PROJECT I — DESIGN DEFENSE

ELECTRIC WIZARDS OF MENLO PARK

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Rules Clarity

I am quite aware of the complexity of my game. A large part of my design energy has gone into making a rulebook that would allow players to play my game without any input from me. It includes several diagrams, overviews and details on the phases, and a miscellaneous index at the end that explains the specifics of certain keywords.

That said, only playtesting the rulebook will show if I've done good or not.

Turn Resolution

There are a lot of choices in my game. In order to make this more palatable, I broke up rounds into phases (more on the choices in these phases later). The first phase, Inventing, is done simultaneously, and provides players little confusion in terms of who does what first. Put simply, players do three things: draw elements, draw cards, and spend elements. They do not need to worry about their opponent in this phase, though a smart player might pay attention to what their opponent plays and react to it.

The second phase, Showdown, is where combat resolution really takes place. Strictly speaking, there is always a discrete attacker and defender, though there are several cards that afford the defender to do damage on a successful dodge. The rules are pretty simple in terms of whose 'turn' it is; to start the phase, the player with the lower hit points chooses if they want to attack first, the attack/defend is resolved, and then it swaps back and forth from there. Because the defender makes decisions even though it is the attacker's 'turn', this phase is not exactly turn-based in that both players are able to make decisions at all times (given that they played their cards right).

Player Excitement

Accuracy

I designed accuracy, as an attribute of excitement, to be left up to the Random Number God channeled through a d20. Accuracy here is not especially exciting on its own, however whether or not an attack hits has cascading effects which *are* more exciting. These effects, which I refer to as 'card triggers', are unique to each type of card and are quite desirable for players to achieve, giving accuracy great weight over the success of a particular card's excitement.

Power

Power is implemented as 1d8 + a bonus you get by attacking with certain cards. In addition to this, there is a way for players to have more agency over their power: they can spend Hot elements to receive a +1 bonus each. This action, however, is not a guaranteed benefit; the attack still has to hit, and if it doesn't the player will have wasted card-purchasing potential. When this action is used, excitement potential increases through player agency, while the tension over whether or not the attack will even hit increases dramatically along with it. Because of this, it remains a well-controlled source of excitement.

Interesting

There are a lot of interesting interactions that can happen in a given playthrough of my game, beyond the basic implementation of the five combat dimensions. Some of my favourites include:

- Using 'Tase' to get rid of a powerful enemy card before it can be used
- Buying a Superweapon
- Building the full 'Mech' combo
- Executing a clever combination of Capacitor exchanges, Metallic draws, and card plays (i.e., using resources efficiently)

System Tension

Dodge

Base Dodge is a non-random attribute that accuracy seeks to meet or exceed. Dodging attacks is at the core of all tension in the system, as all excitements harp on whether or not an attack hits. It might be really exciting to buy the 'Death Ray' Superweapon, however it still has a chance to miss, which would be the tension imposed by the dodge system. Players are afforded the ability to increase their Dodge through agency by using certain cards to defend with.

Armour

The concept of 'Armour' is called Resilience in my game. It serves as an equaliser between the two characters at the base level, in that Faraday starts with 1 Resilience while Curie starts with 0. Currently, you can permanently change a player's Resilience score only with the 'Lazarus Machine' Superweapon, though defending with certain cards adds temporary modifiers to a character's Resilience. Granted, I think this game could be improved with more ways to increase and decrease Resilience, and with that, the game's components would also need something to track this.

Controlled

The system controls tension primarily by having a static (non-random) Dodge attribute. It can change slightly, but only as a result of player choices. This is great for reliable early investment.

The resource system is another source of controlled tension, as inefficient use of resources can lead to a sub-optimal set of choices. With four resources to manage and random card hands, players will seldom play their resources optimally and therefore face the tension of having to decide between several sub-optimal paths.

Strategic Decisions

In the Inventing Phase, players have three and four choice available to them in terms of cards (Curie starts with a hand of three, Faraday with a hand of four). While Curie has one fewer card, she also has an additional choice of gaining one extra element at the start of the phase. In addition to card choices, the abilities afforded by their elements add two more choices to this phase: Capacitors allow players to exchange resources, and Metallics allow players to draw more cards. Even if a player does the latter to have a hand greater than four, the number of slots on the Lab sheet limits the number of cards they can choose from, in addition to the fact that having less Metallic to spend overall reduces card purchasing capability. Therefore, this phase has a net maximum of six choices.

The choices in the Showdown are somewhat more straightforward, as they rely on the choices players made in the Inventing Phase. That doesn't make it a solved space, however. There are many ways in which heuristics for using cards to attack or defend can switch ad-hoc, and many cards were designed to afford this. For instance, 'Radioactive Sludge' has a desirable *on hit* trigger and +1 to Power, however it also has a desirable +10%[1] to dodge if used to defend, *and* by defending with it there is no risk of regaining Radioactive. The gamble built into this card makes player heuristics on how to use it in the Showdown Phase highly fluid. This phase has a net number of choices equal to the number of cards active in the player's Lab (absolute maximum of five), plus perhaps an extra choice for boosting an attack with Hot elements.

Familiar-With-Games Demographic

It is my interpretation that though my game is relatively complex, it is but a gateway to how complex real boardgames are. I admit it has a learning curve, however I strived to make it a learning curve that can easily be overcome in the course of one playthrough. This, to me, is perfect for the fm demographic, because they already have the tools to learn, learning is fun, and if learning grows throughout the course of the game, then the game is (in theory) fun throughout.

[1] I realise now that 10% is too low. Future revisions will reflect this realisation.

Information

Most information needed to make strategic decisions should be apparent on the cards and on the player's Lab sheet. However, with a game like this, there is always risk of information overload. This is why I rely on the fact that my target audience is the familiar-with-games demographic; they can handle the larger amount of information, whereas the audiences we designed for in previous GAT classes would not be able to.

Consequences

Every decision in my game has clear potential consequences, which become clearer as the player learns the system. The first consequence that is known to the player is an obvious one: if I spend resources to do *this* thing, I'll have less to do *that* thing. Another big one is: if I attack with this, then I cannot defend with it, and vice versa. Specific cards have more specific consequences, such as the *on miss* trigger in 'Radioactive Sludge', or the *on activation* trigger in 'Death Ray'.

Player Investment

Engagement

The excitement-tension balance created by a basic 5-D system with random elements is excellent for early player investment. I've employed this here, and added onto it with things like unique cards and abilities. But the player experience my game *really* focuses on is the 'I feel smart' engagement. Managing resources around in order to play cards is a game in and of itself, and when a player executes this effectively, it feels pretty good. Because of the resource system's complexity, it is not easily mastered, and the player's growth as they continue to play increases their feeling of 'I feel smart'. This growth, I propose, is at the core of player investment here, and is what lends to an overall engaging experience.

End Game

Toward the end of the game, players will have a much better understanding of how it works. Additionally, they will be able to afford new abilities, namely Superweapons. Superweapons exist as a sort of game-ender, and come with huge amounts of excitement and tension. In the end-game, players begin to realise that it can all end in one round, and usually, the winner could be either player. This uncertainty is what keeps the game going until its final resolution. But what really creates player investment in the end game tends to be an element of surprise: one player suddenly uses the Hot element ability to boost their damage, or they play a Superweapon out of nowhere, or they unleash a fully-built ‘Mech’ combo. These excitements often surprise the other player, and immediately kicks them into gear as they react to new or even forgotten information.

Gameplay Builds

The primary way the game builds from start to finish is in the resource system. In an average game, no player will be able to spend all their resources in a round. Because of this, players will tend to accumulate resources such that they can begin to afford more and more each round. In tandem with this, we have the inevitably counting-down hit point counters. Radiation damage is one way I’ve controlled this continual countdown, and as players lose health while learning how to play more effectively, they begin to make more powerful-feeling decisions even as those decision begin to matter more.

Special Abilities

Here, I will list some special abilities/effects and briefly speak on why I've designed them in.

- **Crit** : On a natural 20 Accuracy roll, roll an additional d8, add it to your damage output.
  I added this because it is generally exciting to roll max value on any die, and I wanted to reward players who pull off this 5% chance occurrence with *something* special. It gives players a specific number to *want* to roll, whereas before the game had crits, players would just wish for anything above a certain number.
- **Radiation** (Damage over Time) : Unspent Radioactive elements deal damage to you.
  This special is system-wide. It significantly affects the heuristics of both players by strongly encouraging them to spend this resource (or else take damage), and is included as part of the mechanic in several card effects (see 'Radioactive Sludge', 'Pure Fulmination', 'Directed Meltdown'). It is a good mechanic that a player can use to indirectly change the heuristics of their opponent, thereby creating player-led engagement.
- **Capacitor Exchange** : Exchange 2 Capacitor elements for 1 other element.
  This gives Capacitors more value than they were worth previously. Additionally, it gives players the ability to afford cards that they couldn't otherwise, and when they make the exchange in order to afford a card, they get that strategic feeling of 'I feel smart'.
- **Metallic Exchange** : Exchange 1 Metallic element for 1 new card.
  A player may be stuck with a hand of what they think to be sub-optimal cards, and one of the things this special does is allows them to gamble on getting something better.
- **Hot Enhance** : Spend 1 or more Hot elements to improve your potential damage output.
  This is for players who are feeling lucky, or are in a tight spot and need just an extra push to potentially win. It adds intensity, excitement, and tension to a given attack, all driven by an act of player agency.
- **Stun** : There are several card effects that are effectively stuns, such as 'Tase' or 'The Mutation'. These cards essentially reduce your opponent's ability to use cards. 'Death Ray' is a sort of self-stun, which I designed because it is such a powerful card.

System Balance

Invention Cards		Resource Cost					Combat Stats			
Card	Qty.	Cap	Rad	Hot	Met	Total	Acc	Pow	Ddg	Res
Overload Cap	4	2	0	0	0	2	2	0	0	1
Radio Sludge	4	0	3	0	0	3	0	1	2	0
Failed Exp	4	0	0	2	0	2	0	1	1	-1
Repurpose	4	0	0	1	2	3	0	1	0	2
Flash Blind	2	0	3	1	0	4	0	-1	4	0
Tase	2	3	0	0	1	4	1	0	1	0
Flame Throw	2	0	0	3	1	4	-1	2	N/A	N/A
Atomic Phase	2	0	2	1	2	5	2	-1	3	0
Mech, Heart	2	2	2	0	0	4	0	2	0	0
Mech, Mind	2	3	1	1	1	6	2	0	2	0
Mech, Body	2	1	1	1	4	7	0	0	0	2
Fulmination	2	1	0	3	1	5	1	2	0	0
Mutation	2	0	2	2	0	4	N/A	N/A	N/A	N/A
	Qty.	Cap	Rad	Hot	Met	Total	Acc	Pow	Ddg	Res
Totals	34	28	34	36	28	53	18	20	32	12
Average		0.824	1.000	1.059	0.824	3.706	0.529	0.588	0.941	0.353

EV Calculation

The important numbers to note here are the averages, as they can aid us in calculating the expected values for (1) cards played per round, (2) hits/misses per round, and (3) expected damage output per round. Additionally, the comparison of totals can generally inform us on the distribution of resources, which I will soon discuss.

(1) Cards Played Per Round

With the average card costing 3.7 resources, an easy calculation would be to say that each player can play around three cards in a turn (calculation at right). However, reality is more nuanced than that. Often, a player will draw cards whose costs don't fit perfectly with each other. Or, a player will spend their Capacitors and Metallics for their element abilities—usually to increase the playability of their hand—thereby reducing the number of cards they can play if they were given a perfect hand. This is a hard value to pinpoint because it depends so much on random card hands and player heuristics.

	Curie	Faraday
Rounds	5	5
Resources	65	60
Cards Drawn	15	16
Total Cost	55.59	59.29
Card Potent.	17.54	16.19
Per Round	3.51	3.24
Adjusted	2.51	2.24

For the purposes of the next two calculations, I will be reducing the best-case averages (3.51 and 3.24) by 1 due to the low probability of the best-case hand. This adjusted average is also supported by playtest data.

(2) Hits Per Round

Assuming most players will use at least 60% of their cards for attack instead of defense, the number of cards each player uses for attacking is highlighted at right.

Curie has a Base Dodge of 9, and Faraday has 8. This means Curie has a 65% base hit chance, and Faraday has 60%. You can adjust this for what accuracy/dodge is added on average from cards, but the net change is very small. (Perhaps this isn't a good thing? In hindsight, these numbers may be bad.)

	Curie	Faraday
Per Round	3.51	3.24
Adjusted	2.51	2.24
For Attack	1.50	1.34

Base Hit %	65.00%	60.00%
Adjusted	65.76%	60.76%
# Hits	0.990	0.816

(3) Expected Damage Output

Base Resilience (armour) is where it all gets evened out. Because Faraday has a Base Resilience of 1 while Curie has 0, the overall damage done per round actually skews in Faraday's favour, if only slightly.

These numbers seem low. However, this damage doesn't count DoTs from Radioactive, special damage dealt from card triggers, or Superweapons.

	Curie	Faraday
Base Armour	0	1
Adjusted	0.353	1.353
Base Dmg	4.5	4.5
Adjusted	5.088	5.088
EV Dmg/Round	3.682	3.799

Resources

First, you will notice that the cards cost around 20% more Radioactive and Hot elements than they do Capacitors and Metallics. I did this because **(a)** everyone wants to get rid of Radioactive as much as they can; **(b)** the special ability of Hot elements is potentially lethal and should be more uncommonly available than the abilities of Capacitors and Metallics; and **(c)**, Capacitors and Metallics will be used significantly often for their abilities rather than for their card-purchasing power.

Here I will explain my rationale behind giving Curie 5 more hit points than Faraday. It all has to do with the Radioactive resource and how it is essentially a DoT. Originally, Curie started with *two* more Rads than Faraday, and though it was an interesting dynamic to have one character battling their own radiation, it was simply too much of a PvE experience where PvP belonged; overwhelmingly, Curie's player had to deal with their own radiation *and* their opponent, whereas Faraday's player only had to deal with their opponent. So, why 5 more hit points? Well, games tend to last 5ish rounds, and if Curie starts rounds with 1 more Rad than Faraday, then she will on average take 5 more damage from Rads than Faraday will over the course of the game.

Counterplay

A number of cards are built specifically for defending, though currently all cards *can* attack. Some cards, such as 'Failed Experiment', exhibit counterplay, because even while defending with these cards, damage is dealt on a successful defend.

Ludonarrative Fit

When I was assigned a ‘Mad Scientist’-themed two-player combat game, one of the first things my mind went to was the legendary rivalry between Nikola Tesla (*The Man Who Invented the 21st Century*) and Thomas Edison (*The Wizard of Menlo Park*). So, my interpretation of the ‘Mad Scientist’ archetype became more specifically the archetype of the ‘Epic Genius Inventor’, arguably a rectangles-and-squares relationship.

Most of the ludonarrative qualities in my game come through how things are called and what they do. For instance, each resource’s ability makes sense with what that resource is called; ‘Hot’ elements (think fire) deal more raw damage, ‘Radioactive’ elements inflict proximity (self) damage, ‘Metallic’ elements can be ‘scrapped’ into new ‘inventions’ (cards), and ‘Capacitor’ elements can be used up to generate heat or radiation, or be scrapped for metal. Additionally, cards have mechanics that make loose ludonarrative sense with what they are called; ‘Tornado Generator’ mixes up active cards, ‘Tase’ disables an enemy card, ‘Flamethrower’ destroys enemy resources, etcetera. My favourite combination of cards, the ‘Mech’ set, is extremely fitting in a ludonarrative sense because its mechanic is exactly what you might expect of a ‘Mad Scientist’ game: build a massive death robot piece by piece until you are ready to unleash it on your enemy.

