

**MECHA:
EXPRESSIONS OF CULTURAL INFLUENCES AND DIFFERENCES
DEMONSTRATED IN SCIENCE FICTION MECHANICAL DESIGN**

by

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Abstract:

The opening theme to Cartoon Network's animated series *MEGAS XLR* (2004) exclaims:

You dig giant robots!

I dig giant robots!

We dig giant robots!

Chicks dig giant robots!

This is perhaps the essential anthem for our fixation with out of this world technology. Japanese and American audiences in particular are innately passionate about science fiction robots, as ardent consumers and proprietors of contemporary *Mecha* culture. The challenge then for the academically-minded aficionado is to put across just what makes these fantastic machines and their stories so fascinating, so prevalent in entertainment and society, and so tied to our own perceptions of human development.

Science fiction represents what people are thinking about technology. This thesis posits the contemporary science fiction phenomenon *Mecha* as the predominant expression of humankind's age-old fascination with the mechanical arts. The philosophical approaches taken in these forms of escapist entertainment often mirror the attitudes each culture has towards real-life robotic machinery- from replacement prosthetic limbs, to robotic household companions and even weapons of war. In *Mecha* fiction, the sentiments of the artist-citizen towards this notion of

a robotic, hi-tech society are expressed free of the limitations of a practical and commercial reality. Science and engineering have not yet caught up to the culturally-nurtured imaginations and ambitions of the human spirit, and they never will. Instead, the artists and creators of *Mecha* consciously and unconsciously translate and magnify this social consensus into mechanical designs and narratives that enforce a particular paradigm on the overall human-machine relationship.

This study examines through key written and visual texts the function of “low culture” pop-entertainment as an influential and relevant indicator of broader societal values and cultural traditions. By reverse-engineering and deconstructing (quite literally) these *Mecha* designs and how they function as a creative work, I believe we can better understand how two cultures have come to express their relationship with technology both conceptually and philosophically.

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PREFACE

The opening theme to the 2004 Cartoon Network produced animated series *MEGAS XLR* exclaims:

You dig giant robots!

I dig giant robots!

We dig giant robots!

Chicks dig giant robots!

This is perhaps the essential anthem for our fixation with out-of-this-world technology: as consumers and proprietors of contemporary *Mecha* (giant robot) culture, Japanese and American audiences in particular are passionate about science fiction robots. The challenge for the academically-minded aficionado is to describe just what makes these fantastic machines and their stories so fascinating, so prevalent in entertainment and society, and so linked to our own perceptions of human development.

Mecha, as an (art) form of mechanics different from the robots of yesteryear, is a subject that receives modest attention outside of small but avid fanbase made up of artists, scholars, and fans from all around the world. However, the themes, stories, and imagery of *Mecha* science fiction appear at an increasing rate in many forms (in many spheres) in popular culture.¹ As a

¹ These spheres usually include but are not limited to: Modern medicine, the military, automobile ads, sporting events and the art/entertainment industry.

movie-shelf genre of sci-fi robot fandom, *Mecha* retains its niche status, but as the practicing form of a larger system of symbols, beliefs, and ambitions, *Mecha* is the universal language of machines and the ideals they represent.

Mainstream media is unprepared to effectively confront and interpret the conceptual implications of *Mecha's* explosion into the public realm. Therefore, in approaching this subject matter, my objective here is to present information and ideas I believe are essential to understanding what *Mecha* is, how it functions in the worlds of science fiction and pop culture, and how it bridges the gap between real and fantasy to connect with its audience. This paper is not a historical chronicle of robotic development. Nor is it a socio-economic analysis of machines and industry. It is neither speculative fiction nor psychological probing into artificial intelligence and its relevant social commentary. This thesis posits the contemporary science fiction phenomenon "*Mecha*" and its related works as the preeminent expression of humankind's age-old fascination with the mechanical arts. The sci-fi sub-genre of *Mecha* will be placed here within a larger historical and social context in order to demonstrate for both the seasoned fan and the uninitiated viewer new ways of looking at and thinking about science and technology.

I begin with an outline of the function of science fiction in modern societies. Then, in chapter one I explore the very essence of mechanical expression and its origin with primitive humankind. In chapters two, three, and four I continue to chronicle the history of the anthropomorphic machine in contemporary culture beginning with the *Automaton*, continuing with the *Robot* and ending with an outline of the four major steps in the transformation of the Japanese *Mecha* into its current form. Chapter 5 attempts to unpack the meaning of the term *Mecha*, while chapter 6 is a case study of the powerful visual and socio-cultural rhetoric demonstrated by two (Japanese and American) science fiction machines.

A note on images:

This thesis makes reference to various images of specific characters and designs. The following is a list (organized by mention) of where images of these creations can be found in the public domain:

Maria, *Metropolis* (1927):

<http://www.robothalloffame.org/06inductees/maria.html>

Gort, *The Day the Earth Stood Still* (1951):

<http://www.robothalloffame.org/06inductees/gort.html>

Atom/Astro Boy:

http://www.robothalloffame.org/04inductees/astro_boy.html

Tetsujin 28/Gigantor:

<http://www.gigantor.org/>

Mazinger Z:

<http://www.toei-anim.co.jp/lineup/tv/mazingerz/> (Japanese)

Gundam RX-78:

<http://www.gundamofficial.com/worlds/uc/msg/index.html>

RX-78-2 Kabuki-mono 2005 Version:

http://www3.ocn.ne.jp/~tenmyoya/art_new/0_tuika/03_RX-78-2.html

Mach V:

<http://www.speedracer.com/viewCharacter.asp?s=mach5>

ED:209:

<http://www.robocoparchive.com/info/making1-ed209.htm>

INTRODUCTION: SCIENCE FICTION

For even the most advanced modern civilization, the boundaries of technological capability will eventually draw near and become frustrating obstacles, but these realities do not douse the spark of imagination. Just because we cannot yet make something does not mean that a superior mechanism is outside our collective consciousness. We want to build better, faster, more useful or more deadly devices. When science isn't fast enough, this urge is channeled into science fiction. Science fiction is an emotional and intellectual sluice gate, an outlet for the inexorable urge to develop, channeling impetus and erudition into creative, imagined works of written word and visual design. Sci-fi exists alongside real-world science and technology as a cultural chronicle—guiding it, shaping it, giving commentary and reaction to it, and even predicting it. As a result, science fiction has become the mythology of technological peoples.

Science fiction in its essential form is the product of the industrialized nineteenth century. The genre was born out of humankind's need for a new literary method to relate to us "the new models of the universe described by science, and to the new possibilities suggested by technology".² As E. E. Fournier D'Albe writes:

The "mechanical age," which to some appears as the very negation of the soul, is, on the contrary, the age of supreme psychical achievement. Science and invention

² Warrick, "Science Fiction Myths and Their Ambiguity," p. 5

are for ever annexing fresh regions of the universe and subjecting them to the free play of our mental faculties.³

Thus sci-fi's scope is by definition broad, owing both to the inexhaustibility of the human imagination and to the infinite technological horizon of modern times. Due to its fusion of reality and fantasy, a work of science fiction will fall between two creative premises: the logical extension of current technological principles, and the whimsical imagination of alternate realities unbounded by any real-world constraints.

The genre has been subject to debate by both critics and authors. Some, like Isaac Asimov, argue that science fiction should maintain a more rational standard with regard to established scientific knowledge. According to Asimov, the science fiction story will increase the current level of technology but never displace established principles of natural law. Others, such as Tzvetan Todorov, allow for a more fantastic mode of science fiction. His interpretation puts no strict limits on the strange and illogical. Instead, he views science and science fiction as an analogous relationship in which supernatural elements are judged according to how similar they are to things in our own reality.⁴

Sci-fi Myths

It is apparent that the very use of the term “science fiction” can be a question of semantics. Nevertheless, whether we assign a broad or narrow definition to science fiction, there

³ E. E. Fournier D'Albe, Hephæstus, p. 36-37

⁴ In the introduction to Science Fiction Cinema, Christine Cornea examines a variety of proposed definitions from top sci-fi authors and scholars. They are left mostly unexplored in this thesis as only the most basic working definition is required, but the reader should be aware that science fiction is a multifaceted an encompassing topic with boundaries yet uncharted.

continues to be a body of work categorized as belonging to that genre. Although there are problematic works of fiction on the periphery, if we go to a book or movie store and locate the science fiction shelf, this grouping will remain fairly consistent from one store to the next. Out of this, some recurring "myths" have emerged that characterize the genre.

Patricia Warrick describes a myth as “a complex of stories which a culture regards as demonstrating the inner meaning of the universe and of human life.”⁵ A myth is the way in which people relate to the world around them, created to explain that which the mind cannot immediately experience; a myth speculates, wonders, and reflects on the mysteries of the cosmos, satisfying the human impulse to contemplate beyond that which is readily available. If a myth is truly made up of, as Warrick puts it, “the collective dreams of mankind,”⁶ then science fiction is where these thoughts on the human condition are collected and transcribed. In this way we can think of sci-fi as the myths of human progress.

Like the genre of science fiction, sci-fi myths⁷ have their own defining qualities. First, unlike the timeless nature of traditional lore, the science fiction myth is not eternal. Science fiction myths are usually set in the future, or a specific time or reality that is decidedly different from our own. For the sci-fi myth, time is always moving forward, progressing into the unknown. A second element of the science fiction myth is how humankind copes with the uncertainty that the future brings. In the sci-fi myth, humankind imagines what this future might be like when it arrives, occupying it in order to become better acquainted. It doesn't matter that these science fiction myths are untrue; their power lies in their believability, providing a reasonable assessment of the unknown. Lastly, science fiction myths are morally ambiguous.

⁵ Warrick, "Science Fiction Myths and Their Ambiguity," p. 2

⁶ Ibid., p. 3

⁷ The editors of Science Fiction: Contemporary Mythology, along with nineteen other sci-fi writers, scholars, and critics, outline ten of them in total. p. xv-xviii

Unlike biblical tales of good and evil, it is unclear what constitutes good and evil in the future. The sci-fi myths are uncertain about humankind's relationship to the world, recognizing that what we know about the universe changes over time. This uncertainty means that we can't in absolute terms predict what might be universally right or wrong.⁸

One myth of science fiction is that of "The Machine and the Robot:"

The machine, continually more complex, sophisticated, and powerful, is a recurring myth. It is a product of the scientist who develops a technology to implement his theoretical constructs. The machine can accomplish all kinds of feats involving both physical and intellectual work. The attitude towards the machine, like that toward the scientist, is ambiguous. The machine may release man from the slavery of hard work, but it may also enslave man, exceeding him both in physical and mental power and control.⁹

The machines in science fiction are not simply current technology transplanted into a make-believe story setting. These staples of science fiction expound on the familiarity of everyday life and accelerate our perspective into a new reality. In science fiction, machines build our cities, sustain our way of living, and cultivate lifelong friendships as intelligent equals. Machines subjugate our enemies, then rebel against us and become our greatest fear. Machines penetrate our bodies, mesh with us, augment organic tissue and bring to light questions about the very meaning of humanity. Machines, in the end, are often humankind's last hope for survival against outside forces with technologies far surpassing our own.

⁸ Warrick, "Science Fiction Myths and Their Ambiguity," p. 6-7

⁹ Warrick, "Introduction," p. xvii

CHAPTER 1: THE MACHINE SOUL

The origin of the machine myth begins with a preliminary inquiry, as expressed by E. E. Fournier D'Albe in Hephæstus; or, the Soul of the Machine:

Who was that audacious man who first took upon himself the divine privilege of making tools and weapons for himself, instead of waiting for "nature" to provide them for him?¹⁰

To answer this question, imagine that one day this early "man" has found himself the victim of unfortunate circumstance, confronted by a dangerous, wild beast (for D'Albe, a wild boar). In a moment of biting clarity the man considers the severity of the situation in which he, the human species, finds himself a creature with no fang, tusk, claw, nor any other evolved implement of violence that he can wield in defense. Desperately, he grasps a nearby stone and hurls it at his animal aggressor. The human prey requites the threat of violence, turning the tables on his predator. The animal flees, confused at this new resistance. The end result of this very possible confrontation is the first mechanical utility, the use of an external device to allow a human to function beyond natural human capability. This single, pivotal motion forever changes humankind's position within the natural world, initiating a shift in physical and psychological status. Thus:

¹⁰ E. E. Fournier D'Albe, Hephæstus, p. 14

The adoption of mechanism was a turning point in evolution, and an event the significance of which can only be classed with such far-reaching innovations as the birth of life itself or that adoption of locomotion as an aid to nutrition which gave rise to the animal kingdom.¹¹

For this early man there was no turning back. Now able to succeed through the manipulation of his environment, this effect, irreversible and irresistible, set into motion his *mechanical destiny*. From this new authority came the mastery of fire, the six simple machines, iron, steam and, with practice, steel, electricity, and plastics. With each generation the natural is twisted and rebuilt to our liking, fashioned to satisfy the omnipresent desire of humankind to express itself beyond the limitations of our human bodies; mortal bodies that are soft, slow, relatively frail and un-enduring. Tools, weapons, machines—all were at any point constructed to compensate for or enhance the capacities of the human species:

He took a piece of the outside world and made it temporarily a part of his person, a part which could be detached and resumed at a moment's notice, a temporary attachment or extension of his body which required no blood-vessels to keep it in repair and which, if broken or injured, would inflict no pain upon himself.¹²

As D'Albe points out, the mechanized human weapon or tool is unique by comparison with those of other creatures. The manmade weapon is not a biologically integrated part of the organism that wields it. Unlike a tusk or beak, it can be removed, replaced, broken or changed without consequence to the body. When a mechanical weapon is lost or destroyed the human body suffers no real physical damage. Additionally, the human has the option of procuring a new

¹¹ E. E. Fournier D'Albe, Hephæstus, p. 14

¹² *Ibid.*, p. 8

weapon, effectively making them invulnerable.¹³ A machine is useful to us because it is not of us, in the sense that it is not limited by evolution. From this end, humankind is able to take on an infinite variety of forms and shapes. Our arms can be widened into oars, our legs can be modified into wheels, and the lenses of our eyes can grow many times in diameter until we can see for miles.¹⁴ These concepts of "meta-physical" augmentation are a driving impulse behind our progress and development as a technologically conscious civilization.

The functional advantages gained from the mastery of machines should be obvious; but, the biological or physical detachment that contributes to a machine's practical usefulness should not imply a lack of sentiment towards that machine. As our relationship with technology becomes more intimate, we continue to project more of ourselves onto our machines:

Any weapon which a man may use may therefore be regarded as a limb of the man's body, so long, that is, as it is in active use. And if a "soul" animates that man's body and drives it to perform deeds of valour, the same soul will animate his weapons. The soul of the weapon is the soul of the man who uses it."¹⁵

Machines that necessitate human interface become extensions of the body, whether they share the same "blood" or not. All of these machines, whether a rock, chariot, or firearm embody a human thought and purpose, and when the user adopts that purpose through a mechanical interface, the machine is imbued with a soul.¹⁶

As technology becomes more advanced, the material criterion for what constitutes a satisfactory "interface" within this human-machine relationship becomes unclear. Because it is the nature of machines to reduce human effort, this process results in the reduction and

¹³ E. E. Fournier D'Albe, *Hephæstus*, p. 17-18

¹⁴ *Ibid.*, p. 67

¹⁵ *Ibid.*, p. 19

¹⁶ *Ibid.*, p. 20

simplification of human bodily involvement in carrying out these purposes and this effect increases as machines become more complex. We can then rate the mechanical essence of a device in terms of its performance in relation to human control. Of this phenomenon, Isaac Asimov writes:

The further a device is removed from human control, the more authentically mechanical it seems, and the whole trend in technology has been to devise machines that are less and less under direct human control and more and more seem to have the beginning of a will of their own.¹⁷

Following Asimov's logic, a spear that leaves the hand is more mechanical than a club, a rifle is more mechanical than a spear, and a modern missile, which is able to be fired from miles away with a press of a button, is more mechanical than the rifle.

The application of Asimov's standard inevitably results in two extremes. An artificial limb or biomechanical implant is the most severe example of a direct mechanical interface/embodiment, and, as a direct physical extension of human will, it is easy to apply the principles of the machine soul. Opposite is a machine that is able to function independent of physical human touch. In science fact and science fiction, this migration towards total mechanical autonomy leads to the ultimate, yet classic pursuit of artificial intelligence. In science fiction, robotic machines that operate without human interference are more and more out of our control, this lack of control eventually leading to fear and hate.

¹⁷ Asimov, "The Machine and the Robot," p. 244

CHAPTER 2: AUTOMATON

We consider the mechanical men and women of science fiction to be a relatively modern idea, but the concept of an artificial body in motion has always been with us. Ancient authors refer to the *Automaton*, from Greek *autómatos*, meaning a self operating machine or mechanism.¹⁸ Norbert Wiener writes that "the ability of the artificer to produce a working simulacrum of a living organism has always intrigued people. This desire to produce and study automata has always been expressed in terms of the living technique of the age."¹⁹ This is apparent from the drawings and models of real-life ancient *automata*, such as the walking, tea-carrying Japanese *karakuri* dolls and Hero of Alexandria's pneumatic animals (a tradition that reached a modern milestone with 18th-century inventor Jacques de Vaucanson's mechanical duck, the first *automaton* to digest food).²⁰ But the history of antiquity also features fantastic stories of *automata* that were the product of imagination and extrapolation, not invention, existing beyond the "living technique" of any real-world science or technology.

¹⁸ Automaton

1. *lit.* Something which has the power of spontaneous motion or self-movement.

2. A living being viewed materially.

3. A piece of mechanism having its motive power so concealed that it appears to move spontaneously.

From L. *automaton*, from Gk. *automaton*, neut. of *autómatos* "self-acting," from *autos* "self" + *matos* "thinking, animated," "Automaton." Oxford English Dictionary

¹⁹ Wiener, p. 39

²⁰ Schodt, Inside the Robot Kingdom, p. 55-56

Legend speaks of an *autonomous* meta-human—artificial "others" constructed from inanimate material, larger-than-life mechanisms "formed by man in man's own image" (or the image of Gods, animals, and all varieties of irregular beast). Imbued with life and energy, yet soulless and unconstrained, these walking automatons could crush mortals, wielding a power that was truly their own. Or, if suppressed through human ingenuity, automata could be harnessed to attend to the needs of civilization. The rest of the human race stands in awe of them, curious, sometimes terrified, but ultimately inspired as they bear witness to the power fashioned by human hands.

Consider Hephæstus, Greek god of the forge. In the *Iliad*, he is described as having constructed a series of golden mechanical women to serve him in his daily work:²¹

There were golden handmaids also who worked for him, and were like real young women, with sense and reason, voice also and strength, and all the learning of the immortals...²²

Hephæstus was something of a mad scientist, his hunched figure toiling away in a fireproof workshop, creating unnatural wonders that surpassed any Earthly device. His gilded servants were a whole new breed of *automaton*, combining lifelike realism and a divine technology that allowed them to move about under their own power, their golden skin being the only real indication of their mechanical nature.

As the great Olympian builder, Hephæstus was often contracted to produce devices for other Gods and mortals. For King Aetes of Colchis, he built two bronze bulls that breathed fire through their nostrils. For the warrior-god Achilles, he constructed a great bronze shield, a force

²¹ Asimov, "The Machine and the Robot," p. 245

²² Butler, "The Iliad by Homer."

field which no mortal weapon could penetrate,²³ and for Alkinoös, king of the Phaiakians, he constructed two metal guardian dogs:

... and there was a silver lintel above, and a golden handle,
and dogs made out of gold and silver were on each side of it,
fashioned by Hephaistos in his craftsmanship and cunning,
to watch over the palace of great-hearted Alkinoös,
being themselves immortal, and all their days are ageless."²⁴

Although Hephaistos' skill was revered by gods and mortals alike, he was not the only ancient inventor skilled enough to create lifelike automatons. Daedalus, characterized by Asimov as the "Thomas Edison" of Greek myth, was also a builder of mechanical beings. Daedalus' contribution to mechanical mythology is Talos, a bronze warrior designed to guard the shores of Crete. Like a Hellenistic *Robocop*, he patrolled the island daily to intercept enemy intruders. In a likely homage to Achilles, the fluid that kept Talos operational was sealed inside by a plug in his heel.²⁵

Whether created by human or god, the invention of automata is not exclusive to one culture. The Golem is an automatous creature from the tradition of Jewish folklore. The body of the Golem was first constructed from earthen materials, usually mud and sticks, in the image of a person, and then given the ability to move through written or spoken enchantments. Although often created with a devious intent, the purpose of the Golem was to function as its creator's servant and protector and its role in narrative is like that of the *robot* in modern story and film.²⁶

²³ E. E. Fournier D'Albe, *Hephæstus*, p. 20

²⁴ Richmond Lattimore, *The Odyssey of Homer*, p. 113

²⁵ Asimov, "The Machine and the Robot," p. 245

²⁶ Oreck, "The Golem."

Connecting the Past

In the end, what do ancient literary descriptions of imagined anthropomorphic forms have to do with contemporary sci-fi machines? Is it appropriate to call these constructed machines, statues, or mythical beings that were said to walk about ancient sci-fi? It is difficult to apply our modern techno-centric viewpoint, but the same principles are present. Ancient people had the concept of an artificial body as metaphor, and articulated stories based on this concept, elaborating on the world around them. As Asimov says, "the fact that a myth is a sort of vague and distorted recall of something actual does not alter its function of indicating a way of human thinking."²⁷ Today, our functional and technological expectations are far greater but that does not negate any fundamental connection. The builders and writers of ancient mechanical myth simply utilized the understanding, knowledge and materials of their time.²⁸ The principles of science fiction apply to any civilization with the capability to create and communicate, regardless of their relative level of scientific development. Isaac Asimov writes:

Why not? After all, if a human smith makes inanimate metal objects of the base metal iron, why should not a god-smith make far more clever inanimate metal objects of the noble metal gold? It is an easy extrapolation, of the sort that

Although relying on magic, the Golem serves as a proof-of-concept in a time when technology was in its infancy. The tradition of such an artificial being can be traced back to Talmudic legend in which Adam, created by God, is in fact the first golem.

²⁷ Asimov, "The Machine and the Robot," p. 246

²⁸ With regards to the great disparity between ancient mechanism and what we consider high-technology, we need to remember that back then it was marvelous enough in the minds of the people if a Golem, fire-breathing bull or giant Colossus could just *stand* there without falling over.

comes as second nature to science fiction writers (who, in primitive times, had to be myth-makers, in default of science).²⁹

Thus, *automatons* in science fiction exist on a continuum. Artifacts of ancient myth are different from 20th century science fiction, which are in turn different from the objects of 21st century sci-fi. Ancient science fiction is filled with visions of bronze, gold, and horses (all threatening and enlightening high-technology at the time.) Current sci-fi is populated with steel, circuitry, and spaceships. The cutting edge science fiction devices of the 50's and 60's weren't even up to par stylistically and functionally to every day 21st century appliances.

²⁹ Asimov, "The Machine and the Robot," p. 245

CHAPTER 3: ROBOT

As Western civilization began to develop industry in the late 19th -early 20th centuries, a rise in the overall level of technology caused a natural increase in sci-fi literature and imagery as well as the sophistication with which these ideas were presented. The new genre of fiction was ready to confront the moral and social ambiguity of the machine age, and writers and filmmakers needed a model on which to base their stories. The legends of *automata* had nurtured a curiosity for invention that would soon inspire one of sci-fi's most fashionable themes. This new invention is the *Robot*, the product of industrialized invention along with the imaginative stories that have made them such an endearing part of popular culture.

Industry and language struggled with the concept of a robot. When Joseph Engelberger, inventor and father of the first industrial robot, Unimate, was asked "What is a robot?" Engelberger's replied: "I may not be able to define one, but I know one when I see one."³⁰ Japanese robotics engineer Shotaro Ozaki's commented similarly:

What is a robot? A machine that does work in place of man? Mechanization of human labor? Zen riddles of this sort will satisfy few...Everyone has his own image of what a robot is. They are all right, and all wrong.³¹

Officially, the Oxford English Dictionary defines a robot as:

³⁰ Schodt, Inside the Robot Kingdom, p. 43

³¹ Ibid., p. 29

1. a. a machine (sometimes resembling a human being in appearance) designed to function in place of a living agent, esp. one which carries out a variety of tasks automatically or with a minimum of external impulse.

b. A person whose work or activities are entirely mechanical; an automaton.³²

These attempts to define don't give a clear picture of what is being described, and as robots have become more varied the functional and aesthetic distinctions between machines of robotic and non-robotic caliber have remained unclear, but whether you consider a desktop calculator or vacuum cleaner a robot or not is less inspired than what it means to be a robot in science fiction.

The Science Fiction *Robot*

Robots existed in literature for years before motorized arms and industrial computers. Out of the industrial revolution came the machine age and science fiction, and from the beginning there were robots. English author H.G. Wells' alien tripod from the revolutionary 1898 novel The War of the Worlds is acknowledged to be the first cast of modern sci-fi or fantasy robotics. Well's account of the alien tripods reads like a 19th century version of the ancient poems of gods and giants:

And this Thing I saw! How can I describe it? A monstrous tripod, higher than

³² "Robot." Oxford English Dictionary

many houses, striding over the young pine-trees, and smashing them aside in its career; a walking engine of glittering metal, striding now across the heather; articulate ropes of steel dangling from it, and the clattering tumult of its passage mingling with the riot of thunder.

Seen nearer, the Thing was incredibly strange, for it was no mere insensate machine driving on its way. Machine it was, with a ringing metallic pace and long, flexible, glittering tentacles (one of which gripped a young pine-tree) swinging and rattling about its strange body. It picked its road as it went striding along, and the brazen hood that surmounted it moved to and fro with the inevitable suggestion of a head looking about. Behind the main body was a huge mass of white metal, like a gigantic fisherman's basket, and puffs of green smoke squirted out from the joints of the limbs as the monster swept by me.³³

In The War of the Worlds, humankind is in awe of a technology it does not understand, an advanced machinery that is beyond its grasp. Here Wells' describes alien machines that no current technology is able to match. Neither divine nor obedient, the tripods were a new literary image for a civilization poised for scientific achievement. Wells' terrifying tripods wreaked havoc not through magic or divine influence but through the Martian's absolute mechanical dexterity and heat-ray *science*. Nevertheless, Wells' tripods were not referred to as robots—the term *robot* was first coined in Czech writer Karel Čapek's 1920 play *R.U.R.* (Rossum's Universal Robots) to describe humanlike beings called "robots" that were constructed at Rossum's universal robot factory. The very existence of the robots was a challenge to God. They were sold as a cheap labor replacement for human workers, doing monotonous, dirty jobs and allowing the

³³ Hughes and Geduld, A Critical Edition of the War of the Worlds, p. 84

rest of society to live in leisure. All was well until a sympathetic researcher at the factory gave the robots the ability to think and feel on their own—a human soul. The robots, made aware of their advanced capabilities, rose up and declared war on the lazy and weakened human race. Their leader, Radius, proclaimed "The age of mankind is over. A new world has begun! The rule of the Robots!"³⁴ In the original version of the play, the robots were not steam or electric-powered metal men but more akin to organic homunculi (later adaptations would utilize the "tin man" motif). Nevertheless, this story about *robots*, machines built to serve humankind through preprogrammed tasks and actions, is the first significant account of humanoid robots in the 20th century.³⁵

Since Čapek coined³⁶ the term in 1920, the robot in science fact and fiction has developed a rich history too complex to be examined here. Western science fiction has developed a certain ideology of otherness regarding anthropomorphic robots. Čapek's story of supplantation, the Created rising against the Creator, was not a new theme. Greek myths describe a continuing struggle in which one set of immortals is replaced by another: Chaos was supplanted by Ouranos, who was succeeded by Kronos, who was unseated by Zeus.³⁷ Appearing just after World War I, *R.U.R.* presented a disillusioned view of technology that seemed to offer promise but also the possibility of bringing human civilization great despair.

Like the *automaton*, the *robot* is the product of its time. As Western culture experienced the deadly dual nature of machines, there emerged the great fear that out-of-control machines

³⁴ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 32-34

Note: Capek was not the inventor of the word *robot* like most people believe. The word *robot* is modified from "robota," the Czech word for labor. The term was originally coined by cubist painter and writer Josef Capek, Karel's older brother.

³⁵ *Ibid.*, p. 34

³⁶ A discussion of this is outside the scope of this paper but can be found in Frederick Shodt's *Inside the Robot Kingdom*, in which Schodt examines all categories of robotic development, tracing the lineage of early machine tools to the modern factory.

³⁷ Asimov, "The Machine and the Robot," p. 250

would someday cause great harm. "We are in the grip of industrialism," wrote Čapek. "A product of the human brain has at last escaped from the control of human hands."³⁸ Years later, Isaac Asimov voiced the same fear: "Even when the human control is not visibly decreasing, or is doing so at an excessively low rate, it is a simple task for human ingenuity to look forward to a time when the machine may go out of control altogether, and the fear of that can be felt in advance."³⁹ We find the same attitudes towards industrialism in Austrian filmmaker Fritz Lang's 1927 *Metropolis*, where the gynoid robot Maria seduces the working-class of Metropolis and stirs rebellion in the hearts of men, and over twenty years later in Robert Wise's 1951 classic *The Day the Earth Stood Still*, wherein the metallic-suited, laser-shooting alien bodyguard Gort becomes an epicenter of irrational violence and a universal fear of the unknown. According to the robot's master, Klaatu, "There's no limit to what he could do. He could destroy the earth."⁴⁰

Optimistic and pessimistic science fiction attitudes battled each other in the early-to-mid 20th century but, in the postwar period, pessimism won out.⁴¹ Even more frightening machinery was developed and, if the atom bomb didn't annihilate us, the computer, seeming to have all the answers, threatened to replace us. Furthermore, sci-fi authors lacked the necessary scientific background and attention to detail to remain sympathetic to technology in this time of uncertainty.⁴²

Robots of this era exhibit distinct anthropomorphic features. Frederik Schodt writes:

³⁸ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 34

³⁹ *Ibid.*, p. 246

⁴⁰ Heldreth, "In Search of the Ultimate Weapon: The Fighting Machine in Science Fiction Novels and Films," p. 133

⁴¹ One should be careful not to ignore the rich history of humans and robots getting along in science fiction, a constant alternative vision of the future perpetuated to the end by writers such as Asimov. Yet even when humans and robots welcomed each other, any meeting between the two only served to highlight their differences.

⁴² Asimov, "The Machine and the Robot," p. 252

In spite of this pessimism, we will never abandon technology. Humankind has always chosen to counter out of control technology with more technology—bullet-proof armor, missile-proof defense, cleaner automobile exhaust, and so forth. No matter how treacherous our machines become, only the threat of immediate, personal harm will cause us to question their place in society. *Ibid.*, p. 247

Today there are fantasy robots in science fiction, industrial robots in factories, and autonomous robots in laboratories, but to most people around the world a robot in some way approximates the physical movements or shape of a human (or animal), yet it is a machine.⁴³

The anthropomorphic form is especially common in science fiction, where robots exhibit traces of humanity imparted by those who desire to build machines in their own image. Yet compared to their human counterparts, robots are stiff, rigid and inorganic, woefully restrained by the technology (or lack thereof) that created them. The word retro is often used in reference to the relatively quirky obsolescence of postwar-era design trends and techno-mechanical primitives: Maria's cutting-edge art-deco design, Gort's sleek metallic costume, and the lights and sounds of special effects centerpiece Robby the Robot from MGM's 1956 *Forbidden Planet*. Limited by cinematic technology, creative vocabulary, and a society unaccustomed to robot-human interaction, the design and function of a robot emphasized above all its mechanical, inhuman nature. When we think back on the era of the *robot*, we remember stilted walks, blinking lights, transistor tubes, wires, antennae, and metallic skin. In the era of the *robot*, people were people, and robots were robots, the humanoid machine remained autonomous "other."

⁴³ Schodt, [Inside the Robot Kingdom](#), p. 30

CHAPTER 4: MECHA: THE NEW BREED OF WARRIOR ROBOTS

*It's a robot. You know, like a super advanced robot. It's probably Japanese. Yeah,
it's definitely Japanese.*

Sam Witwicky, *Transformers* (2007)

From *automatons* to *robots*, at each stage in development humankind has imagined mechanisms of increasing complexity. As the product of contemporary popular culture, therefore, *Mecha* is a new phenomenon, different from the era of the *robot*, even if the exact name of the shift from *robot* to *Mecha* as a concept is still unclear. What we do know is that *Mecha* is an art form and pop-culture phenomenon that originated and first became popular in Japan.

Japan proudly and unabashedly refers to itself as the "Robot Kingdom" (*robotto okoku*),⁴⁴ an appropriate title because nowhere else will you find a culture whose daily lives are so integrated with the *mechatronic*.⁴⁵ This affinity for the mechanical device pervades the realm of entertainment, where science fiction robots have been featured since the 1924 Tokyo

⁴⁴ Schodt, *Inside the Robot Kingdom*, p. 14.

⁴⁵ The Japanese robotics industry coined the term *mechatronic* to group together all robotic technologies (both hardware and software) under one name. As a result news about *robots* appears in the *mekatoro* (*mechatronics*) section of the Japanese newspaper. Schodt, *Inside the Robot Kingdom*, p. 42-43

performance of Capek's R.U.R. The most popular Japanese robots of the post WW II era were different from their Western counterparts in that they were the product of comics and animation instead of novels and short stories, and they offered more alternatives to the narrative model of "man makes robot, robot kills man." Over a third of all printed matter in Japan is in the form of comics, now read by people of all ages. Depicted in graphic media, as opposed to novels and short stories, Japan's robots were able to achieve a widespread influence over the culture and since 1963 there have been hundreds of animated robot shows serialized for television.⁴⁶

This emergent phenomenon is characterized by the *giant robot*, a new graphic, dynamic machine in the science fiction genre of *Mecha*. As a philosophy of art and design, the *mecha* is as different from the *robot* as the early "rigid" archaic kouros of Greek sculpture is from his *contrappasto* counterpart of the Classical era.⁴⁷ This was due in large part to the ease with which robots could be depicted in comics and animation.⁴⁸ Unlike machines who had their rhythmic origins in Western live-action film and drama, Japanese *mecha* were free to jump, fly, and take on a variety of appealing transformations, the only limitations being the artist's skill at rendering.

The development of the *mecha* robot came about through four primary works that shaped the contemporary sci-fi robot landscape. In chronological order, these are Osamu Tezuka's *Tetsuwan Atomu*, Mitsuteru Yokoyama's *Tetsujin 28*, Go Nagai's *Mazinger Z*, and Yoshiyuki Tomino's *Mobile Suit Gundam*.

Atom Boy

⁴⁶ Schodt, *Inside the Robot Kingdom*, p. 7

⁴⁷ If dance, the *robot* is represented by "the robot" (naturally), and *mecha* is probably break, swing, or even ballet.

⁴⁸ Schodt, *Inside the Robot Kingdom*, p. 85

Created by the "God of Comics" Osamu Tezuka in 1951, *Tetsuwan Atomu* ("The Mighty Atom") is the best known Japanese robot of all time. Tezuka's Atom achieved two significant firsts for Japan. Originally a fan-favorite comic book serialized for over 18 years, in 1963 the television adaptation was broadcast as Japan's first animated series and then exported to over 50 countries, including the USA.⁴⁹ Atom became the prototype for the style of art, animation and storytelling that has become essential to the Japanese *mecha* image.

In Tezuka's original story, Atom was built and programmed by the grief-stricken Dr. Tenma to replace his only son, Tobio, who was struck dead in a traffic accident. An android built to look, think, and feel like a human being, Atom was a true marvel of robotics. Using his "100,000 horsepower strength" and advanced artificial intelligence—Atom could speak over 50 languages—it was Atom's aim help humankind and battle evil robots as the boy next door.⁵⁰

Tezuka's Atom was a new kind of robot, one with a human soul and a strong sense of justice and morality. As a result of this hybrid-humanity, he was tormented by doubt and uncertainty.⁵¹ According to Schodt, he was a reverse "Pinocchio," a near-perfect robot who strove to become more human, and thus more flawed as a machine. However, Atom's ultimate purpose was to function as a bridge between the human and machine worlds.⁵² In the end, his suffering over his own destiny is what made him more human.

Although the Atom comics sometimes take a cautionary approach towards high-technology that reflects Tezuka's own encounters with war and with Western literature, they also demonstrate Tezuka's value-neutral view of technology, where human intent made the difference

⁴⁹ Schodt, *Inside the Robot Kingdom*, p. 75

⁵⁰ Hornyak, *Loving the Machine; the Art and Science of Japanese Robots*, p. 46

⁵¹ *Ibid.*, p. 51

⁵² Schodt, *Inside the Robot Kingdom*, p. 75

between good or evil.⁵³ In contrast with the "robot kills man" mode of Western sci-fi, Tezuka's Atom was a more positive reflection on futuristic technology than one finds in the Western tradition—a friendly, amicable robot that at heart only wanted to live as a normal person.⁵⁴ As Timothy N. Hornyak writes:

Atom embodies a deeply ingrained postwar vision of pacifism and technology, representing the wellspring of an almost universal agreement among theorists, researchers, and engineers that robots can not only be friends with human beings but even be, perhaps, the country's salvation.⁵⁵

As an artist, Tezuka fathered the traditions of what would become the Japanese approach to robots in *manga* (Japanese comics) and animation. After viewing foreign films, Tezuka wrote: "Why are American movies so different from Japanese ones? How can I draw comics that make people laugh, cry, and be moved?" Tezuka was first able to capture the energy and style of the motion picture with his 1947 *Shin Takarajima* (New Treasure Island), a comic that features quick-cuts, dramatic close-ups, and long-shots.⁵⁶

The same cinematic approach was applied to robotics in the Atom series: Atom was given a dynamic body, super strength, flight, and superior agility. At times more human than machine, he shed the clunky walk of his robotic predecessors, fighting as a machine that moved with the fluid grace of an athlete, all precisely illustrated under Tezuka's skilled hand. As he moved, Atom's body was always in a state of flux—his feet transformed into rocket boosters, his arms into giant cannons.

⁵³ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 48-49

⁵⁴ An ideal Western author Isaac Asimov had tried to preserve with his "Three Laws of Robotics."

⁵⁵ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 43

⁵⁶ *Ibid.*, p. 45, 48

As a "child of science," Atom also inspired many contemporary children to pursue electromechanical technology and many would grow up into robotics engineers. This was furthered by Tezuka's depictions of Atom's schematics—a complex network of internal circuitry and mechanical instruments. A famous 1950 drawing shows Atom's atomic reactor, computer, search lights, and rocket propulsion systems, all of which were food-for-thought for young (and old) overactive imaginations. Furthermore, Atom was often damaged in battle and had to be repaired or partially rebuilt by Dr. Tenma, his body shown in various states of deconstruction.⁵⁷ Atom could always be rebuilt because he was a machine, and so the real excitement was being treated to a glimpse of what was "under the hood." One can imagine a delight not dissimilar from a son helping his father work on the family car, and his wide-eyed fascination with the many sorts of wires, pumps, gadgets and gizmos he saw there—for some a near transcendental youth experience.

Atom provided a new outlook towards machines—an energetic, vigorous display of technology that partnered itself with humankind as guardian and companion. Atom's subsequent influence on contemporary robotics—in both the scientific and sci-fi spheres—has been immeasurable, so much so that in 2004 Carnegie Mellon University inducted Atom into their own Robot Hall of Fame as "the first robot with a soul."⁵⁸ "One of Atom's greatest contributions to the development—and commercialization—of robots in Japan," writes Hornyak, "is the fact that he serves as an almost universal reference point for people inside and outside of robot labs. Atom is a shared idea, a medium through which scientists and the public can communicate."⁵⁹ Toshio Fukuda, a Nagoya University robotics professor, notes further that "Although the hurdle

⁵⁷ Schodt, Inside the Robot Kingdom, p. 76

⁵⁸ "The Robot Hall of Fame: ASTRO BOY." The Robot Hall of Fame

⁵⁹ Hornyak, Loving the Machine: the Art and Science of Japanese Robots, p. 54

of his seven powers is a little too high, the desire to create a robot like Atom exists among Japanese roboticists in varying degrees."⁶⁰ Whether in the arena of art, animation, or industry, "Say the word 'robot,'" says Fukuda, "and the image of Atom will pop into the heads of most Japanese."⁶¹

Iron Man

In 1956, inspired by Tezuka's Atom, Japanese artist Mitsuteru Yokoyama began drawing his own robot story, *Tetsujin 28* ("Iron Man No. 28"). Like Tezuka, Yokoyama was influenced by his postwar experience. In the 1995 Magazine *Ushio*, Yokoyama wrote:

When I was a fifth-grader, the war ended and I returned home from Tottori Prefecture, where I had been evacuated. The city of Kobe had been totally flattened, reduced to ashes. People said it was because of the B-29 bombers, the so-called "Flying Fortresses" of the sky. As a child, I was astonished by their terrifying, destructive power.⁶²

In Yokoyama's story, *Tetsujin 28* was a last-resort secret weapon produced by the Japanese military in World War II. The 27 models leading up to *Tetsujin*—and the war itself—were failures, and so the needle-nosed "T-28" became a civilian robot.⁶³ But *Tetsujin*'s heavy metal form represented the terror of industrial technology unleashed, his bulbous body evoking atom-bomb ordinance. In early installments of the series he runs amok in a Godzilla-like rampage, destroying buildings, military tanks, and other robots.

⁶⁰ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 54

⁶¹ *Ibid.*, p. 54

⁶² *Ibid.*, p. 59

⁶³ Schodt, *Inside the Robot Kingdom*, p. 79

Also like Tezuka, Yokoyama was heavily influenced by Western cinema, and one of his first jobs required him to watch over two hundred foreign films. *Tetsujin 28* featured the same "breathless" action frames as Tezuka's Atom, and as University of Tokyo humanoid robot researcher Yoshihiko Nakamura writes, "The story and fast-paced pictures were like scene changes in a well-edited action movie."⁶⁴

Tetsujin 28 was a robot who could fly (with rockets on his back instead of his feet), but unlike Atom, Tetsujin was a metal behemoth, "20 meters tall and weighing 25.08 tons." A step back technologically, his strength came from brute-force punches and kicks used to pummel his adversaries into submission. Unlike Atom, who was an autonomous android with artificial intelligence, T-28 was operated by remote control.⁶⁵ Each manipulation of the remote's controls translated to a punch or shot from the Tetsujin. In the comic, twelve-year-old "private detective" Shotaro Kaneda, the son of Tetsujin's developer, used the robot's strength to thwart criminals and defeat enemy robots around the world.⁶⁶ Since Tetsujin 28 had no intelligence of his own, the person who controlled the remote wielded the robot's power. Thus, T-28 was simply a tool which could be used for purposes good or evil, reflecting a value-neutral attitude towards machines that according to Schodt made Tetsujin 28 closer to today's industrial robots than he was to Atom.⁶⁷

In 1963 the *Tetsujin 28* comic became the first animated series to feature giant, towering battle robots and it inspired generations of imitators, creating an entire genre of *manga* and *anime* (Japanese animation).⁶⁸ When Tetsujin fought, however, it was Tetsujin who was thrown into danger; his operator guided him from the sidelines like a radio-puppeteer. It would take

⁶⁴ Hornyak, *Loving the Machine; the Art and Science of Japanese Robots*, p. 59

⁶⁵ Schodt, *Inside the Robot Kingdom*, p. 78

⁶⁶ Hornyak, *Loving the Machine; the Art and Science of Japanese Robots*, p. 58

⁶⁷ Schodt, *Inside the Robot Kingdom*, p. 78

⁶⁸ Hornyak, *Loving the Machine; the Art and Science of Japanese Robots*, p. 59

another generation to put a human into the driver's seat of the Japanese robot, merging human and machine into a single fighting unit.

The Soul of Chogokin

Japanese *manga* artist Go Nagai was an industry maverick in the late 1960's. His children's comics featured an unprecedented use of eroticism, hyper-violence, and grotesque imagery. Nagai had read both Atom and Iron Man and, as a young artist, he dreamed of creating his own robot *manga* but he needed an original idea. He found his inspiration while waiting to cross a busy street. As Nagai studied the disgruntled drivers sitting idly in a traffic jam, he thought that they must have wished for some way to get around the barricade of cars. In that instant, he was struck by a vision of a car that could sprout legs and arms, like a robot, and simply walk out of the traffic jam.⁶⁹ From this came a natural extrapolation—a giant robot could be piloted from inside its own body instead of controlled from a distance via remote control. "All the robot comics," says Nagai, "were either like Atom—humanoid—or like Iron Man No. 28—remote controlled. I wanted to create something different, and I thought it would be interesting to have a robot that you could drive, like a car."⁷⁰

The concept of an exoskeleton-style robot that could be driven by a human was not new in science fiction. Stories by Issac Asimov (*Runaround*, 1942) and Osamu Tezuka (*Atom*, 1954) had featured people riding on or inside robots.⁷¹ A few years later, Robert Heinlein's 1959 sci-fi novel Starship Troopers featured a squad of futuristic "mobile infantry" who dropped into battle

⁶⁹ Hornyak, Loving the Machine: the Art and Science of Japanese Robots, p. 59-60

⁷⁰ Schodt, Inside the Robot Kingdom, p. 83

⁷¹ Schodt, Inside the Robot Kingdom, p. 83

wearing high-tech suits of robotic powered armor. Heinlein took great care—and an entire chapter—to detail the various functions of these suits, describing them as gorilla-like armor with artificial musculature and advanced feedback sensors that allowed the suits to be worn like clothes or a second skin. Since the suit was worn, not driven, these sensors facilitated naturalistic movement and allowed the soldier inside to focus his attention entirely on the fight. The suits offered the wearer better eyes, better ears, stronger backs, better legs, more "intelligence" (militarily speaking), more firepower, greater endurance and increased protection.⁷² Nevertheless, it was the artist Nagai who best articulated this concept in visual fantasy.⁷³

In 1972 he launched his new creation as *Mazinger Z*, serialized in the comics magazine *Shonen Jump* and airing as an animated series on Fuji TV on December 3 in a 7:00 P.M. prime-time slot.⁷⁴ The *Mazinger* series star Koji Kabuto, an orphaned, motorcycle-riding Japanese schoolboy. After an earthquake uncovers his grandfather's secret underground laboratory, Koji, whose name means "helmet," discovers the seven-story tall robot Mazinger Z. His grandfather, mortally wounded in the collapse of the workshop, tells Koji that the Mazinger will allow him to become a superman.⁷⁵

At the same time, mad scientist Dr. Hell is bent on conquering Earth with his legion of robotic monsters. At times acting more like demons than machines, each of Dr. Hell's robots are unique in appearance and in special powers such as earth-shattering supersonic waves and the ability to shoot lighting bolts. Koji Kabuto agrees to pilot his grandfather's Mazinger Z as Japan's last defense against Dr. Hell and his minions. Each episode ended with the climactic explosion of one of Hell's robots and his promises of "I'll get you next time!" as a bruised and bloodied Koji

⁷² Heinlein, *Starship Troopers*, p. 80-81

⁷³ Schodt, *Inside the Robot Kingdom*, p. 83

⁷⁴ Patten, *Watching Anime, Reading Manga: 25 Years of Essays and Reviews*, p. 293-294

⁷⁵ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 60

returned Mazinger to the nearby Tokyo Research Center for repairs. With Koji, Nagai popularized the character of the conflicted teenager in robot anime. Torn between moral and social obligations to pilot *mecha* and his own youthful interests, he struggled to fulfill his superhero duties while maintaining his grades and a love life.⁷⁶

At the time, Mazinger's visual style was trend-setting. Instead of the monochrome deco so long associated with being "robotic," Nagai's robot was brightly colored with bright reds and blues and glowing yellow eyes. Mazinger also had large red wings that sprouted from his back and hornlike protrusions on his chest and helmet, evoking the Japanese samurai tradition and the childhood pastime of stag beetle collecting. "Most Japanese artists, including Nagai, incorporate these images unconsciously," writes Schodt. "For young boys in Japan, samurai and samurai armor images have always had a romantic air about them, and so have insects...prized for their strength."⁷⁷

The eye-catching style of Nagai's Mazinger Z ushered in another trend in sci-fi robotics: merchandising. In the animated T.V. series, Mazinger had near-invincible armor made out of the fictitious super-metal "Chogokin Z." In February of 1974, Japanese toy company Popy released the "Chogokin" Mazinger Z toy, promoted as having been cast from the same Chogokin "super-alloy" used to build Mazinger in the animated series. The 5 inch figure was actually molded from near-solid die-cast zinc alloy and featured a colorful, shiny enamel paintjob and spring loaded "rocket punch" fists. Super #1 Robot author and longtime Japanese toy fan Matt Alt writes: "The satisfying heft of the die-cast Mazinger Z perfectly channeled the power of the on-screen character." Combined with Popy's ingenious marketing plan, "This one-two punch was like a straight shot into the brain stems of Japan's increasingly robot-crazed children and quickly grew

⁷⁶ Patten, Watching Anime, Reading Manga: 25 Years of Essays and Reviews, p. 294

⁷⁷ Schodt, Inside the Robot Kingdom, p. 84

into a full-blown fad."⁷⁸ The Popy Mazinger set a new standard in the world toy industry for accuracy and quality, and Nagai claims that the "Chogokin" brand became so popular that laboratories in Japan began receiving serious inquiries about whether the material actually existed.⁷⁹

Like Tetsujin 28, Mazinger had no default sense of justice. The name "Mazinger" comes from the Japanese word *majin*, meaning "genie." "The basic concept," says Nagai, "was of a machine that can be used for either good or evil, that when human will is transferred to it, becomes even more powerful than a human."⁸⁰ Koji pilots the Mazinger by docking a small red hovercraft vehicle called the "Pilder" inside it's head, becoming the robots "brain"⁸¹ and forming a cybernetic link with the machine. This was different from Dr. Hell's robots that featured electric brains run amok.

Unlike Shotaro, Koji put his life on the line every time he stepped into the Mazinger's cockpit. According to Schodt, "The man-robot symbiosis that Mazinger Z symbolized helped solve an old problem in robot fiction—the problem of personifying the machine while still preserving its mechanical identity. When the robot became, like a car, a machine that could be jumped in and driven, it had a powerful appeal to young boys."⁸² In writing about Robert Heinlein's power suits, Leonard G. Heldreth discusses the effects this element of personification has on our relationship with piloted machines: "Because man's connections with the combat suits are literally more intimate than with most of his other weapons, he therefore feels positive, or, at worst, neutral towards them: they are an extension of himself. But as these suits undergo

⁷⁸ Alt, Super #1 Robot, p. 11.

⁷⁹ Hornyak, Loving the Machine: the Art and Science of Japanese Robots, p. 61

⁸⁰ *Ibid.*, p. 83

⁸¹ *Ibid.*, p. 58

⁸² Schodt, Inside the Robot Kingdom, p. 83

permutations into the tank and the [autonomous] humanoid robot, his emotions sometimes change to fear and hate."⁸³

Giant robots were fundamentally different from Western icons such as Superman and Batman—muscled athletes who fought evil with superhuman abilities or the assistance of crime fighting gadgetry. "Made in Japan," this new evolution of a powerful, symbiotic human-machine interface is what Japanese Animation scholar Fred Patten refers to as "The new breed of warrior robots."⁸⁴ An entertainment and merchandising industry now worth billions of yen, Timothy Hornyak considers larger-than-life *super robots* like Mazinger and his descendants the apotheosis of the Japanese concept of *mecha*. "After all," says Hornyak, "what boy can resist the idea of skyscraper-sized machines bristling with arms and battling it out like the samurai of old?"⁸⁵ Frederik Schodt, who served for years as Osamu Tezuka's translator, considers these works a "healthy outlet for the aggressive tendencies of normal young boys." He cautions that the popularity in Japan of giant robots battling it out should not be misinterpreted as a love of war. As written in their American-drafted constitution, Japan was a nation that "renounces war" and, because of this, the traditional "war hero" stories were absent (usually censored) from postwar Japanese fiction. But as Schodt reminds us, traditional American-style war stories have never been popular in Japanese comics and, whether by law or by preference, the stories most often featured were those of average humans fighting alien monsters, mad scientists, and evil robots—but not other nations—with superior technology and samurai-style fighting machines.

⁸³ Heldreth, "In Search of the Ultimate Weapon: The Fighting Machine in Science Fiction Novels and Films" p. 133

⁸⁴ Patten, Watching Anime, Reading Manga: 25 Years of Essays and Reviews, p. 293-294

⁸⁵ Hornyak, Loving the Machine: the Art and Science of Japanese Robots, p. 58

As Go Nagai says: "Besides, if we drew comics about World War II, we'd always have to show the Japanese losing, and who'd like that?"⁸⁶

Mobile Suit

Considered a minor deity of Japanese anime, robot animation director Yoshiyuki Tomino is a man who takes robots very seriously. Said to have spent part of his wedding day storyboarding, his outspokenness and passionate opinions have caused him to be described in one Japanese expression as a man "whose teeth are unclothed." While working for the animation company Nihon Sunrise, Tomino became disenchanted with what he called the act of "making advertising films for toy stores."⁸⁷ This was the post-Mazinger trend of super robot cartoons that degenerated into "thirty minute toy commercials, filled with explosions and fight scenes" at worst, or, as some in the industry said, a "synonym for bad taste."⁸⁸ In his autobiography, Tomino writes about his experience working on the Sunrise series *Brave Raideen* and describes the creative limitations of a toy-driven industry:

You introduce a powerful opponent for Raideen, show them fighting the first round, and then show how Raideen polishes him off. That's the basic ingredient. Then you add a little story each episode. The most important thing is to show what weapons Raideen uses, and...you have to have lots of scenes that the kids think are cool—showing Raideen finishing off his enemies, and posing.⁸⁹

⁸⁶ Schodt, *Inside the Robot Kingdom*, p. 82

⁸⁷ Hornyak, *Loving the Machine; the Art and Science of Japanese Robots*, p. 63

⁸⁸ Schodt, *Inside the Robot Kingdom*, p. 86

⁸⁹ Schodt, *Inside the Robot Kingdom*, p. 86

The predictable, menace-of-the-week storylines and heavily commercialized super robot genre was as Hornyak puts it, "ripe for innovation."⁹⁰ On April 1, 1979 Tomino had his "artistic revenge" and released the influential space-saga *Mobile Suit Gundam*. Working under many of the same limitations, Tomino was able to bring a new level of realism and maturity to the giant robot genre.⁹¹

Mobile Suit Gundam is set in "Universal Century" calendar year 0079. In Tomino's future, overpopulation on Earth causes famine, epidemics, and civil conflict. Much of humankind has moved to outer space to seek a new life in giant orbiting colonies. Resenting what they view as oppression from their Earth Federation government, a faction of rebel colonies form the Principality of Zeon (resembling Nazi Germany in style and method) and begin their war for "spacenoid" independence by releasing one of the colonies from orbit and dropping it onto the continent of Australia. The hero of this story is teenage engineer Amuro-Ray, whose Earth Federation colony comes under attack by monstrous Zakus, a new type of giant humanoid weapon employed by Zeon. In the confusion, Amuro discovers the RX-78-2 Gundam, the Federation's own experimental battle robot designed by his scientist father (in the tradition of patriarchal robot hand-me-downs harking back to *Iron Man #28*) along with its instruction manual. Amuro climbs into the cockpit and disposes of the terrifying Zakus with ease. Amuro's mechanical intuition and the need for able bodies of all ages leads him to become an ace Federation pilot in the inter-colonial One Year War as well as the bitter rival of Zeon ace commander Char Aznable.⁹²

⁹⁰ Hornyak, *Loving the Machine; the Art and Science of Japanese Robots*, p. 61

⁹¹ Schodt, *Inside the Robot Kingdom*, p. 86

⁹² Hornyak, *Loving the Machine; the Art and Science of Japanese Robots*, p. 61-63

The series' signature machine was Amuro's eponymous and now-iconic RX-78 Gundam, designed by artist Kunio Okawara under Tomino's guidance. Like Mazinger, Gundam was a humanoid robot many stories tall with samurai-style armor. Tomino, however, took a different, more realistic approach to *mecha* than his predecessors. "I wanted to make a science fiction, futuristic movie in which humanoid robots are used as tools," says Tomino. "I first thought of these humanoid robots as vehicles. I thought they could be giant vehicles the size of fighter aircraft or tanks and be mass produced."⁹³ Instead of using the term robot, Tomino called his gritty war machines "Mobile Suits," and abandoned the physics-defying transformations and mystical energies of super robots. Unlike Mazinger's invulnerable "Chogkin-Z" armor, the Gundam could be easily damaged by weapons of current technology.

Schodt claims that Tomino's idea for mobile suits was inspired by the hard sci-fi exoskeletons of Heinlein's own Starship Troopers.⁹⁴ Tomino rejects that notion, explaining that he arrived at his concept through simple logic. In the frightening emptiness of space, it would be comforting for people to work alongside machines with a familiar human shape. He associates this desire for anthropomorphism with Japan's long religious history of worshipping carved images of Buddha. With humanoid space suits and tools as his inspiration, Tomino adds that "Mobile suits in Gundam are just weapons. Of course they can seem more than just a tool because Mobile Suits have a human form."⁹⁵

In the end, all giant robots and most smaller fantasy *mecha* are impractical in the sense that we have no immediate need for real-life versions. Furthermore, if we did have the need, we do not have the technological and resource capability to build them to the level they assume in

⁹³ Ibid., p. 63-64

⁹⁴ Schodt, Inside the Robot Kingdom, p. 87

⁹⁵ Hornyak, Loving the Machine; the Art and Science of Japanese Robots, p. 64

sci-fi. Given the current implausibility of battle robots, the study of form and function in science fiction is about an implied realism. Function is based on story setting and plot, especially the setting of situations that allow such *mecha* to exist. What made *Gundam* a revolutionary *mecha* series was the way this concept of implied realism was used to present the piloted robot dynamic.

To rationalize the idea of giant humanoid robots fighting in close—often hand-to-hand—combat, Tomino proposed the discovery of a new scientific particle called the "Minovsky Particle" that powered the Mobile Suit's fusion reactors and rendered long-range radar inoperable.⁹⁶ With some creative license, Mobile Suits obeyed the general laws of physics and their names featured coded alpha-numeric model numbers. "RX-78-2" for example, means that the Gundam is a second generation prototype rolled out in the year Universal Century 0078. As Hornyak writes, "They [these suits] are products of industry, with prototypes and mass production—manufactured commodities that can be repaired or replaced when damaged."⁹⁷ Although they come in a variety of forms from tank-like ground models to birdlike flight units, they are essentially the corporate tools of a military at war. In the end it was these realistic, technical aspects of *Gundam* and the way they were presented visually that made it so appealing. Today, the Gundam Museum just outside Tokyo displays meticulously-written scientific treatises on *Gundam* technology, like one paper that describes and illustrates the various mechanical difficulties in developing the Gundam RX-78-2's "60mm caseless triple-barreled vulcan cannon, manufactured by TOTO Cunningham Inc."⁹⁸

⁹⁶ Schodt, *Inside the Robot Kingdom*, p. 88

⁹⁷ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 64

⁹⁸ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 65

Gundam made popular the gritty “real robot” genre featuring giant robots that are realistic pieces of hardware, often sporting oversized weaponry.”⁹⁹ The series avoided making the robots themselves superheroes. Instead, Tomino focused on the human element of war, presenting complex characters with an uncertain sense of right and wrong. The good guys died alongside their sympathetically human enemies, presenting a view of futuristic warfare that was shockingly realistic to an audience raised on “lesser fare.”¹⁰⁰ This earned Tomino his nickname of Minagoroshi, or “Kill ‘em all.”¹⁰¹ Timothy Hornyak questioned the heroic qualities of the characters in *Gundam*: “(But) can they become heroes only by encasing themselves in a massive machine, sealed off from the environment?” Tomino replies: “Think of it like a Formula One driver. It’s a symbol of the relationship between human and the tool. The characters themselves are just common people. But influenced by a machine, there is something heroic about them.”¹⁰²

As an inspiration to generations of Japanese, *Mobile Suit Gundam* is one of the most significant works of contemporary science fiction. It is perhaps ironic, given Tomino’s disdain for commercialism, but *Gundam*’s popularity led to over two-dozen animated series, films, video games, and a toy and model franchise worth billions of Yen. In fact, when plastic models of the RX-78 Gundam robot first went on sale, several people were injured in a riot at a Tokyo department store.¹⁰³ Nevertheless, Tomino was “very pleased” when *Gundam* was featured as an example of modern art in the 2005 Osaka and Tokyo exhibition entitled “Gundam: Generating Futures,” in which young artists were given the opportunity to present their own visions of what Gundam meant to them. Perhaps nothing sums *Gundam* better than Hisashi Tenmyouya’s RX-78-

⁹⁹ Ibid., p. 68

¹⁰⁰ Schodt, *Inside the Robot Kingdom*, p. 88

¹⁰¹ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 68

¹⁰² Ibid., p. 64

¹⁰³ Schodt, *Inside the Robot Kingdom*, p. 88

2 *Kabuki-mono 2005 Version*: Tenmyouya's piece is a traditional Japanese screen painting featuring a tattooed RX-78 Gundam with a coiled dragon emerging from its cockpit. His piece illustrates the essence of the Japanese robot tradition, a fusion of centuries-old philosophy with contemporary *mecha*-chic. "Because I encountered Gundam in my adolescence," says Tenmyouya in an *Art It* magazine interview, "unconsciously it's become part of my flesh and blood. Etched in my memory is an episode from my first year at high school when I asked the girl I was going out with at the time, 'Who is your favorite celebrity?' The answer she gave wasn't a celebrity but [Gundam pilot] Amuro."¹⁰⁴

¹⁰⁴ Hornyak, *Loving the Machine: the Art and Science of Japanese Robots*, p. 68

CHAPTER 5: DEFINING MECHA

The era of giant robots and their heroic pilots meant two things: first, the presentation of the science fiction machine with an unprecedented dynamism and visual flair, and second, the reunion of human and machine in a dualistic, symbolic partnership. The evolution of the giant robot as a contemporary phenomenon is clear. Nevertheless, like many of the terms in science fiction, the use of the term *mecha* can be problematic.

The function of the term *mecha* is a delicate and complex process of linguistic ping-pong and cross-cultural confrontation. The origin of the word *mecha* is traditionally recognized as a Japanese abbreviation (*meka*) of the English word *mechanical*, or *mechanism*.¹⁰⁵ The word as a noun is both singular and plural. You can have "a *mecha*" or "five *mecha*." It is also an adjective (ex: "*mecha* story" or a "*mecha* toy"). In its original defining context as a derivation of mechanical, the Japanese use the term to refer to *any* machination, real or fantasy. The car you drive to work, the robot that built it, and the coffee maker in your kitchen are all *mecha* under the literal, denotative use of the word. In fact, the "*mecha* designer" for any work of visual fiction in Japan will be credited as such whether he was responsible for conceptualizing robots and spaceships, automobiles and airplanes, or teapots and cell phones.

When referring to their skill with machines, the general public will describe themselves as "strong" or "weak" at *mecha*. Here the Japanese have coined a term that reinforces their

¹⁰⁵ Schodt, *Inside the Robot Kingdom*, p. 42

fondness for high-tech machines as a cultural singularity. In America, we don't have an equivalent term to call attention to a general culture of machines, only industry-specific terms such as "grease-monkey" or "computer-savvy." Nevertheless, in Japan the term *mecha* has a particularly "romantic, transcendent aura" for young men, evoking the powerful attraction towards the mechanical schematics of a giant warrior robot or the working insides of a sleek racing car.¹⁰⁶

In the early 80's American television studios were looking for the next big thing to captivate the minds of young viewers bored with the do-good superhero staples of American comic fiction. Distributors began to license and air Americanized versions of popular Japanese anime series such as *Speed Racer* (originally *Mach Go Go Go*), *Voltron: Defender of the Universe* (*Golion*), and most famous of them all, *Robotech*, an animated program re-cut and rescripted from three separate Japanese properties: *Macross*, *Mospeada*, and *Southern Cross*. In April of 1984, television ratings indicated that at least fifty percent of households in America were tuning in to *Robotech* in what would be the country's first major exposure to Japanese animation.¹⁰⁷ *Robotech* also featured a new kind of breathless action involving death, love, and of course, giant robots.

In the West, the term *mecha* was re-appropriated by fans to refer specifically to the warrior-machines in these uniquely Japanese "giant robot" action cartoons—the genre of toys and entertainment featuring piloted, expressive robotic devices of manmade origin which became especially popular with young boys and adult animation fans when they were imported in the 80's. Among these were shows like Tezuka's *Tetsuwan Atomu* and Yokoyama's *Tetsujin 28*, released under the titles *Astro Boy* and *Gigantor*, respectively. Since then, *mecha* has spawned a

¹⁰⁶ Schodt, *Inside the Robot Kingdom*, p. 42

¹⁰⁷ Patten, *Watching Anime, Reading Manga: 25 Years of Essays and Reviews*, p. 303-304

variety of sub-genres and styles that have all been established as some of Japan's most significant cultural exports. Although now a resident of Japan, Matt Alt writes of his own first encounter with the Japanese *mecha* phenomenon as an American youth:

The invasion began in the late 1970s. Legions of toy robots from Japan were quietly filling the shelves of our local toy stores. Their exotic, alluring forms were unlike anything else we had ever seen: shiny, outrageously colorful, festooned with spikes and swords and spring-powered missiles and "rocket punches."

Although we didn't know it when we first encountered them, they represented the vanguard of a new wave of design in their home country. By the time the toys hit American shores, the giant robot had grown from fad to phenomenon to established pop-cultural icon in Japan, forming the foundation for the spectacular popularity of Japanese characters around the world today.¹⁰⁸

It must be noted that in spite of its prevalence in Western culture, the Japanese do not themselves use the term *mecha* to describe any particular genre of entertainment involving robotic machines. A cartoon featuring giant robots would be labeled as a "giant robot cartoon," and a giant robot would be called a "giant robot," or "robotto," not a *mecha*. This is different from the West where the term "mecha" is often used to distinguish machines with arms and legs from more traditional vehicles and other types of machinery like tools and weapons.¹⁰⁹ In fact, if you search for *mecha* (メカ) on ja.wikipedia, the Japanese version of Wikipedia, you are redirected to "kikai," which means "machines". In Japan, robots are called robots, and robot anime is called robot anime- and that is how it always seems to have been.

¹⁰⁸ Alt, *Super #1 Robot*, p.

¹⁰⁹ However, Westerners often describe vehicles and weapons as "*mecha*" or *mecha*-like if they share the same type of design style or embellished machinelike quality as traditional *mecha*, i.e. giant robots.

That the Japanese do not have a catchy title for their sci-fi robot genre does not indicate a lack of celebrity or suggest that it is not a distinct artistic phenomenon. The number of magazines, television series, movies, toys, games, art and advertising spots featuring giant robots in both the underground and mainstream cultures is proof that a new transcendent movement in science fiction exists. Irrespective of the terms used, global recognition of a common artistic pursuit has led to *mecha's* cross-culture proliferation. When I use the term *mecha*, therefore I refer to this new Japanese model of sci-fi robotics for the contemporary era—especially the giant robot.

Mecha-Chic

The working definition of *mecha* provides few criteria for what has come to be included in this broad genre of sci-fi. Whether featured in books, film, or animation, what makes a *mecha* design *mecha*, especially in an era where we are surrounded by cutting edge technology?

Mecha are typically classified by the presence of an onboard human pilot that wears the *mecha* as a suit of armor or interfaces with its control devices from a cockpit. While it was not called so upon its release, the first true "*mecha*" in this sense is often said to be Robert Heinlein's power suit from his 1959 novel Starship Troopers. Nevertheless, the humanoid automaton—made popular by writers like Isaac Asimov—became the quintessential machine in Western science fiction. Japanese *mecha* are most commonly a return to the intimate human-machine interface outlined by E. E. Fournier D'Albe in his treatise on the "soul" of the machine.

Viewed from a critical perspective, *mecha* are a return to what Claudia Springer calls "industrial" technology. While postindustrial electronic technology is often characterized by the

quiet, hidden, and perhaps more sensual internal workings of the computer and the human mind, industrial technology has "a robust physical presence and moves visibly through space." In the 20th and 21st centuries, however, the bigness and boldness of industrial technology has been superseded by the miniaturized sophistication of electronic technology to the point where even the gasoline-powered car seems outdated. As a result, Springer labels pre-industrial machines "machines of production" and postindustrial machines—smaller in size but more productive as a result of their portability and capacity for information transmission—"machines of reproduction."¹¹⁰ Most giant robots fall somewhere between these two poles—fundamentally industrial, but reliant to some extent on post-industrial technologies like computers.

Mecha also exhibit strong characteristics of what Springer calls industrial "techno-eroticism"—the passionate celebration of technological objects as objects of desire. Springer argues that artistic renderings of industrial technology in the 20th century often have techno-erotic impulses that fetishize qualities of speed, power, and force. Industrial-age techno-eroticism focused for generations on the automobile. As the culmination of industrial technology, the car "combine(s) engines, gears, wheels, and chrome into a beautifully streamlined device, extending and transforming the human body so that it can experience exhilarating blasts of speed and power."¹¹¹ This is akin to the "romantic, transcendent aura" of *mecha* robots as described by Schodt, which have taken the place of the automobile as the apotheosis of techno-eroticism in contemporary visual fantasy. It may be too much to say that the heft, thrust and power of Mazinger's rocket punch or a Mobile Suit's jetpack functions as an erotic metaphor, but these have become, at the very least, 21st-century expressions of the fascination with the machine's ability to transform and enhance the human body.

¹¹⁰ Springer, Electronic Eros: Bodies and Desire in the Postindustrial Age. p. 4-5.

¹¹¹ *Ibid.*, p. 3-4

The essence that makes a design *mecha* (or techno-erotic) is the product of a subconscious connection between the imaginations of creator and viewer. Like love of fine art or popular-design, you can "get" and identify the meaning of something that you cannot fully explain or understand. Defining *mecha* in absolute terms is like defining precisely the aesthetic qualities of "punk rock" or "modern art," and to try and do that would be impossible or even inappropriate. When you ask a *mecha* fan or artist what creates *mecha-chic*, you will come up with a myriad of answers ranging from "It has to be tough, fast, and look cool!" to "A perfect union of form and function."

On the other hand, to claim that *mecha* is too abstract to be characterized is to ignore any established truths. Generally speaking, from humanoid androids like Atom to giant warrior robots, the machines in visual *mecha* fantasy transcend the mundane to offer a glimpse of an alternate or future reality with new possibilities, the general implication being that this future setting is somehow better for the viewer *because* it includes *mecha*. As previously mentioned, any machine that runs, jumps, performs a function for society, or looks cool is *mecha*, but the word most commonly denotes the anthropomorphic, piloted, larger-than-human battle robot. However, to say that a giant bipedal walking robot is *mecha* is obvious. *Mecha-chic* is found with greater subtlety in a wide variety of science fiction machines. Civil construction tools and transportation vehicles, for instance, are machines that—while less remarkable in appearance than a giant humanoid—can have a special style or feature that exceeds everyday expectations. Consider again the automobile. In spite of what Springer might call a techno-erotic *ballet mécanique* of integrated mechatronics under the hood, the classic daily-driver is not *mecha*. In fact, a *Ferrari* is not *mecha*. On the other hand, the transforming *Mach Five* from the 1966

animated series Mach Go Go Go exudes *mecha* cool with its myriad of weapons and gadgets that spring to life from inside the vehicle.

In contrast to the car we take for granted, it is imagining what every shape and line represents; it is the tactile, rhythmic sense of the shifting, sliding, folding, rotating, and transforming of precision parts. The design and function need not be so radical, but it is the celebration and execution of what a futuristic car or robot *might* do or look like that is fundamental to *mecha's* popularity as an art form.

CHAPTER 6: PHILOSOPHIES ON GIANT ROBOTS EAST AND WEST

Since *Mecha* is, today, a global phenomenon one might think it impossible to distinguish giant robots from the East from those originating in the West.¹¹² To the contrary, by examining representative *mecha* it becomes apparent that there exist two distinct philosophical and aesthetic approaches to the robot's physical form. Apart from direct borrowings from anime, the giant warrior robot has historically never established a meaningful presence in mainstream American science fiction. Nevertheless, there are basic differences between the “Japanese aesthetic” which concentrates on the *man* and the “American aesthetic” which concentrates on the *machine*.¹¹³

The study of science fiction *mecha* in mass culture is primarily a visual endeavor. It is an examination of modern "media texts" (essentially, anything visual, written, heard, produced) and an examination of the meanings associated with *mecha* in these texts. These texts range from two dimensional artwork, to film and animation, and even toys and models. When I use the words *artist* and *designer*, I refer to people who, through mediums ranging from pencils to molded plastic have constructed a *design*: a visual representation of an imagined *mecha* machine. This can range from concept art for a computer video game, to an elaborate working plastic and metal model for a studio feature film. From toys like Sony's *AIBO* and Hasbro Corp's *Transformers*, to

¹¹² This is made increasingly true due to the influence of Japanese Animation on American art and entertainment as well as the speed and ease in which ideas can be exchanged over the internet.

¹¹³ This degree of difference is often debated among online *mecha* communities, but I believe these differences are the result of years of cultural experience.

the elaborate practical and cgi robot models from The Matrix, someone first conceived of the form and then drew/produced it for others to see. I also assume that, like all art these designs are the product of the artist's life experiences, and are designed to communicate some purpose or idea to a specific audience or client. *Mecha* designs will be viewed as cultural vessels in two contexts: how they are created and constructed visually and how they function within the narratives attached to them.

The first component of the discussion is the *design*, from concept art to the final product. Specifically, this analyzes the role of form and implied function in representing aesthetic traditions of mechanical design that stem from cultural attitude and influence. The second component, the *narrative*, targets the way the directors, storytellers, and sometimes animators have used *mecha* visually within a context or story. *Mecha* design is often influenced by its role in context, so this discussion focuses on what the design does and why it does it that way. This is the function of *Mecha* in fictional narratives representative of a particular cultural viewpoint. The narrative in question is usually the actual plot and story of a particular *mecha* text, but in individual works of art the narrative is simply the artist's purpose behind the design.

The Robot Samurai

The RX-78 Gundam and its later variations reflect a cultural outlook on *mecha* design that is distinctly Japanese. In fact, the term “mobile suit” is itself indicative of Japanese *mecha* philosophy.¹¹⁴ Japanese *mecha* are usually more articulated, or mobile, than their Western

¹¹⁴ In official Gundam lore, the origin of the term “mobile suit” stemmed from the development of large bipedal robots from smaller, human-sized spacesuits. This relationship between the fitted spacesuit and the larger battle machine show a lineage in which the giant robot is directly descended from prototypes of human form. The

counterparts, they treat the robot as a fluid anthropomorphic form, personified and with the character of a living suit of armor. Eastern designs, which tend towards the humanoid, tend to espouse recognizable classes of people—snipers, soldiers, knights, etc. In particular, the Gundam “suit” is constructed from codified and abstracted symbols of samurai armor: the prominent head crest or “V-fin” on the forehead, the separate mouthplate, jutting chin, large eyes, and round, fluted helmet with overlapping end flaps. The Gundam aesthetic also features separate, overlapping shoulder plates, a skirt of movable armor pieces around the waist, a deflection collar around the neck, articulated ankle armor, and a sandal-motif on the feet; all firsts in Japanese robot design, but suggestive of well-documented Japanese warrior traditions.

The Gundam’s standard firearm doesn’t fire bullets, but rather a brilliant stream of pure energy. This is a physical manifestation of what Phillip Brophy calls the use of “linear energy” in Japanese anime, where, according to him, a causal vein of energy is contracted from one point to another in either "dispersive wave form or directed beam form." This harnessing of natural forces can be explained, in an Eastern context, as a representation of *chi*, the energy possessed by every person and object in the world. This energy can be harnessed, stored, released, and controlled through bodily channeling and disciplinary exercise.¹¹⁵ It is not limited, however, to things like laser beams and energy weapons, and it can be depicted by the fluid vitality of the robot body in motion. Japanese artists are aware of this constant, linear flow of energy, also known as the "calligraphic momentum,"¹¹⁶ and their creation of a dynamic, articulated mechanical body dramatically illustrates this idea.

enormous “mobile suit” is by name still considered an extension of the pilot’s body. The relationship between pilot and *mecha* is akin to the way one’s clothing (or spacesuit) naturally responds to the wearer’s movements.

¹¹⁵ Brophy, *100 Anime*, p. 10

¹¹⁶ *Ibid.*, p. 10

In Japan, the brush is not used calligraphically as a tool, but as a "musculatory extension" of the body/arm/hand. It becomes self-reflexive, both in the physical sense of brushwork and in the way in which *chi* leaves its mark on everything. Because the brush is the instrument for channeling energy, any act of depiction is essentially the "recording of energy that stimulated an actioning of its form."¹¹⁷ The simplest application of this philosophy is that the anthropoid nature of Japanese *mecha* allows the robots to wield their instruments of war as a painter holds his brush. This means that the robot is an extension of the pilot on another level as well—its form and function a physical representation of the users inner self. When, on the other hand, one recognizes that it is the nature of Japanese animation to animate "brushstrokes," or energy instead of "things,"¹¹⁸ it becomes apparent that Japanese robots such as Gundam represent a deeply innate, near subconscious techno-erotic relationship more like D'Albe's "soul of the machine" than any tangible real-world equivalent.

The Gundam often finds itself in close hand-to-hand combat using swords of energy called "beam sabers" and a handheld shield. Here the *Gundam* truly looks and moves like a Samurai, thrusting and swinging its blade at the enemy *Zakus*. If the sword is to be considered the "soul" of the Samurai, the Japanese *mecha* is the soul of its pilot. It is the instrument through which he expresses his power to overcome by bonding with the machine and becoming of one mind and body. A machine with an unsympathetically inhuman design would disrupt this connection and obfuscate the symbolism that results from such a merger. Brophy summarizes the pilot-mobile suit relationship with this thought:

¹¹⁷ Brophy, *100 Anime*, p. 11

¹¹⁸ *Ibid.*, p. 11

Again, like the sword, the mobility of these suits is controlled by the user/rider/fighter within, whose own bodily control and prowess determines the suit's amplified analogues of human mechanics. This grants the mobile suits an incongruous agility, just as the humans inside become virtual machines. Such fluid interchangeability and fused duality are both a tenet of the bushido code of the samurai and a prime design factor in the manual of mobile suit operation."¹¹⁹

The Gundam's aesthetic results from the application of the ethical and spiritual traditions of the Japanese mechanical designer's culture to a design that can translate these themes into a dramatic science fiction body. Although the physical relationship of the pilot to the mobile suit is one of "containment," write Susan Napier, it can also be read as "empowerment." The frail human body inside the suit becomes stronger as it fuses with the exoskeletal armor.¹²⁰ Napier notes that this arrangement clearly plays to a "wish-fulfilling fantasy of power, authority, and technological competence."¹²¹

Napier further explores the notion of the Gundam as a type of "body armor," intrinsically connected to the human body. Unlike conventional Western robotic depictions, Japanese-style *mecha* emphasize the body over the armor, and any armor is intended to remind us of the body within. Napier cites the work of Klaus Theweleit¹²², who views the Western armored body as spiritually empty, and able to express itself only in terms of the destruction it can wreak through its machinelike fascism. In writing about the 20th century German *Friekorps*¹²³, Theweleit

¹¹⁹ Brophy, *100 Anime*, p. 154

¹²⁰ However, while the human body itself is literally contained within the cockpit of the suit, it is not a "true" containment. Although his location within the machine gives the pilot protection and strength, the nuance and demeanor of the pilot's body is magnified, focused, and transferred outwards through the body of his or her machine.

¹²¹ Napier, *Anime: From Akira to Howl's Moving Castle*, p. 86

¹²² Author of *Male Fantasies*, an examination of the stories recorded by *Friekorps* in the Weimar Republic.

¹²³ Literally "free soldiers." During the Weimar Republic, small paramilitary death-squads formed by German soldiers seeking stability after their defeat in World War I.

expresses a Western view of technologically advanced armor that dehumanizes the wearer. In an idealistic setting, this soldier is described as having a "...machinelike periphery, whose interior has lost its meaning..."¹²⁴ The Westernized ideal of looking upon a fighting machine is to stare into a cold, soulless entity that only finds self-meaning in the destructions of combat. This weapon's inhuman outward shell is how it defines itself and how it relates to its surroundings. The Japanese "body armor" philosophy is distinctly different. Napier emphasizes that while the Japanese giant robot series feature grand displays of mechanical agility and technological violence, all too often we are reminded of the human element within these *mecha*. As a Mobile Suit is pummeled with robotic punches and kicks, it hunches over, reels back, and staggers as if it were alive. When the cockpit is riddled with bullets, blood and gore seeps out over the smooth outer shell, snapping us back to the reality that these machinations only thrive due to the existence of their human cores.¹²⁵ This duality and interchangeability of character and focus is unique to the style of Japanese robots, to the point that the motions of the robot, as depicted, and the emotions of the pilot inside become one.

The Walking Tank

An iconic Western representative of the contemporary *mecha* myth, *Robocop* is a 1987 science fiction film directed by Paul Verhoeven. The tagline reads: "Part man. Part machine. All cop. The future of law enforcement." The film is a cyberpunk action piece set in a dystopic, near-

¹²⁴ Napier, *Anime: From Akira to Howl's Moving Castle*, p. 89-90

¹²⁵ *Ibid.*, p. 89-90

In most *mecha* the personification is so complete that the robot will continue to exhibit the characteristics of a living, breathing, walking suit of armor even when no pilot is present.

future Detroit, where the under-funded and undermanned Metro Precinct police department has allowed violent gangs to run rampant. Enter Omni Consumer Products (or OCP), a patriarchal mega-corporation that promises to rebuild Detroit into a modern utopia, beginning with the elimination of all crime. To this end they employ the new ED-209 autonomous law enforcement robot, superior in strength, firepower, and its semi-expendable nature. Their plan fails when the ED-209's artificial intelligence proves unreliable and runs amok during a trial demonstration. In order to save-face, OCP turns to the Robocop Project. Recently killed in the line of duty, Metro police officer Alex J. Murphy becomes the project's first candidate and his face and brain are rebuilt into a new cybernetic body. While the cyborg Murphy faces corporate corruption, deceit, and a final showdown with the ED-209, he confronts his own humanity through memories of his past identity.¹²⁶

Although *Robocop* the film is a rhetorical message, the image of the ED-209—now an icon of sci-fi design—is itself a rhetorical symbol. The ED-209 best represents the category of design that has become synonymous with Western *mecha*—the “walking tank.” This designation describes machines whose form and function is more akin to a military vehicle with legs than a walking soldier. Of particular interest to me is the ED-209 and the way in which it emphasizes patterns of Western militarism and consumerism through visual performance and representation. In considering the ED-209 within the context of Western science fiction, it becomes apparent that this form and its function enforces Westernized beliefs about technology and humankind's relationship with it. The following analysis the ways in which the ED-209 acts both as a representation and as a critique of these technological ideals.

¹²⁶ *Robocop*, 20th Century Fox Home Entertainment.

Enforcement Droid Series 209

The film *Robocop* is Verhoeven's critique of the corruption and greed of big-business driven capitalism in the 1980s. Thus, the ED-209 is the visible end-product of OCP's corporate haste and waste. Marketed with the same hyperbole and conceit as an ad for a cutting-edge automobile, the ED-209 embodies within its frame corporate American values: Craig Davies, designer of the ED-209, comments that director Verhoeven didn't want anything "cute" on the robot—the design was supposed to look "hard and mean." Eyes were eliminated from the final design because they were too emotional, and didn't fit the model for a fearsome machine designed by corporate America.¹²⁷

Verhoeven's desire to capture the essence of "corporate America" in mechanical form is the driving motivation behind the ED-209 concept. The ED-209 thus functions as a Western design on two levels. It represents the product of a fictional American corporation, but it is also the result of an American creative team thinking about what makes an American robot. Davies writes:

I myself already had a pretty strong idea of what a giant robot should look like, especially when it was a product of modern American design. To begin, I thought it wouldn't be designed to be wholly functional. First they'd design it to look neat and then they'd worry about making it work. In other words, these futuristic designers would pay a lot of attention to the cosmetics of it in an attempt to market the thing on looks alone -just like an American car.¹²⁸

¹²⁷ Robocop Archive, "Making ED-209"

¹²⁸ Ibid.

Davies' design incorporates many references to the inefficiencies of design by corporate committee. Specifically, there are four large hydraulic rams on the legs. Davies points out that even if you built such a gigantic beast in real life, it wouldn't need half that many rams—the powerful joints of a real-world backhoe or crane feature only one. In his view, the technological redundancy is what makes the robot a true corporate product. The grill in the front of the head unit is another critique of American design. It evokes the front of an automobile body but, from a weapons design standpoint, it is a structural liability. "Some people look at that and they go, 'Oh, it's a mouth.' But it's also a big, obvious, extremely stupid place to put an open area like a radiator on a fighting unit like ED 209. Through those kinds of things my feelings about the real Detroit come through on the robot"¹²⁹

Generally speaking, in Western science fiction robot design often emphasizes machine characteristics over human ones; technological innovation is demonstrated over self representation and metaphysical symbolism. Although the ED-209's retains a sense of anthropomorphism, its appearance is decidedly un-human. Its central "cockpit bubble" and arm pylons evoke imagery of Western attack helicopters rather than ground troops. Rigid legs with reverse-joint knees and multi-pronged "chicken" feet are designed to evoke stability, efficiency, and simplicity—not a human stance and gait. Unlike their Japanese counterparts, American *mecha* don't roll, jump, or kick. The ED-209 moves through calculated, procedural motions not unlike the rhythmic beating of an engine, yet its immense bulk lacks the necessary speed and agility to maneuver effectively within an environment designed for human inhabitants. The ED-209 overcomes obstacles with technologically superior firepower—instead.

¹²⁹ Robocop Archive, "Making ED-209."

Western sci-fi robots adhere to a general code of “form follows function,” even if, in the end, all giant robots are by their nature illogical and impractical. The ED-209 projects a sense of *implied* tactical functionality, with hard-mounted weapons instead of hand held ones and a no-nonsense aesthetic. In the world of giant robots, physics and economics are ignored and realism is relegated to a design trend. The ED-209 takes many design cues from real-world tech, incorporating radiators, heat exchangers, oil coolers, and other automotive parts into the body design, all of which serve to heighten the sense of its mechanical nature.¹³⁰ It is this *mechanicalness*, the raw essence of post-Industrial Revolution mastery which becomes a Western design convention. Exposed wires, hoses, pistons, and vents are the recognizable artifacts of human intervention. Although by its nature the autonomous ED-209 features elements of postindustrial science, as a mode of visual representation it most closely resembles the heft, thrust, and power of industrial technology, and thus symbolizes the explosive mechatronic output of 1980's Detroit.

Although the design of the ED-209 robot communicates rhetorically, it is the way in which the design is used within the film that completes the message. To the Western viewing audience and the characters in the film itself, the idea of a fully autonomous robotic police "droid"—a cop that doesn't need to eat, or sleep—is a great novelty. Nevertheless, as the science fiction of the past has demonstrated, novelty is often met with hesitation and insecurity.

We see this insecurity play out in the film when the ED-209 is first introduced to the Omni Consumer Corp board of directors. During a trial demonstration, a volunteer ("Mr. Kinny") is asked to aim a loaded handgun at the ED-209. As a reluctant Kinney points the gun at the ED-209, it roars to life and initiates its arrest sequence: "Please put down your weapon. You have 20 seconds to comply." Unfortunately for Kinny, the 209's experimental artificial

¹³⁰ Robocop Archive, "Making ED-209."

intelligence routine malfunctions. Although Kinny places the weapon on the floor, the ED-209 becomes more forceful: "You have five seconds to comply. Four... three... two... one... I am now authorized to use physical force!" As the ED-209 turns its cannons on the hapless Kinney, the man is reduced to hamburger before a shocked, yet comically jaded audience of apathetic executives who, just moments ago, were more than eager to give Kinny up to the 209 as they scrambled for their own safety.

For all its implied technological prowess, the OCP ED-209 is in practice a failed experiment: the programmed nature of its logic meaning that it can't make rational decisions outside of a series of set parameters. Kinny's death at the hands of the ED-209 and the non-reaction of the board members demonstrates an attitude of unacknowledged corporate responsibility and an ignorance of moral consequence. The scene also serves as a visceral depiction of the ambivalence of our predisposition towards machine-dependency. This is the "double vision" described by J.P. Telotte, who ascribes to Western sci-fi films "the simultaneous celebration of technology through its privileged presence in the narrative and an excoriation of its destructive and dehumanizing potential."¹³¹ These ideas become encapsulated within the robot's intimidating metal figure.

Later in the film the ED-209 pursues Robocop through OCP headquarters, until the chase leads to an internal stairwell. The 209 attempts again and again to descend the stairs, feeling blindly with its foot-pads as it searches for the pressure-sensitive stimulation required to accurately assess its terrain. Even in his restrictive cyborg body, Murphy is able to negotiate the stairs with ease but, the ED-209's excessive, unnatural bulk and lack of human dexterity causes it to tumble down and fall clumsily on its back, kicking and screaming like a baby. In these scenes

¹³¹ Napier, *Anime: From Akira to Howl's Moving Castle*, p. 86

the juxtaposition of ED-209 with the humanoid Robocop, who is already more machine than man, confirms its reputation as a soulless, silly, clumsy machine—a satire of our hurried push towards robotic replacements.

In *Robocop*, the malfunctioning ED-209 represents a fear of machines that is all too common in Western sci-fi, as autonomous robots created by humans subsequently threaten our humanity. The positive aspects of *mecha* are diminished to the extent that the mechanical augmentation of society becomes a liability. The final message of the film is that although the cyborg Murphy is overcome by his own technological body, in the end it is his *human* qualities that enable him to persevere over the soulless and inhuman ED-209. The message here, according to Christine Cornea, is that “rather than the industrial technologies that provided him with his powerful armored physique, it is his engagement with these connective, cybernetic technologies that enable him to find himself.”¹³² Unlike the Japanese ideal of the mobile suit pilot who is only victorious through his union with *mecha*, *Robocop* depicts a future where the characters of Murphy and the ED-209 defend the separation between man and machine, soul and cyberbody, human and *mecha*.

¹³² Cornea, Science Fiction Cinema, p. 128

CONCLUSIONS

Why *Mecha*?

What makes *Mecha* the new sci-fi mechatronic continuum? Science fiction represents what people are thinking about technology and *Mecha* sci-fi in particular is a contemporary, graphic approach to articulating and understanding humankind's intimate relationship with robotic machines, used both as tools and weapons. We need a vehicle to experience the technological problems of the future today; a need *Mecha* artists and their army of androids, cyborgs, super robots and Mobile Suits are eager to meet.

This essay is an attempt to interpret “low culture” pop-entertainment as an indicator of broader societal values and cultural traditions. Applied practically, the philosophical approaches taken in these forms of sci-fi escapist entertainment often mirror the attitudes cultures have towards real-life robotic machinery- from replacement prosthetic limbs, to robotic household companions and even weapons of war. Recent examples include the American films *I, Robot*, *The Matrix*, and *The Terminator*, all of which explore humankind’s struggle to find its place in a technological society.

In film and animation, *Mecha* function aesthetically as visual metaphors and cinematically as thematic allegory. In this new fiction, the attitude of the artist-citizen towards the emergence of a robotic, hi-tech society are expressed without the limitations of a practical

and commercial reality. Hard science and engineering have not yet caught up to the culturally-nurtured imaginations and ambitions of the human spirit, and they never will. Instead, the artists and creators of *Mecha* fiction consciously and unconsciously translate and magnify this social consensus into mechanical designs and narratives that force a particular paradigm on the overall human-machine relationship. By reverse-engineering and analyzing these *Mecha* designs and how they function as creative works, I think we can better understand how two cultures East and West have come to express their relationship with technology.

The *Mecha* phenomenon is the result of the continuous evolution of the automatic or semi-automatic machine in popular culture. As the robot evolved, some found it to lack a key human element. The same autonomous, hands-free interface that once made the robot so marvelous to writers and thinkers like Asimov also made it more frightening. Yet when viewed broadly, *Mecha* are no less terrifying or destructive. Death, destruction, and chaos seem to follow in the wake of these machines and their warrior-pilots. The better of them often caused collateral damage in the hundreds of millions of dollars. Yet in spite of all this, *Mecha* represent the search and desire for a new mechanical intimacy in a timeless relationship with machines that has been marked by "otherness" and uncertainty.

With the boom of the internet and the import/export of film and media, there is a rich cultural interplay between Japan and America that did not exist until the last decade and half. Resulting from this is an aesthetic and artistic dialogue between these two countries, with specific *Mecha* archetypes representing the language of this exchange. In 2007 *Transformers*, an American-produced film based on a series of Japanese transforming robot toys from the 70's and 80's grossed over \$700 million worldwide, proving that, Japanese or American, East or West, we all dig giant robots.

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