

## Sea Creatures who Walk

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### Introduction

Sea creatures have been with us ever since Man learned to gaze at waters and dream. Monsters from the depth are a part of seafaring lore which is why they seem so fascinating. What really is just under the surface...just waiting...looking?

As we gaze into the sea's murky depths we have a sense of fear of the unknown. What sort of scary creature is lurking there just waiting for you to be their next meal? Film producers have known this since the silent cinema days and have gone to (ahem) great depths to exploit this fear for cinema audiences.

Universal Film Studios' Creature From the Black Lagoon franchise is a favorite among sea creature critics and fans alike. Though most naturally prefer the first two films, *The Creature From the Black Lagoon* (1954) followed by the sequel, *The Revenge of the Creature* (1955), my personal favorite is the third in the series, *The Creature Walks Among Us* (1956). After all, this film features several scientists involved in hematology, surgery, genetics, evolution, and physiology. All this and more packed into a measly 78 minutes! Many dismiss this film as "scientists babbling ridiculously" and though somewhat true, much can be learned from such 'babbling'. Which is the point of these articles for Scary Monsters magazine, to help make sense of such babbling and hopefully learn something fun along the way.

### **The Creature Walks Among Us** (1956)

The tag-line for this film is, "Beauty and the Man-Beast from a lost world".

#### Brief film summary

In this film a team of scientists go into the Florida Everglades in search of the Creature (he is there from the film, 'Revenge'). In their attempt to capture him he is accidentally burned. As the scientists treat and examine the Creature they realize how close to human he really is. They then contemplate the idea of going one step further and attempt to make him "human". In essence, convert a sea animal into a land animal. In the end, the gill-less creature escapes, wreaks havoc, and returns to the sea to face an unknown fate.

Note: the Creature originally came from the Amazon, a fresh water environment. The sea surrounding the Everglades, the Atlantic Ocean is salt water so the Creature is euryhaline, meaning spawned in fresh water but can readily adapt to salt water, a rare process for water living species. North American salmon are

also euryhaline, spawned in fresh water can adapt to the ocean's salt water (see below entry on *Humanoids From the Deep*).

So, irrespective of the babbling, how does one go about converting a sea animal into a land animal? Something that perhaps Dr. Moreau considered if not actually tried.

#### Group science

One interesting aspect of this film is the divergent group of scientists all working together towards a common goal. In the film are a geneticist, a biochemist, a surgeon, and an x-ray specialist that all work together to better understand the Creature they just caught.

At first they just wanted to understand the Creature's biology but after discovering his peculiar and perhaps unique physiology the scientists changed their plans and wondered if they could convert a sea creature to a land animal. This concept drove the rest of the plot.

#### dialog

Dr. William Barton: We are turning a sea creature into a land creature.

Dr. Thomas Morgan: We only use what nature offered. The lungs were there, we don't make them.

Barton: You'll see, Dr. Morgan.

Morgan: Just don't move too fast trying to change him.

Barton: Are you afraid of unknown things?

Morgan: I'm only afraid of misusing what I do know.

#### Rotenone

In *Scary Monsters* #110 an article about poisons in SF films noted that the word, 'rotenone' was misspelled in TCWAU. Clearly seen on one of the poison tanks used in the film was the incorrect spelling, "rotonone". No matter how it is spelled, it kills. As Morgan comments, rotenone will, "anesthetize him in a matter of seconds." Rotenone inhibits mammals' ability to use oxygen and will not anesthetize but rather cause death. When captured the Creature is harpooned with two rotenone spears and most likely this should have killed him.

#### Blood work

A man living in the Everglades was located who fought the Creature with a knife. The scientists examine the blood still on the knife and Barton comments, "The red corpuscle count checks with the Ocean Harbor figures, 35 percent [from the sequel, *Revenge of the Creature*; see the article, "Dr. John Agar, Scientist" in *Scary Monsters* #102]. Half way between the count in mammals and marine life vertebrates. Nature moving out of one phase into another." It should be noted that though the blood count does indeed differ between marine life vertebrates and mammals there is no "half way between" point.

While examining a fresh blood sample from the captured Creature, Johnson, the biochemist, notes that the red blood cells (RBCs) do not have a nucleus. Just so you know, all mammals do not normally have a nucleus in their RBCs. The only animal that has nucleated RBCs is the duck. All other vertebrates have a nucleus in their RBCs. Since fish RBCs normally have a nucleus and since the Creature's RBCs do not have a nucleus one would conclude that the Creature is more human-like than fish-like. For mammals, to maximize the amount of hemoglobin in each RBC the cells extrude their nucleus during blood cell development, which is why blood banks must constantly replenish blood supplies since RBCs typically survive for only 120 days.

For the Creature's RBCs Morgan asks, "Are the corpuscles beveled?" Meaning are they missing a nucleus. Johnson replies, "No", and Morgan responds with, "Then the blood type is of a marine life animal." Meaning the RBCs have a cell nucleus. This is a mixed conclusion since it was already established that the Creature's RBCs do not have a nucleus and are therefore, 'beveled'. But, as Morgan says, the blood type is 'marine life' then the RBCs would have a cell nucleus and therefore not beveled.

Once the blood analysis was done on the Creature Barton wants to "build up the corpuscle count" (i.e., RBCs) in the Creature bringing it more in line with human values. The most efficient way to do this would be using the hormone, erythropoietin. Erythropoietin (EPO) is a glycoprotein hormone that plays a principal regulatory role in erythropoiesis, the process of production of red blood cells. This hormone is primarily secreted by the kidneys (does the Creature have kidneys?). Fish kidneys are different from mammalian (and human) kidneys. In fish, their kidneys are primarily involved in water and salt regulation; different in salt water fish and fresh water fish. In humans, kidneys are primarily involved in body osmoregulation so to go from sea Gillman to land Gillman would involve some sort of kidney restructuring. Injecting EPO into the Creature should, however, "build up the corpuscle count".

You're fired

In their attempt to capture the Creature he jumps on board the skiff to attack the scientists. It was noted that the Creature weighs about "300 pounds" so this much weight added to the small skiff may have sunk it. Nevertheless, during the attack the Creature unfortunately lifts a can of gasoline over his head thereby spilling the gas on his body. The gas is ignited that causes "third degree burns" on his body. However, the Creature was not on fire for all that long, a few seconds of actual screen time, since he immediately jumped into the water after he was set on fire thereby extinguishing the flames. The scientists then bring the seemingly badly burned Creature to their lab (located in their boat) to care for and examine him. He is seen strapped down on a gurney bed while under their care. Even though the Creature was hurt he shows great strength by breaking his wrist leather straps attached to his gurney bed.

Since the Creature's gills were also burned Barton comments, "He isn't converting enough air into oxygen...he's dying of suffocation." Morgan responds, "But so slowly. He's getting a small air supply from some area." [Note: Mammals do not "convert air into oxygen", but rather remove oxygen from air for proper respiration. Gills are used for removing dissolved oxygen from water, not air.]

The burnt portions of his outer body would heal and assuming that the Creature does indeed have both human skin and fish skin (see below) then different healing processes would be necessary to repair each skin type. Complex indeed.

### Gill and lung

In the lab a chest x-ray of the Creature is examined and Barton says, "We were right. There is a perfect lung formation. It shows much darker than average. They could be partially collapsed." The African lung fish has both gills and lungs, which uses gills during the rainy season and lungs when the lakes dry up, so there is a real example of a mammal that has both so it could be possible that the Creature too has both gills and lungs. After all, in the first two films of the Creature franchise he is frequently seen on land (why else would he have legs?) so he must have some sort of lung capacity. Furthermore, during one scene in the first film, TCFTBL, we see a scientist discussing the biology of lung fishes so the idea is familiar with Creature connoisseurs.

Further commenting on the Creature's chest x-ray, Morgan asks, "What's that black patch at the opening of the lung?" Barton responds with, "Not a typical human formation." At first this may seem like a 'throw-away line' (scientists babbling) but it is an interesting comment that deserves further analysis. "Not a typical human formation" does indeed add much authenticity to the Creature in that he would of course have internal body structures that are not 'typical human formation'. Being somewhat amphibious the Creature would have developed unique anatomy and physiology to support both sea and land survival. Stating the obvious, the Creature has both gills and legs so the ability to survive in water and on land is there and not a typical human formation.

While being captured the Gillman roars and growls suggesting vocal cords, something fish do not have. Also, later in the film, once captured and on land, we clearly hear the Creature growl. Where did those vocal cords come from? Also, if the Creature can make vocal sounds then he must also have hearing though no "ears" are clearly visible.

### Breath of fresh air

Once the scientists realized the Creature has lung capability Johnson places a respirator over his mouth and says, "He is getting very little oxygen", suggesting some sort of obstruction. Barton immediately understands the problem and comments, "We'd better get those lungs inflated and working again. We'll do a

tracheotomy immediately.” A tracheotomy tube is placed in the Creature’s throat and his chest immediately rises and falls in a breathing motion. When the throat is blocked no air could get to the lungs. The Creature may have an anatomical structure like a septum that closed the throat while underwater and a simple tube in the throat bypassed the blockage allowing air to go directly to the lungs. As the Creature begins to breathe on his own Barton exclaims, “We are changing a sea creature into a land creature.”

#### The game of Yacht-zee

In Barton’s yacht, Vagabondia III, is located his laboratory with an astonishing array of equipment and supplies. Visible are an examination table, cabinets, shelves, books, a variety of instruments, light box (for x-rays), compression tanks, glassware, a nice microscope, and a table top centrifuge, among other bench bling. It should be noted that they also have an x-ray machine on their yacht! In addition, for surgery, they must have a means of sterilizing surgical instruments such as scalpels and clamps. Where is the autoclave to sterilize? All this equipment requires a significant amount of power to run so the boat must have its own megawatt generator which would be an unusual item to have on board.

After looking over the lab in the yacht Barton looks at a small glass cabinet and comments, “I had no idea you (i.e., Morgan) could arrange surgical instruments this well.” All meaningless babbling. Any rough seas would rearrange everything.

An onboard sonar device, also located in the yacht lab, reveals the “exact species of fish”. Obtaining the size and number of fish by sonar is reasonable but to determine the exact species is beyond the technology at hand.

#### Lab data

No matter what data is the holy grail of science. The more data you have the better you understand the problem at hand and can propose real solutions. The scientists all get together and use their individual expertise to examine the Creature and obtain data.

An electroencephalogram (EEG), a technique used to measure and record various brain waves, is obtained from the Creature and gaps are noted in the recordings. Barton comments, “He had a critically low supply of oxygen to the brain for more than an hour. It could have caused permanent injury.” Though possibly true it is difficult to know exactly how the Creature’s brain functions and what areas, if any, were affected. For humans, starving the brain of oxygen for as little as 8 minutes is enough to cause irreversible brain damage. So for the Creature to have a “critically low supply of oxygen” for an hour may or may not have caused any damage. Though low it could have been sufficient enough to allow normal brain function to continue without damage. Some of the Creature’s

aggressive behaviors later in the film could be attributed to some sort of brain damage.

While looking at another chart recording Barton comments, “The metabolism rate (of the Creature) shows several sharp changes. It was the method of breathing...we should have known. The step from fish to amphibian to mammal, it had to be the method of converting oxygen.” An increase in oxygen consumption does increase the metabolism rate so the evolution of fish to mammals would also increase metabolism through more efficient oxygen consumption.

#### Surgery in session

Initially, Barton reasons he wants to surgically alter the Creature so he can learn how to adapt man to the conditions of outer space; a noble though totally impractical cause. Barton comments, “The Creature can be changed. We can make the giant step and bring a new species into existence...we can create an entirely new form of life. We can change the blood texture, build up the red corpuscle count, then the gene structure has to be affected.” Unfortunately, this is wrong on all accounts. The Creature *is* a new species (!) so why would they want to create another new one? Changing the blood texture is open for interpretation and could include the texture of proteins and other molecules in blood, the texture of cells, such as white cells and red blood cells, and/or the texture of the serum or plasma. To radically change the blood texture would mean a major change in the DNA genetics of the cells and tissues that make up blood and its components. No need to do this with the Creature.

All in all, surgery will get you only so far. The rest of the way will involve some combination of hormones and modifications at the DNA level. For a complete transformation of the sea Gillman to the land gill-man extensive surgical procedures as well as gene therapy are needed and none of these are seen in the film so we can only suppose.

#### Removing bandages

Bandages from the Creature’s hands are removed first revealing an articulated, webbed five-fingered hand. Then the bandages from his head are removed revealing a face that is human-form in shape. The Creature’s eyes show intelligence as his gaze shifts from Morgan to Barton. His eyes clearly appear human whereas in the first two films in the Lagoon series his eyes are more fish like. Somewhere along the way his eyes morphologically changed. Did the Creature’s range of vision also change as his eyes went from fish to human?

#### Gillman skin

After removing the bandages from the operated on Creature, Barton says, “The fire burned away the outer scale. There’s a structure of human skin underneath it. Two separate coverings. The way he had lungs and gills.” Further analysis is

needed to confirm whether the skin is “human” or even skin at all and not some sort of scale epidermis hybrid.

#### Scientist to scientist

Barton and Morgan carry on an interesting conversation about the Creature while returning to the San Francisco Bay Area from their expedition. Barton says, “We’ve found the secret. Change the metabolism and man will change.” Morgan responds, “As a geneticist, I know – the way any geneticist does – that nature hasn’t created a new major type of animal on this earth for over 400 million years.” Barton continues, “The Creature’s a different major type.” Morgan says, “It’s the interaction of heredity and environment for millions of years that makes a new species. We only changed the skin, not the animal.” Fundamentally, this is correct. However, Morgan is not a very good geneticist since Nature has created countless new species within the past 400 million years. 400 million years ago was the mid-Paleozoic Era and since then Earth has had the Mesozoic Era (Triassic, Jurassic, Cretaceous), the period of dinosaurs, and the Cenozoic Era, the period of mammals, so many new species have developed. However, Morgan did get it right in noting that the interaction of heredity (i.e., DNA or genes) and environment for “millions of years” does contribute to the creation of new species. This is called adaptation.

So, changing metabolism will not fundamentally change man. All life forms on Earth, from simple bacteria to plants to mammals, including man, essentially use the same metabolic processes so metabolically changing man will not necessarily physically change man.

To sail from the Everglades to the San Francisco Bay Area (Sausalito, home of Barton) would mean they had to go through the Panama Canals. What sort of manifest did they present to the authorities about their cargo? Did the Creature need a passport? Furthermore, bringing an x-ray machine, plus a radioactive source, might have also raised a few eyebrows from Canal officials.

#### The clothes make the (gill)man

The Creature’s clothes are made of sail canvas. Never having clothes before it must have been an unusual feeling for him though he acts like he wears clothes all the time. While on route to the Bay Area the clothed Creature escapes and jumps into the water. Morgan comments that he will drown if he tries to use his lungs. We clearly see the Creature struggle to ‘breathe’ while under water. He is rescued by Morgan who uses an air hose to bring the Creature back to the surface where his lungs can function.

Once docked in Sausalito, the Creature is transported via a covered truck to the home estate of Barton. It appears the Creature is kept in the truck without being tied down. Once stopped at the estate the rear truck door is opened and the Creature freely walks out clearly showing he was transported without restraints. Did the Creature bounce around from the truck accelerating and negotiating turns

since he had never experienced such transportation and most likely did not know how to react to the trucks jerky movements while moving?

With the Creature held captive in a fenced enclosure, Barton comments, "He doesn't even know that if he returns to the water he will drown...his skin and features look more human every day." In the fenced area the Creature shows wet/moist skin suggesting he just came out of the water but there is no water in his enclosure. If his skin is naturally moist, as sea creatures naturally are, then he would need to consume a lot of liquid to replace that which evaporates off.

In one scene, a cougar jumps into the Creature's fenced enclosure and the Gill-less man had no problem dispatching the animal even though this must be the first time the Creature sees such an animal and perhaps thought it scary. Since the Creature fought alligators in the Amazon a cougar was no problem.

What would it take to actually make the Creature a functioning land animal? Well, it's all about oxygen. First and foremost he would need lungs for breathing to access oxygen and his diet and consumption of liquids would also have to change. Being a lung-breathing pseudo-mammal would most likely mean the Creature is no longer cold-blooded - much like fish, amphibians, and reptiles who derive their body heat from the environment - but warm-blooded and therefore able to regulate body temperature (thermoregulation), which is hormonal based so new hormones will need to be made for this. In mammals, body temperature is controlled by the brain's hypothalamus so the Creature will need this. Furthermore, being a land animal would also mean a change in behaviors. Hunting for food is one example since he can no longer swim to find meals.

### Conclusion

Morgan says it best: "There is no short cut. You can't bypass Nature." Eons ago life literally crawled out of the sea and forged an existence on land...and thrived.. though life radically changed since the first single-celled microorganisms. There was no short cut in this since it took many hundreds of millions of years for mammals, including man, to evolve from what crawled out of the seas. Here in the 21<sup>st</sup> Century man now has the technology to bypass Nature, for better or worse, so what took millions of years can now be done in a few hours. Scary indeed.

### **Horror of Party Beach (1964)**

Brief film summary

Fifty gallon barrels of "radioactive waste" are dumped illegally into the seas by a scow, nicknamed the "floating pig", near "Western Island" (note: according to a map on the wall this is located off the coast of Massachusetts, near Buzzard's Bay). They have been dumping radioactive waste from the university. Toxic liquid leaked from the barrels into the sea and the Atlantic ocean currents brought the toxic radioactive waste to the harbor where it found human remains

inside a sunken ship. The human remains mutated into the Horror of Party Beach, humanoid-like creatures that function both in water and on land. The monsters wreck havoc, kill some people, and are eventually killed with a chemical weapon.

#### Sea Creatures of Horror

The sea monsters in this film all have legs, arms, and hands with articulated fingers. Since the monsters were derived from human remains then humanoid features dominate. The toxic waste somehow managed to congeal various cells, tissues, muscles, bones, eyes, scales, gills, and a 'hotdog mouth' into the party beach horror. It is noted that these humanoid creatures have no webbed hands or feet. They are quite nimble when walking and attacking victims. Since several monsters are seen - at least six in one scene - then there must have been other human bones nearby the toxic spill to form them (how many bodies were on that sunken ship?). It should be noted that fish and other sea life are seen swimming in the toxic waters yet they did not mutate.

It is not clear how long the human remains were underwater. We see a clear shot of a human skull and presume the rest of the skeleton is there too. Underwater, all skin and tissues would have been dissolved or eaten leaving only the bones so the skin and tissues of the monsters had to come from somewhere else.

The scientist, Dr. Gavin, gets a tissue sample of a monster from the police and says, "I'm going to run some carbon-14 tests on this tissue. There have been some recent discoveries in the field of genetics that may give us a clue to its structure." Carbon-14 tests would help to establish the age of the tissues but since they are *tissues*, meaning living body components, then their age is very recent and no C-14 test is necessary. "Recent discoveries in the field of genetics" is true when the film was made, 1964. Just two years before that, 1962, Watson and Crick received the Nobel Prize for their work in determining the structure of DNA.

It amusing that Gavin wears a lab coat, with pens in the front pocket, while at home.

#### Walk the walk and growl the growl

The monsters walk on land for extended periods of time so they must have lung capacity to breathe air. Also, since they live underwater then they must have gills too. However, they could be amphibious. The monsters make growling sounds so they have vocal cords and therefore, lungs. Based on the monster's behaviors and actions they have some sort of intelligence. With their legs the monsters are seen walking under water instead of swimming. Later in the film the monsters are found living in a water filled quarry. Note: this would be fresh water so the creatures have adapted from the Atlantic salt water to salt-less fresh water.

### Slumber Party hi-jinx

Since this is a party beach film from the early 1960s then naturally there would be a slumber party and, as expected, the monsters invade the party. One girl comments just before the attack, "smells like dead fish." As a result of the attack it is stated that "over 20 girls killed" with body parts eaten. Some of the girls were taken away as captives. A TV commentator (with a lisp!) describes the monsters as an, "invasion from the sea". As one victim later describes before an attack, "sounds like somebody big walking in mud."

### Dis-arming activities

In one scene, a monster sees a female mannikin in a storefront and brakes the window in an attempt to attack the mannikin. As a result his arm was severed from the broken glass and subsequently taken to Gavin's lab. Of the severed hand/arm someone says, "It's still alive." While examining the arm Gavin comments, "Notes on possible malignant organism. Overall configuration that of a human arm, severed just below the elbow joint. Muscle tissue seems to be a sea anemone, species of protozoa. These organs are exactly like human organs except they have been replaced by the protozoans. Of course, this creature needs the ordinary necessities of human life, proteins, fats, sugars, and so forth. But since his organs are so decomposed they can neither produce nor retain the oxygen necessary for its survival. It needs the only food which can keep it alive." "Blood" says an onlooker. A police lieutenant further adds, "Human blood." Gavin continues, "If a human body, a drowned person, were attacked by tiny seed plants which became parasites and completely...but it's changed into, well, is it a plant or animal?" "It's both", says the lieutenant, "It's a giant protozoa...they're more like a jellyfish. You can't kill it by shooting it or cutting it up."

Where to start with such dialog? Muscle tissue that seems to be a sea anemone!?!...which is a species of protozoa!?!? The mind boggles. Anemones and protozoa are invertebrates so they have no spine but the monsters clearly walk so they must have hips which must be connected to some sort of back support, a spine. Also, protozoa are single-celled organisms so there are no organs to decompose. Even better is the concept of tiny seed plants completely taking over a human body, dead or alive, and converting it to a 'plantimal'-like giant protozoa jellyfish that walks!

### Maid of Sodium

At one point Eulabelle, Gavin's maid, says about the monsters, "A human, evil thing lurking and creeping and crawling around out there at night." Later, Eulabelle spills a beaker of sodium metal immersed in a liquid onto the severed hand/arm which destroys it. Gavin exclaims, "burning up...look, completely dehydrated, meaning all water is gone and just residue left. Protozoans are almost all water." Gavin's daughter asks, "What makes all the smoke and steam?" Gavin responds, "Sodium...plain old sodium...sodium is a very unstable

metal that reacts violently with water.” Though true, this only applies to metallic sodium and not sodium bound with other atoms such as chloride (sodium chloride is table salt). Therefore, for such a chemical reaction to happen the monsters, composed of “almost all water” would have to come in direct contact with metallic sodium, which Eulabelle conveniently spilled onto the arm.

Gavin says, “These creatures are human bodies that are kept alive by radioactive decay.” They surmise that using a Geiger counter to detect radioactivity (“radioactive water”) may be useful to locate where the monsters are. Once found they will use the sodium metal to destroy the monsters. Chunks of sodium metal are then thrown at the creatures which destroys them in violent, fiery explosions. Note: just the moisture on the hands of the humans throwing the sodium metal would be enough to activate the elemental sodium. In reality, the humans should be wearing gloves when handling metallic sodium.

[Scary monster kid scientist memory. While attending college at the University of San Francisco (1970-1974) I was fortunate to be able to spend a lot of time in the chemistry department. On the shelves of the supply room was a chunk of elemental metal sodium. To prevent this from combusting with the moisture in the air the metal sodium was kept in an alcohol solution in a jar. One day, during the Spring of 1974, just before graduating, I obtained some of the sodium metal and placed it into a Nalgene container, a plastic container popular in science labs used to hold various liquids. I used a knife and cut gashes in the plastic container. At Golden Gate Park in San Francisco is a pond called Stowe Lake. One dusk evening when Stowe Lake was not occupied I threw the sliced Nalgene container with the sodium inside into the lake and a few moments later there was a descent sized explosion with a flaming geyser of a water spout. Not expecting such a display of pyrotechnics and noise I immediately left the scene and am thankful no one found out. So, between me and you gentle readers please keep this a secret.]

Gavin’s lab is of interest. What are seen are primarily organic chemistry purification glassware, out of place for the film. Shown are the proverbial ring stand, test tube racks, flasks, (unlit) Bunsen burner, beakers, a simple monocular microscope, separatory funnel, instruments, the ability to detect radioactivity (a Geiger counter instrument), and a chalk board with simple bromide and hydrocarbon reactions.

In one scene we clearly see a sign on a building: “Police Department / City of Stamford” (Note: the action is supposed to take place in Massachusetts but there is no city of Stamford in that state. However, there is a Stamford, Connecticut which is nearby.)

#### Conclusion

On face value, restructuring human skeletons with toxin-mutated protozoa to make an articulated, fully functioning humanoid, the horror of party beach, is

ludicrous. But quite in keeping with our favorite SF film plots. After all, it is a challenge to take ol' sausage mouth seriously. Nevertheless, the babbling science is quite enjoyable.

### **Humanoids From the Deep (1980)**

Brief film summary

In this interesting Roger Corman film, Dr. Susan Drake, an ichthyology (fish) scientist at "CanCo", has been doing research to increase the size and numbers of Pacific Northwest salmon. The action in this film takes place around the Noyo river area in Northern California. As it goes with these films some of these salmon were accidentally released into the wild and swam to the ocean where they were eaten by coelacanth fish. As a result the coelacanth fish mutated into "humanoids", came ashore, tried to mate with women, and were eventually destroyed in a fiery climax.

Note, the opening of the film shows kelp beds, primarily *Macrocystis pyrifera*, and the northern California coast does indeed have kelp beds which were thriving when this film was made in 1980. Since the 2000s these kelp beds have significantly diminished due to an overpopulation of sea urchins who feed off of the kelp.

Coelacanth and coelacanth

It should be noted that coelacanth fish, *Latimeria chalumnae*, once thought to have been extinct, were first found off the coast of Madagascar in the 1930s and later in Indonesia. Neither of those places are anywhere near the Fort Bragg area of northern California so it is a mystery how a coelacanth population made it to the California coast. Please note that Noyo harbor is located in Fort Bragg, Northern California. Noyo is an unincorporated community in Mendocino County, California. It is located 1 mile (1.6 km) south of the center of Fort Bragg at an elevation of 108 feet (33 m) and named after the Noyo river.

Salmon salutations

Salmon are referred to as being euryhaline, just like the Gillman, meaning capable of freely migrating between fresh water and salt water environments. Salmon are spawned and bred in fresh water yet can easily handle the salt in oceans. Few species have this capability. Salmon have specialized cells that are able to remove excess sodium from sea water.

Drake's original intent with her work, done over the past "seven years" is "to make salmon grow bigger, faster, and twice as plentiful." We all know the path to Hell is paved with good intentions. Especially with cinemascientists!

Humanoids appear

There are many humanoids so how could they breed so quickly? How many coelacanth fish ate the mutated salmon? Did they all mutate the same way and

at the same rate? The humanoid size is, “six and a half to seven feet tall.” When seen walking on land, though they are somewhat hunched over, they certainly do not appear to be up to seven feet tall. They have very long arms (which makes them seem taller), webbed hands, and a tail. They appear to have lengthy hair strands on their upper bodies, mostly on their shoulders and arms (vestiges of seaweed?). No fish have hair.

#### Lung among us

Since the humanoids can easily walk on land then they must have lungs to breathe the air. Earlier, it is shown that the humanoids do indeed have gills, a hallmark of fish. So, they appear to have amphibian like qualities, though true amphibians do not have gills and need to surface to get air whereas the humanoids showed no such behavior and seemed quite comfortable under water.

In the film, sea fish are being depleted which is negatively impacting the livelihood of local fishermen. The humanoids are gorging on local sea life. Also, humanoids came onto land to find more food, such as in garbage cans. In addition, they attack, kill, and eat dogs so their diet is amazingly varied. While walking around on land the humanoids leave a significant slime trail so these fluids will need to be replaced.

In one scene the humanoids are seen on a beach lounging amongst some kelp. When disturbed by some people the humanoids growl and have a high-pitched scream so they have vocal cords which also means they have lungs.

#### Tadpole embryology

The scenes of fertilized tadpole eggs replicating are wonderful and often shown in classroom settings. How the eggs divide and grow shows the beauty of Nature.

Apparently, the emergence of the humanoids took place within one generation. Drake comments, “In one lifetime these creatures seem to evolve through four growth stages. Starts out as a fish and is humanoid in its final stage.” [what are the middle two stages?]. Drake further adds while examining a dead humanoid, “As far as I can tell this species only just appeared so there has to be a reason that a humanoid creature evolved so quickly...note the gills at the side of the head...look at the size of the cranium. Must have tremendous brain capacity.” For a species to appear “so quickly” means it did not evolve, which takes time and many generations, but is the result of some mutation that causes an immediate effect. Drake says, “their natural habitat is clearly the water though I think they are in the process of becoming amphibious.” Since it was noted that the humanoids have gills then these creatures were not in the process of becoming amphibious.

Dee Ennay

In explaining her research Drake says, “We add DNA5 which carries genetic information that stimulates the growth hormone in frogs. With the aid of DNA5 adults can reach maturity in a matter of days...we are duplicating this process to accelerate the growth of salmon.” Drake is incorrectly assuming that the same DNA5 gene that works in frogs will also work in salmon. Most likely, a DNA5 analog is necessary that would work specifically in salmon species. Also, this process just increases salmon numbers and does not address the “bigger, faster” claim mentioned above.

Drake further explains, “Heavy tidal surges tore apart one of our experimental plants. 3000 DNA-treated salmon escaped into the ocean.” Then Drake adds, “it’s my theory that feeding on the DNA5-treated salmon may have brought about evolution in more primitive fish like coelacanth discovered in this area a few years ago by a local marine biologist.” So, according to Drake, the coelacanth ate DNA5-treated salmon and subsequently mutated into humanoid creatures.

#### Ichthyology lab

Overall, Drake has a remarkably clean lab. Seen are test tubes in racks with multi colored liquids, several preservation jars with sea specimens (note: specimen jars typically have labels naming the species of the specimen and none of the jars seen here have labels), a nice compound microscope, and other general glassware items. Nothing indicative of someone doing DNA research.

#### Leg/limb development

So, what is really involved in limb development, in particular legs, in vertebrates? Limb development begins soon after fertilization. In the embryo a region of the developing organism bulges out forming a limb bud. A hormone called fibroblast growth factor as well as signaling molecules called morphogens serve as organizers at the end of the limb bud which helps guide further development and morphogenesis. A group of genes called the Hox genes, a subset of homeotic genes, help establish the developing embryo limb bud. The limb bud forms along the dorsal-ventral axis in the developing embryo. A special type of cell, a mesoderm cell in the limb bud, then produces the cartilaginous and skeletal portions of the limb while myotome cells form muscle components. From the basic limb bud develop differences that result in the different bones such as the pelvis, leg tibia and fibula as well as the feet and toes. In addition, muscle and cartilage form at this stage too. Stating the obvious the developing limb has to align itself in relation to the body’s axes of symmetry such as head to tail, back to front, and near to far axes for balance while walking.

Since the claim is made that humanoids are derived from coelacanth fish then did the leg limbs develop from a fin or did the limbs develop independently? If they developed independently then which organ structure contributed to the limb development? Most likely the leg development was derived from fish fins. Since the coelacanth fish have fins then soon after eating DNA5-treated salmon these fins could have transitioned to limbs. This is a mutation. Another question to ask

is did the humanoid legs develop naturally from a fertilized coelacanth egg (fetus) or mutations obtained later in life?

### Conclusions

Coelacanth fish are considered “primitive” since they have remained unchanged for millions of years implying normal evolutionary pressures did not affect this species. This does not necessarily mean they are primitive fish. Considering coelacanth fish less evolved than salmon has no bearing on whose genes would dominate in a mixing of the species. Furthermore, a coelacanth fish or any fish for that matter that ate a DNA5-modified salmon would digest the meal, including the salmon’s DNA, like any other fish or any other meal, and this digested DNA5 would not integrate into and modify the coelacanth’s genes in any way. But that doesn’t mean it couldn’t happen! In the world of SF cinema everything is possible.

### Summary

Sea creatures who walk implies some remarkable biology. It’s all about oxygen. To walk means having legs and being on land (why else would you have legs?) and to obtain the necessary oxygen to maintain metabolism to survive means needing lungs. And being in water, to access oxygen, means needing gills. Therefore, to survive under water and on land means having both gills and lungs. This is an interesting adaptation and certainly gives an advantage to species that are at the land/water interface. On land the gills would not function so there must be some sort of mechanism to block or shut them off plus keeping them moist. Likewise, under water the lungs are useless and there must also be some sort of mechanism to block their use. This was surmised in TCWAU when the Creature received a tracheotomy. It should be noted that dolphins and whales are air breathers, live in water, and can block off blow holes when submerged so our sea creatures who walk most likely have a similar mechanism.

In TCWAU film the Creature already had his legs so no further changes were necessary. In HOPB, the monsters developed the necessary cells and tissues around existing leg bones so adaptive growth occurred. In HFTD the monster’s legs mutated from fish fins so complicated gene activity is necessary for this. All in all, sea creatures who walk have a leg up on their fellow denizens of the deep.

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

For you gentle readers who like to keep track of such things below is a list of some of my other favorite sea creature films. In no particular order:

The Giant Behemoth (radioactive mutations)  
Creatures from the Abyss (radioactive plankton)  
Monster that Challenged the World (giant mollusk)

Attack of the Crab Monsters (giant crab)  
It Came from Beneath the Sea (octopus)  
Attack of the Giant Leeches  
Zaat (man into fish)  
Jaws et al (Sharknado(s))  
20,000 Leagues Under the Sea (giant squid and mollusk)  
Meg  
Piranha  
Gators and crocs (too many to list)  
Aquaman