



The Secrets

A Service Sheet for Writers

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World Building Part Two: Magic and High Tech

I know that for some folks the idea of lumping magic and high tech together is something of an anathema, but from a design approach they really are the same thing. As is noted by the Clarke dictum: sufficiently high-level technology appears to be magic. Both things have so many similarities that the handling is almost identical. After all, the difference between a lightsaber and an enchanted sword is negligible.

The first and overwhelming thing you need to keep in mind about magic is the bottom-line effect on the world. Take a look at Star Trek and replicator technology. Using it you can make anything, anywhere, at any time. There seems to be no limit, no demand on energy, no cost. This means, in effect, that worlds where this technology exists have zero economy and unlimited

energy. No one would have to work, save perhaps to earn credits so they could access health care, but then again, the hospitals and medical staff don't need money, so why would they be open and working? And so it goes. The very existence of replicator technology would so profoundly affect society that we'd probably not recognize it as coming from our own history.

This brings us to a series of basic design considerations about magic/high tech (henceforth MHT). The first consideration is the level present in the universe. If there is a high level of magic, great miracles are possible—perhaps up to and including the raising of the dead. High levels of magic would also likely include world effects, like places where rivers can flow uphill, or people can exist in an underwater city without being merfolk or having special

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breathing apparatus. There are likely to be more magical creatures which occur in the wild, and they're likely to have magical powers of their own. People, in such a world, will likely all be able to access magic on some level or other.

Low magic power levels will result in the reverse—miracles will truly be rare and virtually no one will use magic. The world will seem fairly mundane to our eyes. This is certainly easier to handle, but bring with it a need to consider a lot of the things that tend to get bypassed in many novels. MHT are assumed to deal with things like illness and other housekeeping details, so we don't have plagues, open sores and other ugliness running around. In the world before penicillin, for example, a dirty wound was a serious problem—in the Civil War a significant number of deaths came from sickness and infection instead of instant battlefield causes.

Scarring, amputations and the like will be far more common in a low magic setting.

If you think of magic level as one axis, you might cross it with another, and that would be breadth of magic. Just how widespread is it in the world? If there is a lot of magic, but it is concentrated in the hands of a very few, the world will likely be run by an oligarchy of magicians. On the other hand, if there is lots of magic, but everyone can do something, you end up with a world where everyone has a talent, and those who use them the best are likely to become the heroes. Low magic levels and only a few practitioners boil down to the old saying: in the land of the blind, the one-eyed man is



king. And if its low magic and widespread, heck, you have *our* world.

And, yes, technology does work the same way. In **Guns, Germs and Steel**, Jared Diamond is very successful in showing how sufficiently higher technology (steel and guns) can allow a handful of people topple empires (Pizzaro versus the Incan Empire). Back to Star Trek, you can see why the Prime Directive was in place, and why you got interesting stories whenever it was ignored.

In various books I've handled magic in a variety of ways. **Eyes of Silver** takes place in a magic rich world where everyone has a talent—but very few can handle powerful magics. The **DragonCrown War** books have a magic-rich world, but few people can handle magic, and fewer can handle it well. In the **Chaos** books and **A Secret Atlas**, the worlds are highly charged with magic, and the means for controlling it are not easy to come by. In the **Star Wars** novels you have worlds where magic is limited to the few, but high

tech is easily available to the many, balancing one against the other.

Another point that cannot be stressed enough is the *cost* for MHT. Cost is really the first in a series of limitations that need to be imposed on MHT. If there are no limits, there is no drama because no decisions have to be made. Drama comes, in part, from the tension between what a character can do, would like to do and is allowed to do. Where these things come into conflict is where we get drama.

Cost for MHT is critical in making the world seem real. Many fantasy novels require a spellcaster to be tired after clicking off a spell, and this is a good limitation.

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Dennis L. McKiernan has used a system where triggering spells literally takes time off the caster's life. D&D adapted a system from Jack Vance where mages had to study to cast spells, and could only use those which they had prepared ahead of time. In this world, then, magic *cost* time and forethought. In yet other systems, magic takes components to cast, so if you're out of frogwort at the wrong time, you're in a serious world of hurt. If you have to sing spells, you best not get a sore throat or be underwater. With high tech you're talking computer connections, batteries and ammo clips as the main costs for magic. (And those seriously *big* bits of high tech magic require big machines and are often too heavy for a single person to carry.)

The important point about cost is simply this from a dramatic standpoint: cost forces decisions. If a mage knows that clicking off a spell will save the day, but likely cost him his life, he has a decision to make. If the captain of a starship knows that making a warp jump while within a system might burn out his engines, he has a decision to make. Weighing the consequences and making the ultimate sacrifice are very powerful tools in storytelling, and MHT costs make them available to you.

Figuring out exactly *how* MHT works is very important, but here magic and high tech diverge. High Tech, with a few exceptions, has to actually *work*. The exceptions are for things that have become standards in the field: artificial gravity, faster than light travel, unlimited energy, instant communication, matter transfer, energy weapons and defensive weaponry. There are a lot of stories written using nothing more than those standards, but a good author will do the research to understand technology

enough to make the descriptions work. Likewise, see above, he'll do the brain work needed to make sure the rest of society functions around the technology described. After all, if everyone has jet-belts, will we have stairs anymore? Ditto if everyone has a personal communicator, will we have pay phones?

Magic gets to be a little bit different since you're making stuff up out of whole cloth. Sure, there are laws of magic and magic systems worked out by mages who claim their work will let you cast spells. Things like the laws of similarity and contagion, for example, form a good basis for a believable magic system. Beyond that, however, when it comes to the mechanism of stuff, you get to figure it out. The reason to come up with a rationale for magic is so that all magic effects in your story are internally consistent.



In **Once a Hero I** postulated that all magic boiled down to using energy to influence probability and time. If the effect was improbable and you wanted it to happen

now, it was going to cost a lot. Things that were likely to happen, like dry tinder catching fire, didn't cost that much *now* and less if you were going to wait for the fire to start. In **Cartomancy** a character learns that magic is using energy to shift the balance between elementary states. Shifting something from liquid to vapor is not as costly as shifting something from vapor to solid, for example. (There are other aspects to all things that help define them, so the balancing thing is tough.)

Whatever rationale you use, it really doesn't matter. You just need to know what it is and make sure it works with every effect you show in the book.

Now, just because you've gone to all this work to come up with a mechanism for how

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things work, do *not* think you need to show your work to everyone. Such discussions can be rather boring and slow a story down. For example, explaining how magic works during a combat scene is *not* a good idea. If you do want to show how clever you are (and I fall prey to that all the time), pick an appropriate spot in the story to do so. I'd also go back at a couple other points and show that having knowledge of how magic works impinges on someone's ability to make a decision, or puzzles him, so the reader has a reward for having stuck through reading all that stuff.

Another big area that needs to be addressed with MHT is the *source* of it. Magic often has a variety of sources, usually centered on religion and then one or more independent traditions. High tech is the same, even in our world. While it might be possible for any of us to buy anything we want, the simple fact is that medical technology is limited to the medical priesthood, security paraphernalia is in the hands of police officials, heavy weapons belong to the army (or gangs) and so on. Heck, the fact that you're reading this on a computer screen makes you a source of magic for folks who are utterly computer illiterate.

In SF/F, we also have the species factor that can allow us access to different sorts of MHT traditions. I actually like it when different species in a fantasy world have different traditions, especially when they baffle others.

The important thing about the source of magic is that it can influence the presentation of it. If magic comes from a god, it's likely to be tied to that god's aspect.

For example, a priest of Ares is likely to be good with combat spells, but in the transport or communication or healing areas, he's not going to be as good. Someone who learns magic over the course of his being an apprentice sailing a ship is likely to learn stuff that will splice lines, repairs torn cloth, plug holes and deal with wind and water, where as fire, earth and livestock magics wouldn't be top of his list of things to do.

In the high tech area, another old saw applies: if all you have is a hammer, all problems look like nails. Having forty-seven clips of ammo for a nifty gun isn't very useful when you've got a sucking chest wound. And having big band-aids isn't quite the thing you want in a hostage-taking situation.

Another point to consider is *control*. How does one learn to work magic? How long does the schooling take? Can it be easily passed on? Do you need peace and quiet to cast a spell, or can you do it under combat conditions? Do you need special things to make it work. (At my brother's

wedding reception, to which half the doctors in Burlington, Vermont had been invited, my grandfather fainted. My uncle Dick Bouchard, an internist, worked on him and noted afterward that even with all the doctors there, they were all pretty much powerless without a blood pressure cuff, stethoscope or a flashlight.)

On a very basic level, if the enemy fighting the Space Patrol has tentacles, what are the chances you can pick up one of their guns and even find the trigger? Worse yet, what if it only works because of electrical charges they pulse into it, or specific chemical compounds they ooze from their flesh?



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Considering control also leads one to look at its opposite. Can MHT get out of control? What are the consequences of its use? If someone can be brought back from the dead, for example, what is the effect on that person? In **The Dark Glory War** a bunch of warriors had their wounds healed by magic. The enemy went and cast one huge *dispell*, which undid all of that work. The warriors who thought they were set to go now had to decide if they could go further, and leaders had to decide what they were going to do with the wounded.

Yet another point that has to be dealt with is the *basis* for the magic. Is it possible to enchant items? (For high tech, sure, you can make an item into a wonderful thing, but can you enhance a human?) Is magic limited to an inherent ability for a creature or item? In other words, can magic only make swords sharper, but fail to make them glow—similarly making torches brighter but not being able to do anything about their usefulness in combat? Are some powers, like flight or *psi*-ability naturally part of a person, or can they be granted through magic? And can magic hamper any of the same things?

I've worked with a number of different bases for magic. In **Eyes of Silver** one school of magic held that only items could be enchanted, while another would only allow magic to work on humans. Using enchanted items is a great way to limit magic, since without that item, things won't work. Giving the item limited charges or exacting a cost for using it, further heightens that limit, and makes the situation more dramatic. In **The Dark Glory War**, a magic sword promises to make someone invincible in combat, save that in his *last*

combat using it, he *will* be broken. As can be imagined, drawing that sword each subsequent time becomes more and more difficult.

A lot of magic in fantasy novels falls into the class of “flash-bang” stuff. It's really roleplaying game magic: a mage points his staff, clicks off a spell, a monster goes boom. A lot of flash-bang magic is used in describing combats, but seldom is there any consequence to its use, any cost paid for its use and are any serious decisions made about its use made. Obviously this goes against a lot of what I've been talking about, but if the conditions mentioned further above are met, flash-bang magic is great for special effects. Face it, having a gout of flame gobble up a bunch of henchmen is pretty slick.

The big problem with flash-bang magic is that it encourages sloppy thinking on the author's part. It fails to integrate magic back into the world and look at the consequences of it. If fire can be made in killing quantities with little or not cost to the caster, the world has a problem. Cuckolding a mage suddenly becomes a very dangerous proposition. Worse yet, what happens if a pyromaniac learns how to make fire?

Or a child does?

For me, the main constant in all of my magic systems is that learning how to make fire is the *second* spell folks are taught. The first is how to put fire *out*. Now, I do mean that to be ironic and funny, but the point is that this is how magic would be taught if it truly existed.

Let's examine a couple of technical problems that impact MHT. The first is that of instant teleportation (individual or mass). If things can be teleported from point A to point B, we have a serious raft of problems. First off, there are no longer any frontlines in



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combat. Anyone can jump behind you. There are no vaults that are proof against thieves. There are also perfect crimes, because if I can teleport a bubble of air into your heart, you die of an embolism and they're not going to find fingerprints on that bubble.

Unless, of course, the identity of the caster can be discovered by use of magic. Counters and counterspells have to be considered all the time. For every listening device, there is a jammer, for every bullet-proof vest there is a Teflon bullet. If you want MHT to work, you also need to figure out when, where and why it doesn't work. That limitation is vital for internal consistency.

Instant communication is another problem that MHT can solve. The bane of every military commander is the lack of timely and reliable information. Napoleon had a complex system by which orders would be sent out with three messengers, each who would get time-stamped receipts and/or a reply to convey back to Napoleon to let him know the orders had been received. A battlefield commander with real-time satellite intel and the ability to give direct orders avoids a lot of mistakes in combat. (Unless he's overwhelmed by all the intel coming in.) More importantly, instant communication between two parties to which others are not privy gives the informed party a chance to speculate on or prepare for the consequences of news others will get later. In fantasy novels, information tends to travel fast or slow, depending upon whether it would help or hinder the story, and this is a conceit that just makes the whole story fall apart.

Communications, travel and combat/healing are the three areas where

MHT tends to be used for the convenience of the author. I think they are the areas that warrant the most attention. As long as there is a huge cost for immediate results, drama remains in the story.

There is one very good consequence of looking at all these various factors (and I am sure there are more that others will point out in the future). Because SF/Fantasy depends on MHT, magic and tech should be used as more than just special effects in the story. Solid systems guarantees this can happen.

I cited the Jared Diamond book **Guns, Germs and Steel** before. MHT becomes very powerful when civilizations collide. First contact novels deal with this idea in the main. The conflicts between two

different schools of magic and how they function, either within or outside a religious framework, provides a lot of drama and tension. The collision of science and magic or superstition generates a lot of heat as well. (Just look at the old Creationism/Evolution debate if you don't think that's true.)

Fundamentalism becomes a potent force when combined with MHT. Obviously you can see it in conflict with science today, but imagine the reverse. Imagine scientists who take it as a fundamental truth that mankind can be made perfect through genetic engineering, and that we should all be forced to go through that to reach perfection. Or, on a more simple level, that to combat terrorism, we should all have ID chips inserted under the skin.

MHT and its proper employment can make or break a story. The time you put into considering how to use it properly will reward you greatly. Make your systems real, and your universe will be real.

