it. In replicating nature in our favorite SF films humans were essentially "doing things man was meant to leave alone".

In the beginning made, not born developed from man's quest, essentially started by the ancient Greeks, to understand his relation to himself, Nature, and God. Over the centuries this concept developed into a more intricate and complex version that included physical automatons. Once the film industry got started during the early 20th Century then made, not born typically refers to robots. However, this changed in 1931 when Universal Studios released, *Frankenstein*, and forever after, 'made, not born', now includes the mechanical and the biological.

For us gentle readers, made, not born, has a different meaning which extends to all sorts of filmed creations. The examples discussed here just scratches the surface and these few examples show the depth and breadth of what has been made and not born in SF cinema.

Robots pose an enduring question about the nature of Man and his place in the Universe, his limits of knowledge and his beliefs about creation, his relationship with technology and how life is defined. Much of this is captured in some of our favorite SF films. In these films many of the made, not born characters were seemingly more human than human. The robot Adam Link is such an example who seems more human than robot. A strong lesson learned there.

Machines and robots have freed workers of drudgery and potentially unsafe conditions. One example is a bomb-diffusing robot. Industrial robots now produce many retail products. What was myth is now history and an everyday part of our lives.

Though not a part of this discussion, in the broadest sense, heroes and leaders are made, not born.

We now have 3-D printing machines that can virtually make, not born just about any shape or object so now the world of 'making' has entered our homes. Very convenient and perhaps maybe even a little scary.

Author disclaimer: No matter what you heard yours truly was born, not made.

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