

The Cradle 5 Mod - Fully compatible with the Apolyton Edition

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Kull's Note: This file is a sequential compilation of all the ["Cradle 3+" posts at Apolyton](#) (the thread title is no longer correct), but I've made some edits to improve accuracy. There won't be a **"Cradle 5" Manual**, so while I've tried to cover many of the improvements and findings using Great Library entries, you should be able to answer most of your remaining questions by doing a text search within this document.

Download & Installation: Link & Instructions are on the last page of this document (**Heading 290**)

1. Opening Post & Issue with Scenario Folder: This is going to be a rambling thread, which meanders here and there but hopefully winds up achieving the goal as stated in the thread title. I started playing around with this several months ago and have made quite a bit of progress, but it always feels like "one step forward and two steps back". Probably because the goal isn't simply to make Cradle compatible with AE, but additionally to make use of many of the new AE features and to add some new bells and whistles. Assuming this beast can be wrangled, it will still be recognizable as "Cradle", so rest easy on that count.

Anyway, first some kudos to the Source Code guys for all their great work. The more I dug into this, the more it became obvious that they've added loads of new modding functionality which - sadly - has gone largely unutilized. One exception to that rule is BureauBert's "Modern Times" mod which is worth looking at even if you don't speak German! Even more so, his CTP Bureau is a wonderful resource, and my halting progress would have been impossible without it.

That's a good segue, because my particular journey began with BureauBert's version of Cradle 3.03 which he modified so it did not require Modswapper and would run from the "Scenarios" folder. Long story short, I found several problems with that approach:

1) When you start a New Game, it ALWAYS defaults to the base game's "civilisation.txt" file (the one in ctp2_data\default\gamedata) when presenting the list of civs to choose. This has several effects, none of them good (although you can work around the problem):

- You will always see "Aborigine" first, even though that is not a "Cradle" civ
- The base game file has 72 civs while Cradle has 33
- If you choose any civ that is numbered 34 or above, the game will CTD. For example, "Aborigine" is #60 on the AE list, even though - alphabetically - it appears first on the selectable list.
- The workaround (which is not intuitive) is to select a starting civ based on the Civ number in the Cradle "civilisation.txt" file. For example, if you want to play as the Egyptians (Cradle Civ #12) you have to select the Russians (Civ#12 on the AE list).

2) The Great Library uses the file in the Scenario folder on new games, but when loading a save game it reverts to the base game's GL file (the one in ctp2_data\english\gamedata). Again there is a workaround, and again it's not intuitive. Start a new Cradle Scenario campaign and then IMMEDIATELY load your Cradle save game.

There may be more problems like those, but that was enough for me. This is supposed to be fun, not an ordeal. There had to be a better way, and in fact there is.

2. Cradle5 subfolder system: The solution is to add a Cradle folder just one level down from the base game folder (i.e. the same level as "Scenarios" or "ctp2_data"). In order for the game to "see" this new folder (which I call "Cradle5"), you have to edit the "Ruleset" line in the ctp2_program\ctp\userprofile.txt file.

Normally that line looks like this: "RuleSets=" (that's right, nothing comes after the = sign)

However, if you change it to this: "RuleSets=..\..\Cradle5", the game will now process all files found in that folder before looking for equivalents in the ctp2_data folder. An immediate cure for the Civ list and GL bugs noted above.

Worth noting that "..\..\\" is NOT shorthand notation for "type in your actual folder structure". Type those EXACTLY as they appear - a set of periods and slashes. I spent an inordinate amount of time typing in new and altered folder structure variants before - like Gandalf at the Gates of Moria - I realized the solution was as simple as it appears. Der.

Anyway, this allows you to install the full range of customized features one would theoretically get from the Scenario system, but with none of the headaches and without altering ANYTHING in the base game folder....well, other than "userprofile.txt", of course. Oh, and should you desire to play a non-Cradle game, just edit the "Rulesets" line back to its original setting.

3. Dynastic House & Great King unit: Cradle 4 added an interesting new Wonder ("Dynastic House") which provided the "Great King" Wonder unit. Unlike all the other Cradle Wonder Units, this was not a historical figure, but a somewhat generic character meant to represent the leaders of the first Empires of the ancient near east. I liked the idea, but it seemed a shame that - as with all Wonders - only one civilization could have such a leader.

My concept was a structure (and Wonder Unit) available to all civs - and much earlier in the game - so that you begin to see more AI cities with slaves (currently rare), and a way for even the weakest civs to acquire a powerful leader unit. And with the new AE modding options, this idea is now a reality:

- "Dynastic House" is now an improvement listed in "buildings.txt"
- It has the new "oneperciv" attribute (thus ensuring only per civ) but also can only be built in a city with a "Capital" building (which avoids a multiple build queues exploit)
- It requires the Dynasty advance (so it appears at the right time, early in the game)
- The cost is much lower than a typical Wonder and the AI priority is high.
- The building provides a 20% reduction in anti-war sentiment (oppose the Great King at your own risk) and gives 1 gold per citizen (war loot always comes to the capital city first). Worth noting that I originally used the Cradle building attributes but not only are they purely for Wonders, they keep the building from appearing in the Great Library!
- A small slic file generates the Great King unit
- As in Cradle 4, the GK uses the "slavemaster" record in the GL (and units.txt & gl_str.txt)
- The sprite and 2D pix were shifted from Legion to Chariot (more appropriate for this era)

I've tested this and everything works, so hopefully it will be a nice new feature in Cradle 5. **Edit:** See **Headings 59 and 184** for additional features

4. City Specialists: The sliders that allow you to assign citizens to specific tasks (Entertainer, Farmer, etc) are controlled by Pop.txt (in Cradle it's "CRARR4F_Pop.txt", although - for the record - I'm not using any of the Cradle prefixes in the Cradle5 subdirectory system). Specifically, which Advances turn on each slider. The Cradle GL did not address this properly, since in the "Specialists section" many of the listed advances are those from the base game, and there was nothing in the "Advances section" (both are now fixed).

As an aside, Pop.txt is not a file that was changed by the Source Code team, but the Cradle version has an additional piece of code titled POP_ZERO_IGNORED which is included because "Mayors ignore the first pop record, this fixes the problem with low happiness not being handled correctly by mayors."

I haven't removed it (at least for now), although this portion of the "Apolyton_README.txt" indicates that the issue may have been resolved:

Fixed: Basic AI population assignment.

- *If cities has slaves the number of pops to assign is calculated correctly.*
- *The first pop in the database can now be used, meaning AI can use entertainers.*

- The minimum amount of calculated entertainers can now be assigned.
- However this are only basic fixes, population optimisation has still to be done.

5. City Size: This is rather complicated, and took me quite a while to figure out.

First of all there are SIX "difficulty-setting" files named "citysize0.txt" through "citysize5.txt". However, the Cradle values are identical in all of them, so difficulty levels have no effect on this facet of the game.

The other file which controls City Size is "buildings.txt", more specifically the "RaiseMaxPopulation" code assigned to the six buildings needed in order to grow beyond a particular city size limit. For example, "Apothecary" has a RaiseMaxPopulation value of 8.

Returning to the "citysize*.txt" files, they contain a "BaseMaxPop" level which is assigned to each city-size level. Which is where the problem arises, since that number is 12 for city levels 1 and 2 (i.e. the base value is 12 at Level 1 while Level 2 is 12+8 after the Apothecary is constructed). However, in Cradle 3 & 4, at Level 3 the "BaseMaxPop" level changed from 12 to 16. Which meant the Level 3 through 6 city sizes were actually capped 4 points higher than the number given in the Great Library (f/e Level 3 was really 34, not 30).

Obviously this means there's a disconnect between the actual city level population caps and those cited in the GL, where most max populations supposedly rise in increments of 10 (from 20 to 30 to 40, etc.) Accordingly, I'm going to adjust the "BaseMaxPop" level from 16 down to 12 in all the Level 3 and above cities, and will do so in all six "citysize*.txt" files, so the new caps are as follows:

- Level 1: City size is capped at 12 until Apothecary (+8)
- Level 2: City size is capped at 20 until Physician (+10)
- Level 3: City size is capped at 30 until Bath House (+10)
- Level 4: City size is capped at 40 until Drug Store (+10)
- Level 5: City size is capped at 50 until Hospital (+14)
- Level 6: City size is capped at 64 until Arcologies (+16) (New in Cradle 5 – was +12 in Cradle 3 & 4)
- Level 7: Cities will grow naturally until they attain a population of 80. Although it is possible to use artificial means to increase the City size to 81 and above (such as disbanding a Settler unit inside the city), natural growth stops at 80.

6. Camel Sprite: I'll post more on the topic in a different thread, but I was able to create a new "Camel" sprite as you see below. It's not currently intended for use in Cradle, but that could change. **Edit:** Now used as the new "Camel Good". See **Heading 40**.



7. SLIC Files: A number of SLIC files are no longer needed, thanks to Source Code improvements. BureauBert's Cradle scenario eliminates or replaces 3 of them, and I've followed his lead with Cradle 5.

- "Frenzy.slc" was developed in order to make the AI more aggressive, but that is no longer necessary in AE, given the new AI improvements.
- "Diplomod.slc" has been replaced by "diplomacy.slc" (a file included with the AE update)
- "Goods.slc" is not needed either, since the additional goods are now part of the base game.

He also commented out a fourth file ("pw_cheat", which adds gold and public works for AI civs), but that appears to be an incomplete action. The MoT mod uses a similar file called "pwcheat.slc", which features improved coding, and I suspect that BB planned at some point to implement a similar replacement for his Cradle scenario. Anyway, Cradle 5 will use the file from MoT. **Edit:** Not implemented. See item 22 of **Heading 81**.

Lastly, BB developed a new slc file for MoT ("settling.slc"), which adds a strategic component to the AIs city selection algorithms. A "Cradle-specific" version of this file was included with his scenario pack, and that will be part of Cradle5 as well. **Edit:** Not implemented. See item 25 of **Heading 81**.

Given the new Cradle 5 folder structure, most of the slc files are activated by code located at the bottom of "script.slc", and that's where you'll see these and additional changes that I'll discuss in upcoming posts. Worth noting that although "frenzy" has been deactivated, BB created a "new and improved" version for his MoT mod, and I'll include that file with the Cradle 5 download, but leave it unactivated. Those players who desire an even more aggressive opponent can edit "script.slc and remove the "// " from the #include "frenzy2.slc" row. **Edit:** Not recommended. See **Heading 111**.

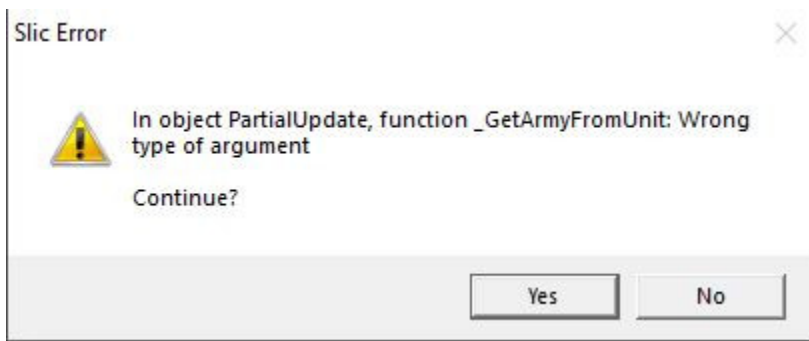
8. "Const.txt": As the name implies, many of CTP2's "constants" can be found in this file. A comparison of the Cradle file vs. the AE version ([Winmerge](#) is very helpful in this regard) identified a number of improvements (AE has 8 new settings appended at the bottom of the file), so Cradle 5 uses the new AE file. Although I kept a majority of the Cradle settings (most of which come from the base game or were borrowed from MedMod), in a few cases I went with the AE settings or my own. For example, I altered the river settings and now you see more of them (and longer) in Cradle 5 games.

9. Unit Upgrades: One of the best new features of the Apolyton Edition is the built-in unit upgrade system. It's controlled by a button on the interface, and the human player can update units at any time and in any order. The AI has this benefit applied to all affected units immediately after discovering the associated advance, which definitely adds to the "degree of difficulty". After a lot of research, all "non-Special" Cradle units now have the complete upgrade path added to units.txt. Transport-type ships now upgrade from Coracle-to-Crawler, artillery types from Ballista-to-War Walker, missile units from Slinger-to-Hover Infantry, etc.



10. Updater.slc: Unfortunately the new system does not apply to the **Cradle Militia** (garrison units created when a city is founded) or **Cradle Elite** units (government-specific land units that can receive "battlefield promotion" into non-government-specific units of an improved type). Because these Militia/Elite units are - by definition - unbuildable, there's no way to upgrade them normally, so the SLIC system is still utilized for this subset of unit types. The good news - it has been improved! The old code only gave you one chance to upgrade, for example, from Elite Legion to Elite Pikeman. Miss that opportunity and you were stuck with Elite Legions forever. But stripping out all the non-Elite/Militia upgrade code (now handled by the built-in upgrade system described in the post above) cut the file size by more than half, and allowed me to add upgrades from every lower level to any higher one. For example, Hoplite Elites can be upgraded directly to the highest available level. So upgrades from Hoplite Elite to Pikeman Elite, Arquebusier Elite, Infantryman Elite, Machine Gunner Elite and even Hover Infantry Elite are all possible.

This increase in the number and types of possible upgrades identified a problem with the original update code. For some reason, if you choose a "partial update" - upgrading some units of a particular type instead of "All" - **the code shuts down without warning after the second time it runs**. And that applies whether the "second time" is in the same series of updates or those chosen during a different turn. Fortunately this does not cause a CTD, and you'll only get a warning message if Debugslic=Yes (see below). I've looked at the code but the complexity is well beyond my ability to understand, much less fix. The only solution I can suggest (and remember - this is not a new issue, but one that has always been present in the code as verified by testing a non-AE Cradle install) is to avoid "partial updates". If you don't have the money to do all of them, wait until the next opportunity - of which you now have plenty! **Edit:** This problem has been solved – see **Heading 63** below.



11. **Deleted** (not necessary)

12. **Deleted** (not necessary)

13. Two different "Emerald Goods": Unique among the on-map Goods there are two Emeralds, each with a different "sprite". Those in polar regions feature a bluish triangle-shaped gem, while those in mountain terrain use the original CTP rectangular green. They have the same stats, but importantly, Emeralds aren't found in polar regions, nor do they look much like the triangular ones we see in-game. This seemed like a good opportunity to substitute something a little more "region-appropriate".

Which is what you see in the attachment. A newly created "Polar Bear" sprite replaces the Polar Emeralds, with new stats and a write-up in the Great Library. As a helpful by-product, I spotted a statting problem with the "Mountain Emeralds" which prevented them from appearing in the GL, but that has been fixed as well.



14. Veteran Stacking "Bug": Several of the Wonder Units are said to "grant veteran status" to any units they are stacked with. This is not a built-in game feature, but is controlled by slic code in the "wonderunits.slc" file. That in turn is modified code from the Activision-created Alexander scenario. I've always been a bit intrigued as to how that would work, since the code itself seemed to be very simple in nature, mostly focused on identifying those units to which it would NOT apply.

I spent some time studying the Alexander scenario, looking for evidence of the code in action, and there's no doubt that it works. Units which start a turn in the same hex with the Alexander unit ALL had Veteran status, clearly visible with the Veteran unit flag. This status wasn't conditional on staying with Alexander DURING the turn - they remained "Veterans" even when moving separately. However, any units which were not stacked with Alexander at the end of the turn, LOST veteran status at the beginning of the next turn.

Which explains why the code is so simple. It completely alters the Veteran mechanism, assigning and removing it ENTIRELY on the basis of whether a unit is stacked with a "Veteran-status-granting" unit. For example, even units that gained Veteran status normally - during combat - lost it at the start of the next turn.

Interestingly, the code never actually worked in Cradle. Units that supposedly granted the status - did not. So rather than try to impose a questionable mechanism, I've opted to remove all mention of it from those Cradle units which allegedly had this power.

15. Stone Roads graphics issue: A very minor issue, but the "Tile" tab on the selection interface is where the player chooses which Tile Improvements to build. Although the Cradle picture directory includes a Stone Road graphic, even in Cradle4 the visual menu showed the same graphic (top image) for Roads and Stone Roads - and the GL entry did as well. Both issues have been fixed in Cradle 5 (bottom image). **Edit:** These were altered twice. First as discussed in **Heading 54**, and finally the version revealed in **Heading 285**.



16. At this stage of its existence, CtP2 is a 20 year old game with a limited following, but even to this day, you can read posts around the Internet (reddit, GoG forums, etc) from folks who are still nostalgic about the game. In particular, they recall the interesting way in which CtP1 portrayed future units like the "TV-Head" evangelist or BureauBert and his traveling corporate desk. The craziest looking units were those from CtP1, but because most of those sprites don't have the Idle Animation ([as I discuss in this thread](#)), their motion is truncated, and even when brought into CtP2 (as many mods have done), they are just shadows of their formerly interesting selves.

It's paradoxical I suppose, that while working on the Cradle mod - heavily focused on the Ancient World - I began to miss those fascinating old units. And so, one-by-one, I've been deconstructing and rebuilding many of those sprites in order to restore their full animation. And they WILL have a place in Cradle. Remember, Cradle still has most of the CtP future techs, and thus there's plenty of room to fit them into the late game, even though - realistically - many games won't make it that far into the future.

But who knows, maybe some of these reinvigorated future sprites might find their way into other mods and regardless it's gratifying to see them functioning as they once did. For example, the "Subneural Ad" is a blimp-like unit that carries full-motion advertising panels on its sides. Those panels were condemned to a dark, unchanging appearance, but not anymore (**Edit:** Gah! That's a small gif showing the SubNeural Ad unit in motion, but apparently the motion part doesn't work for embedded files):



17. By today's graphical standards, it's almost laughable to rave about the "interesting animation" of CtP1 sprites, but they had motion and a 3D appearance and were a vast improvement over the comparable units in their closest gaming competitor, Civ2. So don't laugh (too hard, anyway), as this next attachment shows one of several "advertising displays" that rotate across the panel as the SubNeural Ad moves from place to place:



18. **Natural Wonders:** Speaking of "eye candy", there's an old mod which adds seven "Natural Wonders" to the map, and - as with the slic code that deploys "Visible Wonders" - there can never be more than one of each anywhere on the map. These include the Urgup Cones (Turkey), Guillin Hills (China), Lake Baikal (Russia), Ayers Rock (Australia), Great Barrier Reef (Australia), Grand Canyon (USA) and Angel Falls (Venezuela)

I studied the way in which this mini-mod was incorporated into the "Modern Times" mod and was able to get it working in Cradle 5. However, it was disappointing to find that not all of them would necessarily appear on the map, and some didn't look so great even when they did. So I played around with the slic code and made the following fixes:

- **Lake Baikal:** It was appearing in plains hexes, but the reality is that Baikal is noteworthy for its high altitude and mountainous surroundings. So now it appears in the middle of a mountain range, and the effect is much more dramatic (see attachment).

- **Great Barrier Reef:** These are generated on existing Reef tiles, but - for whatever reason - the map generation code does a poor job of adding Reef tiles to the map (by contrast kelp is everywhere), so this Wonder was rather rare. I altered the code by adding a conversion of some Kelp tiles to Reef, so not only does this wonder always appear, but there's now a lot more reef tiles on the map, many of which add visual diversity to the ubiquitous "kelp gardens".

- **Ayers Rock:** It wasn't uncommon for the code to deploy this graphic on a shoreline tile, which was an ugly look since the "Rock" would hang out into the neighboring beach tile. And besides, it's an inland Wonder anyway. The code has been fixed to eliminate shoreline appearances.

- **Angel Falls:** The code ensured they could only be built on hill tiles at the beginning of a river system, which made their appearance very rare. But the fact is that most waterfalls appear somewhere along the course of a waterway, so I added code to that effect and now this Wonder is much more common.

More generically, I added code to keep all the land wonders (except the Waterfall) from appearing on River tiles (an ugly look), nor do they share tiles with Goods (another ugly look) plus they can no longer be pillaged and you can't build other tile improvements on top of them (which effectively wiped them off the map). **Edit:** The Grand Canyon has also been significantly improved – see **Heading 148** below.



19. "Belfroi" unit: The Great Library, the Sprite, and the 2D unit art portray this as an early form of catapult, but [the name is actually that of a siege tower](#). Even if the graphics were correct, "city siege" isn't a feature in CtP2, so there's no point in having a "Belfroi" unit. Hex undoubtedly recognized the problem, since Cradle4 changed the graphics to show a Ballista (a device which hurls a giant arrow-like weapon at walls and men), but the unit name and text descriptions were not updated to match. However, a complete shift from Belfroi to Ballista (name, GL, pix, and sprite) is included with Cradle 5

20. Tile Improvement Sounds: Another nice addition from the source code team was giving tileimp.txt the ability to associate sound directly with tile improvements (the 5th line of text for every entry). Previously sounds were completely omitted from this aspect of the game, but Martin Gühmann added slic code (soundfix.slc) which worked around the issue. However, the Cradle5 conversion moves all those sound links directly into tileimp.txt, so the slic file is no longer required.

As part of that effort, I also added a lot of new sound files, primarily for Goods. So you get alligator grunts, camel snorts, a less-ear piercing elephant screech, and actual recordings of sea creature sounds from lobsters, whales, and mollusks. I also made a few changes to the mineral and vegetable Goods, but there's not a lot one can do with those (what DOES a potato sound like?) Along the way, I noticed that construction sounds were absent from Watch Towers and Stone Roads, so those were added as well.

21. City Sprites: The source code project increased the number of city sprite slots to 255 (from 200), so let's see how they are being used in Cradle. First of all, Cradle still uses the "original" set of CtP2 sprites, not that one has many choices. There is a sub-mod which created new ones from Civ3 - which theoretically gives more stylistic variation - but to me they are a bit "muddy" in appearance and not as clearly distinctive from one civ to another. That said, there's a pretty limited number of original-style sprite groups in CtP2: Roman, Asian, Mayan, Arabian, Egyptian, and Castle. There's a seventh group called "Palace", but it has garish green roofs and the architecture begins in the late Middle Ages (thus not usable in Cradle). On the plus side, BureauBert created a full set of [sub-saharan African city sprites](#) which fit this stylistic look, and so I'll be adding those for Kush and Zulu in Cradle 5 (see attached example).

Which brings us back to the original point - availability of Sprite slots. The 8 City Styles mentioned above use 19 sprites each, plus there's quite a few reserved for Computer, Genetic, Diamond, and Future ages, along with another three groups for underwater and space cities. Accounting for duplicates and the 19 assigned to the new "African" group, that leaves 39 open slots (even without using those assigned to things like CtP1 "space cities"), which is enough for two more City styles (at 19 slots each). That's important, because 8 of 33 Cradle civs are "ancient Near Eastern" in culture, and there isn't a single city style which is even remotely appropriate for them. "Arabian" Babylonians or "Mayan" Sumerians is something I tolerated over time because the mod is so much fun, but it's definitely a problem. **Edit:** Mesopotamian Sprites have been added – see **Heading 30** below.

Related to all this is the conversion of "**civilisation.txt**" over to the new AE format. It offers a number of benefits, to include assigning the city styles discussed above, adds the ability to link a female emissary photo (or use national flags in the diplomatic window), and even allows for assigning a flag to the "on-map" unit sprite stacks. The latter is not implemented in Cradle (IMO, flags aren't appropriate for the era), but I've left the text in place. Here's one example: # NationUnitFlag MAPICON_GREEK_FLAG. For those who may want nation flags, simply delete the "#" at the start of the line and they'll appear in game.



22. Civilian Unit Groups: While working on the new Unit Upgrade system ([as described in Post #9](#)) - and remembering some of my previous Cradle games that lasted well into the modern era - I decided to take a comprehensive look at the various Civilian units in Cradle. The biggest issue being the prolongation of Ancient-appearance units well into future ages, and some questionable upgrade paths. Let's take a look at each group, by category:

Abolitionist: There's only one unit for this function, but given the timing and history of the abolition movement (and lack of ancient era equivalents), along with the "same period" end of Slavery as a CtP2 institution, well, no change is needed.

Slaver: Again, a single specialized unit for this role, but the CtP2 sprite is appropriately garbed for the early era periods. Theoretically the CtP1 "red-shirted fat guy" could be added as an Industrial-era upgrade, but it would only exist for a short period. So *maybe* that might be done at some point, but definitely not on the priority list.

Nomad: The unit which creates new Ctp2 cities. Four units in Cradle (Nomad, Settler, Urban Planner on land & Sea Engineer for water cities). The "Settler" sprite has been repurposed as "Plunder", with the Nomad sprite doing double duty

(there isn't really a good alternative), but otherwise fine. However, I will knit the three land units together using the Unit Upgrade system.

Assassin: A Cradle unit which repurposes some of the CtP legal attacks in order to target Wonder Units, City Governors and various other civilian units. Ingenious, really, but the sprite is the CtP1 Hypaspist, and it never upgrades (although unbuildable after the discovery of Communism). So it lingers on, well into the modern and future eras. A candidate for improvement, which I'll discuss in a separate post.

Emissary: An interesting Cradle unit which repurposes some of the CtP commercial attacks in an Ancient-era fashion. First available under City State, it is eternally buildable (so you have an ancient Greek wandering around carrying a scroll, into the modern Era and beyond), but fortunately there's a clear upgrade path to the Commercial line of civilian units. Another unit series to be examined in detail.

Clerics: Cradle has four units of this type (Prophet, Cleric, Patriarch, and Televangelist), so there's a lot we can do. To be examined later.

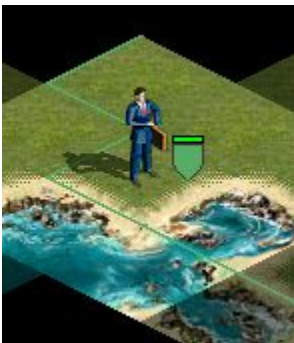
Spy: The first unit arrives with Republic, and the upgrade path moves from there to Communism (Revolutionary) and eventually to Neural Interface (Cyber Ninja). There are some issues (and opportunities) with that, also to be discussed in an upcoming post.

Lawyer: One modern-era unit. Never expires. More can be done.

Diplomat: The toga-clad diplomat arrives with the Dynasty advance, and lasts all the way until his replacement (Empathic Diplomat) becomes available with Gene Therapy. There's a big gap in the middle which needs to be addressed.

So that's the group, and it isn't small!

23. Diplomats: As indicated above, there's a long period of time between the appearance of the diplomat and his replacement in the "Genetic Age". As a solution, we'll use the blue-suited CtP1 Lawyer, name it the **Ambassador**, and make him available with the "Age of Reason". That's a tad bit early for his clothing, but it's far better than a toga-clad scroll bearer! The sprite did not have the Idle animation, but I was able to deconstruct it (212 images) and added a custom animation in which he appears to be looking at his watch (see attached). In addition, the **Diplomat**, **Ambassador**, and **Empathic Diplomat** are all linked together in the Unit Upgrade system.



24. Clerics: The existing Cradle system remains, but it's been tweaked just a bit. You start with the **Prophet** (Polytheism) who upgrades to the **Cleric** (Christianity) and ultimately to the **Televangelist** (Mass Media). There's an additional unit, the **Patriarch**, which uses the CtP2 Televangelist sprite and cannot be built, but is granted via Slic as a reward for building certain wonders. All of that is fine, but there are two problems:

1) The Televangelist and Patriarch shared the same sprite.

2) The Televangelist was defined as a "GovernmentType" unit, meaning that it could only be built if you had the "Democracy" government, AND it would disband if the government changed.

The second issue is the big problem, since it effectively eliminates religious units from the late game, so Cradle5 has removed the gov-type linkage. In addition, I used my "sprite-fu" to disassemble the CtP1 Televangelist ("TV-head guy") and gave it a token Idle animation, so the unit now leans forward as intended when it zooms around the map (see attachment). And yes, that sprite and all the associated 2D unit pix have now been added to the game.



25. Lawyers: The first purely legal unit, the **Lawyer** appears with "Criminal Code" which is a very late arrival indeed, since lawyers certainly existed all the way back to Ancient times. However, even in a modern context, it's a late advance since it has the "Mass Media" pre-req, which puts it on the verge of the Computer Age. My solution was to make some small adjustments to the Tech Tree and to add a pair of new units:

1) Add a new advance between Age of Reason and Democracy (after all, most of the modern democratic systems of government were started by lawyers!), but continue to call it "Criminal Code". This allows you to build the black-suited CtP2 **Lawyer** unit at the beginning - not the end - of the modern era.

2) The advance previously called "Criminal Code" remains in place, and is renamed "Legal System". This provides you with a new, slightly improved unit called **Legal Team**, which is the repurposed 3-person Corporate Branch (more on that replacement later), meaning that the sprite and all the 2D unit pix already exist.

3) Lastly a third unit - the **Cyber Attorney** - appears with the discovery of "Digital Encryption", and carries on through the end of the game. The backstory here is the female CtP1 Cyber Ninja was replaced in CtP2 by a robot. Both sprites have fantastic animations (especially for the era), and it seemed a shame that only one could remain. The old sprite did not have the Idle animation, with all the negatives that entails, plus it used an electronic sword in all the animations, thus limiting its utility as a civilian unit. When deconstructed, there were 740 individual images, far more than any unit I'd worked on previously. The unit had both an "Attack" animation (250 images) and a "Work" animation (380 images), the latter - fortunately - involving non-violent cyber interactions. There was still the matter of the electronic sword, so I individually edited the blade out of 490 files (the old "Attack animation has been removed), and what remains is a unit wielding a boom-box-like device which projects 3D animations of a revolving head. In fact, I took a subset of the Work animation and wove an interesting Idle from it (see attached). Truth be told, Cradle does not NEED this unit, but it was a real challenge to re-invent, and I think Cradle 5 is just a little bit better because it's there.



26. Emissary (Commercial): The **Trade Emissary** (renamed to help clarify its true function) uses CtP commercial mechanisms (Advertise & Franchise) in an Ancient-era fashion, but the unit never upgrades or becomes obsolete. And really it should, because its capabilities are identical to those of the existing **Corporate Branch** and the newly added **SubNeural Ad** (see **Heading 16**). So I've done a few things to clean this up:

1) The **Trade Emissary** uses the former CtP1 Diplomat sprite, which is perfect for the era, but like so many CtP1 sprites, did not display any movement due to the missing Idle animation. I deconstructed the sprite (170 images) and added a custom Idle animation in which the emissary fiddles around with his scroll. **Edit:** Unit removed (see **Heading 98**) and repurposed (see **Heading 131**).

2) Since the 3-person **Corporate Branch** sprite is now used by the new **Legal Team**, it opened the door for the return of "Bureau Bert" and his traveling desk. Yet another CtP1 sprite that needed an Idle animation. Which it now has, allowing him to relax with his feet up on the desk, as in days of old! (see attached)

3) Lastly, all three commercial units are now linked together in the Unit Upgrade system.



27. Missing "Concept" text: While fiddling around with the various types of entries in the Great Library, I noticed there wasn't a "Concept" text entry for ANY of the ten "Ages". The entries existed in the GL, as well as the other affiliated text files: Concepts.txt, Gl_str.txt and Uniticons.txt. All of them looked correct, and a cursory comparison with the base files in the Apolyton Edition didn't identify any differences. Yet the AE entries DID have text in the base game....so why not in Cradle? I stared at those for hours before it finally hit me:

- Every "Concept" entry in the Great Library has only two parts, first a CONCEPT_*_GAMEPLAY and second a CONCEPT_*_HISTORICAL
- All the other entries put their descriptive text in the "Gameplay" section, and in Cradle (but not AE) that was true for the "AGE" entries as well.
- The problem is the game (for whatever reason) wants to see all the text in the "Historical" section - but ONLY for this one type of concept!

So I moved all ten text entries from one section to the other, and...voila...problem solved. This is the kind of thing that makes you want to scream, lol.

28. Assassins: Cradle has re-purposed the CtP1 Hypaspist as an Ancient-era **Assassin**, available with the discovery of "City State". It uses CtP legal attacks in order to target Wonder Units, City Governors and a number of civilian units, but it never upgrades or becomes obsolete, so the mid-to-late game appearance is anachronistic. The artist who worked on this unit did a great job (it's much more detailed and active than the CtP2 Hypaspist), but - as usual for CtP1 units - it had no Idle and thus no movement. That has been fixed!

As to the lack of upgrades, a modder named "Solarius Scorch" created a nice looking, modern-era female assassin sprite with good animations, but, again, no Idle. I killed two birds with one stone by re-building the sprite and providing it a custom Idle animation in which the unit covers herself with a black cloak whenever she stops moving. The result is something of an "Assassin's Creed" appearance (see attachment), and thus it can plausibly appear earlier in the game.

As the **Poisoner**, this new unit now replaces the **Assassin** with the discovery of "Monarchy", and never upgrades - her mix of modern-medieval works well enough that she can stay active until the end.



29. Spies: There are three units filling this role in Cradle, but it does need some tweaking, plus there are opportunities for improvement:

- 1) The **Spy** is a custom made, purple-caped ancient-era unit unit, first available with the discovery of "Republic". Unfortunately, like most of the Tom Davies (Morgoth) units, this one did not have an Idle animation. But it does now!
- 2) There's a long gap between the **Spy** and it's modern-era successor, but fortunately Morgoth created a lovely Medieval-era spy, which we can co-opt and insert into Cradle 3+beginning with "Feudalism". The new **King's Eye** (see attachment) was also lacking an Idle animation, but I've added one here as well.
- 3) The next unit in the upgrade sequence is the "Revolutionary" who becomes available with "Communism". This is the trench-coated CtP2 Spy, and the only concern is with the unit name. "Revolutionary" is fine as a Communist unit, but it's available to all Govs and thus we'll re-name it as the **Secret Agent**. No animation issues here.
- 4) The final unit is the **Cyber Ninja**, and no changes are necessary. A good-looking, fully animated CtP2 unit that appears with "Neural Interface".

In closing, the **Spy**, **King's Eye**, **Secret Agent**, and **Cyber Ninja** have all been linked together in the Unit Upgrade system.

That completes the civilian unit groups listed in **Heading 22**, so it's time to start looking at the military!



30. Mesopotamian City Sprites: Before we get into a discussion on "Military Units" (which is a BIG TOPIC), let's follow up on some comments I made earlier on the subject of City Sprites. **Heading 21** announced the inclusion of BureauBert's lovely African Cities, and I mentioned the lack of Ancient Near Eastern cities. The "Arabian" style used by Babylon or Assyria isn't remotely accurate as a depiction of their ancient "look", and all the other options are culturally inappropriate. Accordingly, I've been working on a full set of Mesopotamian Cities and let's just say that was a project all by itself (see attached). I'm pretty happy with the result, but am not looking forward to creating another full set...and that got me thinking (always a dangerous proposition, lol).

Even with my efforts to improve the look of the "late game", the fact is that Cradle's primary focus is the Ancient Era. And in that regard, there are only 3 of 19 city sprites which are used during the Ancient and Classical eras (i.e. up to the Dark

Ages). Another reality is that by the time the game enters the Middle Ages, many of the starting civs have been winnowed down to a much smaller group. So while 6 (now 8) city styles is terribly repetitive in a game with 16-20 starting civs, it's less of a problem when many of those have been wiped out and only half or less remain.

So that is going to be the focus of any future city sprite work. For example a style with large palaces instead of ziggurats for Hittites and Phoenicia, or the Palace of Knossos as a central feature for the Minoans, Temple of Solomon for the Hebrews, Cahokia for the Native Americans, maybe even the Parthenon for the Greeks. Again, only three sprites each, after which - come the Middle Ages - they'll merge into another city style such as the Arabs and Romans. For almost as much effort as it took to build a "start-to-finish" style for the Mesopotamians, we could have SIX specialized ancient city styles. Which would look pretty cool (see **Heading 220** below to see how this idea was implemented in-game).



31. Military Units is a large topic, so let's break it down into the main focus areas:

- I. New Unit Upgrade system
- II. Sprites without an Idle animation
- III. Government-Specific "Disbanding Infantry"
- IV. Government-Specific "Special" Units
- V. Governments, Units, and the Tech Tree

I'll review the first item in this post, and then each of the rest will follow.

I. New Unit Upgrade system: As discussed in **Heading 9**, this marvelous addition from the Source Code project has been implemented in all cases where it applies (military and civilian). However, units that are only available through SLIC coding (i.e they cannot be built normally) operate outside this system and their upgrades (where applicable) are handled by the updaters.slc file.

32. II. Sprites without an Idle animation: To re-cap, unit sprites without an Idle animation do not display any motion when they move across the map. Fortunately this does not affect the CtP2 sprites, but it is an issue for most of the CtP1 and user-created sprites in Cradle. The long term plan is to deconstruct most of these (more specifically, any sprite which

has a non-working movement animation sequence) and to add the missing Idle animation....and in some cases to find and repair graphics issues. For example, some sprites have incorrect file numbers listed in their animation sequences (makes them "jumpy"), or we see unit size differences from one tif file to another (another "jumpy" effect), one or more "incorrect facing" pix, shadow files that are incomplete (or so awful they simply need to be removed), and any number of problems which cause the sprite to operate poorly. From a military units perspective, these are the Unit Sprites which have been fixed so far:

- 1) **Spearman**: 168 files (Movement, Attack & Death) - Added 2 Idle files
- 2) **Swordsman** (used to be "Warrior"): 168 files (Movement, Attack & Death) - Added 2 Idle & 40 Attack Shadow files
- 3) **Slinger** (+1 Wonder unit): 178 files (Movement, Attack & Death) - Added 2 Idle files
- 4) **Javelin Cav**: 198 files (Movement, Attack & Death) - Added 2 Idle & 40 Attack Shadow files
- 5) **Horseman**: 170 files (Movement & Attack) - Added 2 Idle files
- 6) **Teutonic Knight** (+2 Wonder units): 160 files (Movement & Attack) - Added 2 Idle files
- 7) **Red Guard (New)**: 216 files (Movement, Attack & Victory) - Added 2 Idle files

Of those, the first four are creations of Tom Davies (Morgoth) while the other three are from CtP1.

33. III. Government-Specific "Disbanding Infantry": One of the interesting features of the Cradle System is that most of the Ancient-era Infantry units are government specific and disband whenever the government changes. For example, the Hoplite can only be built by the "City State" government, as controlled by the "GovernmentType GOVERNMENT_CITY_STATE" line in "units.txt". Interestingly, the Source Code project added new code which allows the unit to be built only by a particular government, but it does NOT disband when the government changes. BureauBert's Cradle scenario uses that code, and looking again at the Hoplite, we see the scenario-version code has changed to "GovernmentOnly GOVERNMENT_CITY_STATE".

After playing around with this a bit, I decided to keep the original code. After all, "Disbanding Infantry" is one of the signature elements of Cradle, and I was reluctant to abandon it completely. That said, most Cradle players tend not to build disbanding units when they know a better government is right around the corner. So the net effect was you saw a LOT of Legions (Tribunal Empire) but rarely ever a Hypaspist (Oligarchy). Part of the problem was the Tech Tree - a number of govs so close in sequence that you could quickly research your way to a "preferred type" and thus bypass many of the disbanding units.

I pondered the issue, and eventually decided to make these units available to **MORE THAN ONE GOVERNMENT**. This isn't a new idea, since Cradle 3/4 has Man-at-Arms and Pikemen buildable by both Monarchy and Theocracy, although in practice that didn't work because when you shifted from Monarchy to Theocracy (or the reverse), your government descended into Anarchy and you lost both units!

But there is a way to avoid that. Using the **Hoplite** as our example, the "units.txt" code changes from this (Cradle 3):

```
EnableAdvance ADVANCE_BRONZE_WORKING
GovernmentType GOVERNMENT_CITY_STATE
```

to this (Cradle 5):

```
EnableAdvance ADVANCE_BRONZE_WORKING
ObsoleteAdvance ADVANCE_REPUBLIC
GovernmentType GOVERNMENT_ANARCHY
GovernmentType GOVERNMENT_CITY_STATE
GovernmentType GOVERNMENT_OLIGARCHY
```

Here's what that does. The Hoplite is now buildable by City State and Oligarchy, while the inclusion of "Anarchy" prevents it from disbanding when you shift from one gov to the next. And to keep it from being buildable in perpetuity, or at least anytime your civilization enters Anarchy, the "ObsoleteAdvance" code ensures permanent obsolescence after Republic is

discovered.

Apologies for the long dissertation, but this is exactly the model applied to all the "Disbanding Infantry" units. They still disband, but now they support multiple gov's and thus stay around longer. Which makes them more attractive to build.

In Cradle 5, that means the "Disbanding Infantry" are now assigned as follows (**Edit:** Updated. See **Heading 188**):

Swordsman (was Warrior): Anarchy, Tyranny & Dynasty

Hoplite: Anarchy, City State & Oligarchy

Hypaspist: Anarchy, City State & Oligarchy

Legion: Anarchy, Republic, Dictatorship, & Tribunal Empire

Pikemen: Anarchy, Monarchy & Theocracy

These units also have a very important feature - if victorious in battle, they have a chance to be promoted to "Cradle Elites". These are completely different units with improved stats and their own entries in units.txt, but most importantly, they do not disband.

You'll notice that **Spearman** and **Man-at-Arms** are not on the above list (and nor are the "specials", which I'll cover next). That's because the Cradle system always exempted Spearmen from the "disbanding" requirement - but also left them without an upgrade path. So Spearmen were still a part of your armies from the beginning of the game until its very end, no matter how far in the future that might be. As for Man-at-Arms, they were largely duplicative with Pikemen, as both appeared at roughly the same time and supported the same two governments. In Cradle 5 however, the latter unit has been repurposed as a non-disbanding, mediocre defensive unit. But the main feature is the new Upgrade System allows **Spearman** to convert to **Man-at-Arms** which in turn upgrades to **Infantryman**. Thus a pair of era-appropriate poor-offense units are available for the duration of the Ancient and Middle Ages periods (the kinds of "infantry" which actually comprised the bulk of most armies), but gives them an upgrade path into the regular armies of the post-gunpowder era.

34. IV. Government-Specific "Special" Units: In Cradle 3 or 4 there wasn't much difference between these and the "Disbanding Infantry". The only commonality is that all members of this group have the "IsSpecialForces" code (which basically means you pay full maintenance all the time), but otherwise they were an interesting mix of infantry and mounted units, and most of them had the same, previously discussed incentives NOT to build: Tied to one government, disbanding on gov change, and thus not available for very long.

I *could* have followed the same path as with "disbanding infantry", but in the end opted for something a bit more complicated, but hopefully more interesting. Let's start by looking at the highlights:

- Units are buildable only by their original government-type
- They all become Obsolete
- Most of them Disband
- All are "era dependent" and operate in three distinct time periods: Ancient Era, the Middle Ages, and the Modern Era.
- There are now "mutually exclusive" units for the two Christian & Islamic governments
- There are also "mutually exclusive" units for Communism, Fascism, and Democracy.

In Cradle 5, that means the first set of Government-Specific "Special" Units now operate as follows:

1) Pezheteroi (Republic):

- Upgrades to Praetorians (Dictatorship)
- Obsolete with Iron Working
- Does not disband under Anarchy, Republic, Dictatorship, or Tribunal Empire
- Disbands under all Middle Ages and above governments (or Oligarchy and earlier)

2) Praetorians (Dictatorship):

- Does not upgrade

- Obsolete with Tribunal Empire
- Does not disband under Anarchy, Republic, Dictatorship, or Tribunal Empire
- Disbands under all Middle Ages and above governments (or Oligarchy and earlier)

3) Elephant Warriors (Oligarchy):

- Upgrades to Raiders (Stirrup)
- Obsolete with Republic
- Does not disband under Anarchy, Oligarchy, Republic, Dictatorship, or Tribunal Empire
- Disbands under all Middle Ages and above governments (or City State and earlier)

4) Raiders (Stirrup):

- Does not upgrade
- Obsolete with Feudalism
- Does not disband under Anarchy, Dictatorship, Tribunal Empire, or Caliphate
- Disbands under most Middle Ages and above governments (or Republic and earlier)
- Special Feature: If a player does not enact Monarchy or Theocracy and switches government directly from Tribunal Empire to Caliphate, his Raiders do not disband. It's a round-about way to give Caliphate its own form of cavalry to accompany the infantry Janissaries. (**Edit:** Altered. See item 5 of **Heading 134**):

The next pair of Government-Specific "Special" Units operate in the Middle Ages Era:

5) Teutonic Knights (Theocracy):

- Upgrades to Janissary (Caliphate)
- Obsolete with Caliphate
- Does not disband under Anarchy, Theocracy, or Caliphate
- Disbands under any Modern Era and above government (or Monarchy and earlier)
- NOTE: To retain their religious differentiation (so the player doesn't face armies composed of both Janissaries and Teutonic Knights), Teutonic Knight upgrades to and from Janissary

6) Janissary (Caliphate):

- Upgrades to Teutonic Knights (Theocracy)
- Obsolete with Age of Reason
- Does not disband under Anarchy, Theocracy, or Caliphate
- Disbands under any Modern Era and above government (or Monarchy and earlier)
- NOTE: To retain their religious differentiation (so the player doesn't face armies composed of both Janissaries and Teutonic Knights), Janissary upgrades to and from Teutonic Knight

The last three Government-Specific "Special" Units operate in the Modern Era:

7) Conscript (Democracy):

- Upgrades to Red Guard (Communism) or Fascist (Fascism) or Machine Gunner (Mass Production)
- Obsolete with Mass Production
- Can only be built under Democracy
- Does not disband
- Cannot be promoted to Elite
- NOTE: To retain their ideological differentiation (so the player doesn't face armies composed of a mix of Conscripts, Fascists, and Red Guards), Conscript-Red Guard-Fascist all upgrade to and from each other.

8) Red Guard (Communism):

- Upgrades to Conscript (Democracy) or Fascist (Fascism) or Machine Gunner (Mass Production)
- Obsolete with Mass Production
- Can only be built under Communism
- Does not disband
- Cannot be promoted to Elite

- NOTE: To retain their ideological differentiation (so the player doesn't face armies composed of a mix of Conscripts, Fascists, and Red Guards), Conscript-Red Guard-Fascist all upgrade to and from each other.

9) Fascist (Fascism):

- Upgrades to Conscript (Democracy) or Red Guard (Communism) or Machine Gunner (Mass Production)
- Obsolete with Mass Production
- Can only be built under Fascism
- Does not disband
- Cannot be promoted to Elite
- NOTE: To retain their ideological differentiation (so the player doesn't face armies composed of a mix of Conscripts, Fascists, and Red Guards), Conscript-Red Guard-Fascist all upgrade to and from each other.

Some final comments on the "special units"

- A player who relies heavily on this class of units should be aware that the powerful "Elite Unit" battle upgrade option is **not** available for any of them.
- The Modern Era "specials" can (and should) be upgraded to regular infantry after the discovery of Mass Production.
- Those familiar with Cradle will notice that we have two new units here - the **Red Guard** and the **Conscript** each of which was added in order to facilitate the hitherto absent ideological confrontation familiar to any student of the modern era.
- Also, the **Raider** is now a "special", which resolves two issues. First of all, the "stealth" capability is unique for military units of that era - inevitably the Raider was more destructive (as in wiping out infrastructure behind enemy lines) than anything it would upgrade to. And now it adds the balance of a second unit for the "mounted line" of the Ancient Era specials.

Lastly, a new **Government Specific Units** entry has been added to the Concepts section of the Great Library, which is a consolidated version of these last two posts. It includes links to all 14 units, and each of those has a detailed description explaining how it is affected by this new system. (**Edit:** Several changes to the medieval units. See **Heading 134**):

35. V. Governments, Units, and the Tech Tree: There are three imperatives here, all of them linked:

- ** Since Gov-specific infantry will disband, they must exist longer in order for players to feel they are worth building.
- ** Four of the Ancient-era Governments were so closely linked that you could (for example) move from City State to Republic in THREE Advances or to Oligarchy in FOUR. From either of those to Tribunal Empire was just TWO more.
- ** Three of the early units (Swordsman, Hoplite, and Hypaspist) have Advances which are NOT pre-reqs for their specific Gov types. In fact, it was possible to implement more advanced governments before those units were even AVAILABLE! To that point, you could advance all the way to the FINAL Ancient Era Government (Tribunal Empire) before it was even possible to build Hoplites, much less Legions. Absurdly, the ONLY government of this period with an Infantry-building pre-req is Dictatorship (which requires "Iron Working"), and they couldn't even build the Legion unit which comes from that pre-req.

OK, that should make it clear that changes are needed, but fortunately they are both minimal and logical:

1) DYNASTY: To ensure the Swordsman (used to be called "Warrior") is available, Agriculture is now a pre-req for Writing (+1 Advance). Also, Brick-making becomes the immediate pre-req instead of Religion (+3 Advances). The requirement for Religion still exists, but it is lower down in the Brick-making "Branch".

2) CITY STATE: To ensure the Hoplite is available, Bronze Working replaces Trade as the immediate pre-req (+4 Advances). The requirement for Trade still exists, but it is further down the Bronze Working "Branch". The other branch remains unchanged.

3) OLIGARCHY: To ensure the Hypaspist is available, Barracks replaces Philosophy as the immediate pre-req (+1 Advance). The requirement for Philosophy still exists, but it is further down the Barracks "Branch". The other branch remains unchanged.

4) REPUBLIC: This Gov-type will gain the Legion, but Iron Working is not a pre-req so they will have to rely on their "Special" unit (Pezheteroi) until that Advance is reached. As for pre-reqs, Oligarchy replaces Philosophy (+2 Advances) which again is still a requirement, just lower in the branch. Among other things, this keeps the player from moving to

Republic BEFORE Oligarchy, and thus wiping out the ability to even have Hypaspists. Also, there wasn't a second branch, but now there is: Masonry (+2 Advances), which adds a Construction component to the requirement.

5) DICTATORSHIP: No change (but it will gain Legion as a gov-type unit)

6) TRIBUNAL EMPIRE: One of the two pre-reqs is Bureaucracy, and we will change one of its pre-reqs from Jurisprudence (already required for City State, and thus meaningless at this point) to Concrete (+2 Advances), thus continuing the need for these Roman-type govts to have Construction-related Advance requirements. The other branch is Ethics, and here again we change the redundant Jurisprudence pre-req to Hippocratic School (+3 Advances) thus bringing in a set of Medical requirements for the first time.

This sounds like a lot of changes, but the impact is almost entirely restricted to Governments. In fact, only 3 non-Gov Advances saw alterations made to their pre-reqs.

36. Foreign Leader pix: When you open the Diplomacy window and contact another civ, a picture of their leader - in 20th century garb - appears at the top left of the window. Well, not in Cradle 5. Thanks to several of the later Civ versions (and in particular a number of user-created mods), every Cradle Civilization has an appropriate leader.



DP_Arabia.tga



DP_Assyria.tga



DP_Aztec.tga



DP_Babylon.tga



DP_Babylon1.tga



DP_Barbarian.tga



DP_Byzantine.tga



DP_Carthage.tga



DP_Celt.tga



DP_Egypt.tga



DP_Etruscan.tga



DP_Greece.tga



DP_Han.tga



DP_Harappa.tga



DP_Hebrew.tga



DP_Hexagon.tga



DP_Hittite.tga



DP_Inca.tga



DP_Kush.tga



DP_Macedonia.tga



DP_Maya.tga



DP_Minoan.tga



DP_Mongol.tga



DP_NA.tga



DP_Nubia.tga



DP_Persia.tga



DP_Phoenicia.tga



DP_Rome.tga



DP_Shang.tga



DP_Sumer.tga



DP_Turk.tga



DP_Viking.tga



DP_Yamato.tga



DP_Zulu.tga

37. Plunder.slc: This is the slc file which controls the "plunder" mechanism. Certain units can trigger this benefit through success in battle, and from one period to the next the code awards either "Plunder" units (which can be disbanded in a city and thereby create either a new citizen or accelerate production) or free Military units. There were some issues, however:

1) The code is applied to Wonder Units based on their position in the units.txt file, and originally it applied to those numbered 128 through 139. That may have been an accurate numbering under a previous Cradle version, but by Cradle 3 it meant that even Dwight Eisenhower and Norman Schwarzkopf could generate plunder. So the first fix was to ensure the code would only be triggered by the correct units.

2) With "Raiders" changed to a Gov-type special forces unit (and because they were FAR too valuable and powerful as a free plunder unit), this level of Plunder ("Type 6") is changed to "Plunder III" (a source of shields)

3) The "Type 0" unit will probably never appear anyway, but it's being shifted from "Swordsman" to "Plunder" since UNIT_SWORDSMAN is no longer the "Scout"

4) The "Type 3" appears very briefly anyway (the period after Bronze Working but before Barracks), so it will be converted from Plunder (shields) to Plunder_II ("captives" - the unit disbands and creates citizens, not slaves)

5) Type 8 (after Trade Guilds) also grants "captives", but that doesn't seem appropriate for this Late Middle Ages period, so that was changed to Plunder_III

6) Type 10 (after Adv Inf Tactics) and Type 11 (After Plasma Weapons) granted captives or units, but neither makes much sense in this late game period. Kind of boring, but I'll shift both of those to Plunder_IV

And lastly, the associated messages (in "scen_str.txt") have all been altered to match.

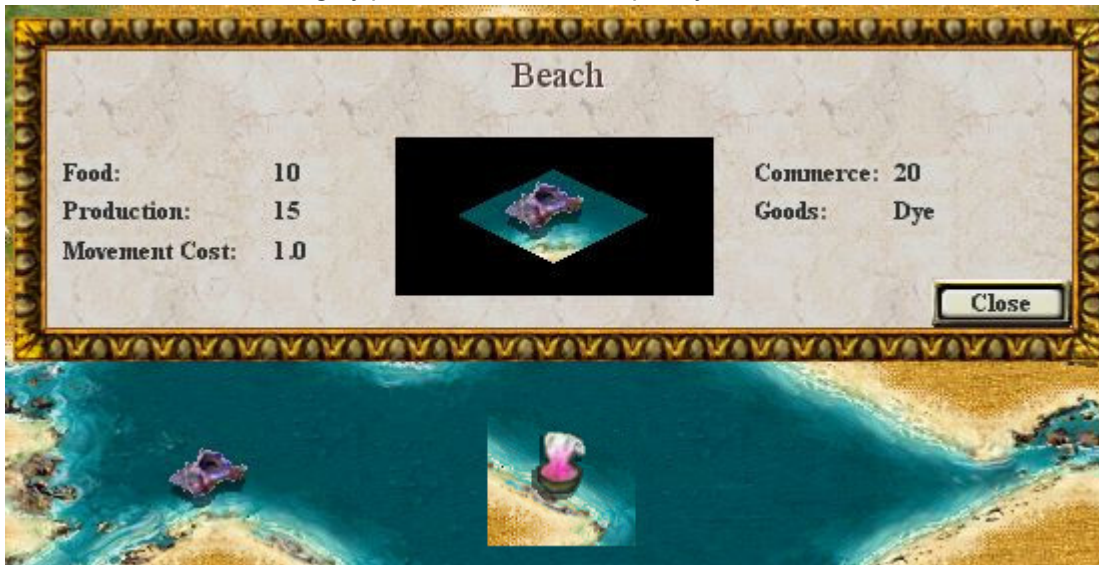
38. New Goods Sprite: Horse

This was a real no-brainer. Replace a terrible looking Goods sprite (The North American Bison, or "buffalo") with an animal found in more locations around the world, and most importantly, one of the most valuable domesticated creatures of all time? Ummm...yeah! In that vein, adding the **Horse** (see attached) offers the tantalizing possibility of associating it with the new AE option in which particular units can only be built if a certain good is available. For example, adding "**NeedsCityGoodAnyCity**" in units.txt for all horse-based units would mean that a civ must have access to the Horse Good in order to build them. I'm a bit concerned about an adverse impact on AI civs, but it's probably worth testing. We'll see. (**Edit:** Cavalry pre-req implemented. See **Heading 78**)



39. Replacement Goods Sprite: Dye

- This replaces the existing Dye sprite (see inset on the attachment), which featured a white cloth being dipped into a tiny wooden tub full of pinkish dye. It was a valiant attempt to represent the dyeing process, but at a resolution of 26x42 pixels....well, it was hard to figure out what was actually being displayed.
- The other factor is the Dye Good is only found on Beach tiles, so what should be represented is the source of the Dye, not the process of using it.
- Which brings us to the replacement sprite, which shows the Murex snail (see attachment), source of the tiny glands used to make the famous and highly prized Phoenician Purple Dye.



40. Replacement Goods Sprite: Camel

- This replaces the existing Camel sprite (see inset on the attachment). The new art is obviously superior, but in fairness, the resources available today far outstrip those on hand 20 years ago.
- The remaining Goods sprites look pretty good, so barring a last minute decision to replace one of them with something new, this will be the last change in this area.



41. New Advance ("Combined Arms") - Looking at the Modern Era advances and units, there was an opportunity for improvement:

- "Explosives" grants the Artillery unit, but that is represented by a Self-propelled Artillery sprite that is technologically far beyond what should be a pre-WW1 unit.
- Similarly, "Tank Warfare" appears roughly around the WW2 era, yet provides an M1 Abrams-type sprite.
- Accordingly, Cradle 5 adds a new Late Modern Era advance called **Combined Arms**, and gives it the "Advanced Infantry Tactics" and "Supersonic Flight" pre-reqs.
- This advance offers two new units - **Heavy Tank** and **Mobile Artillery** - which use the two sprites we discussed above, but now available at the right period in history. Both are fully animated, so "sprite-fu" was not required.
- The earlier advances now provide era-appropriate units, specifically the CtP1 Artillery sprite (now called **Howitzer**, deconstructed and rebuilt to give it the Idle animation) and a fully animated WW2-era CtP2 Tank sprite (the MkIII Panzer).
- The above changes were made and all 4 units (and the new advance) have been inserted in game (Sprites, GL text, 2D pix, new stats, AI build prioritization and sounds).



42. Nuke Animation: One of the most atrocious examples of a missing Idle Animation involves the "Nuke". When the missile is launched, it travels toward the target in an upright, pre-launch position. The example on the left of the attachment is not a missile parked on the ground, but one that's moving toward its target. Which is what you see in the example on the right...but only after the sprite has been rebuilt with an Idle animation! I've probably never actually USED a Nuke in CtP2, but at least now it won't look like a joke.



43. Pharaoh Chariot: All six of the Early Ancient-era Wonder units were chariot-borne, and all of them were using the distinctly non-royal standard chariot sprite. Even worse, that meant there was no difference between the "look" of a Mesopotamian Great King and a Pharaoh. Fortunately, Stan Karpinski created an Egyptian chariot for AOM, but it had some problems:

- First of all there was no Idle animation so yes, no motion. That has been fixed.
 - Sprite deconstruction showed that several of the images were either the wrong size or in slightly different locations, so the unit seemed to "wobble" or "jump" when it moved or attacked. I altered all of those and the unit now operates smoothly in all directions (see attached).
 - The shadow images were, well, horrible. Large black blobs that shifted position dramatically from one image to the next, interspersed with a few "all black" images that obscured the image and contributed to the "jumpiness". The solution here was to remove ALL of them, as they were completely unsalvageable. I prefer the "look" of units that have shadows, but not all of them do and it's very time-consuming to create new ones, especially those with a custom fit. I may revisit this later, but that would mean creating 120+ shadow images from scratch, which isn't a whole lot of fun.
- Anyway, this gives a nice new look to the **Khufu** and **Ramesses** Wonder units!



44. Mesopotamian Chariot: I wanted another chariot for the four remaining Mesopotamian Great King Wonder units, but there weren't a lot of options. Eventually I settled on the Solarius Scorch-created unit he called the "Real Chariot". The unit was a little small when compared to the other chariot units, but it had full movement and attack animations. The downsides were no Idle (easy fix), no shadows (oh well), and - big problem - the charioteer had a Roman-style red horsehair crest helmet. That simply wouldn't work, so - given no alternative - I edited the crest out of all 165 images, leaving a charioteer with a nice, era-appropriate Gold Helmet (see attachment). As a result, **Sargon**, **Hammurabi**, **Nebuchadnezzar**, and the new **Great King** all have a suitably royal chariot unit. (**Edit:** Altered. See **Headings 59 & 60**):



45. Terraforming: Not a huge deal, but a few changes were needed here, specifically with regard to which Advances allowed various forms of terraforming. The modern-era ones I mostly left alone, choosing to focus (for once) primarily on the Ancient Era. What really set me off was the realization that **Toolmaking** - an advance given to every civ at the beginning of the game - was all you needed to terraform Grasslands to Plains and vice versa. It just seemed, ummm, unlikely that ancient civs could terraform even before Farms or Pastures were available. Also, I didn't like that every enabling Advance allowed you to both add & remove a given type of terrain - some variation seemed appropriate. This is not a knock at Cradle either - the SAME terraforming-advance links exist in the base game (even the Apolyton Edition).

1) Water Lifts - Plains-to-Grassland: Irrigation-type advance enables this transformation.

2) Domestication - Grassland-to-Plains: Reflects land dedicated to the use of herd animals.

Starting with Forest, "removing" or "adding" a terrain type involves transformation to-from a variety of different terrain types. For ease of explanation, just assume that the following examples reflect "to/from Plains", but there are variations.

3) Architecture - Removing Forest: For one thing it's easier to knowingly remove a forest than to purposefully create one, and this tie-in reflects the greater use of wood in cities.

4) Feudalism - Adding Forest: Not due to a technology improvement but reflects members of the nobility setting aside forested areas for hunting.

Similar issues with Desert and Jungle. Easier to create Desert than to transform it to something productive, where-as Jungle is easier to remove, while the incentive to add it (or at least see some value in it) comes later.

5) Iron Working - Adding Desert: Not that anyone would choose this, but it reflects environmental damage from widespread use of iron - both in forging it and using the resulting tools in mining and deforestation.

6) Agricultural Revolution - Removes Jungle and Desert: No change from the existing Cradle system (or the base game)

7) Trade Guilds - Adding Jungle: Reflects recognition of the trade value of jungle-based goods, and the desire to have more of them.

8) Tribunal Empire - Removing Dead Tiles: Waiting for the late-game discovery of **Conservation** in order to remove Dead Tiles is a real disincentive to play with pollution on. In the Cradle era, that sort of environmental devastation was more likely to be the result of poor land management, and it's reasonable to imagine that a large-scale Government could mobilize to deal with it.

The remaining forms of terraforming become available with **Explosives**, **Industrial Revolution**, **Advanced Composites**, and **Fusion**. While it's possible to quibble about some of those choices, it's far enough in the future to ignore for most Cradle purposes. And again, this reflects the base game set-up, not something unique to Cradle.

As always, the Great Library has been updated to reflect (and explain) these alterations.

46. Heptireme (now "Quinquereme"): The Ctp1 Trireme is in Cradle as the "Heptireme", and like most Ctp1 units did not have an Idle animation. Which means that 120 out of 142 total images went unused. And it's even worse, because the 10 "Attack" animations were simply a single fixed image aiming in one of five required directions. Accordingly, the Heptireme didn't move and it didn't attack...but, well, it definitely could sink! Adding a 6-file Idle animation was easy enough (it now waggles the oars), but the real challenge was the Attack. Ships of this era featured a large bronze beak attached to the prow and relied on ramming attacks to sink enemy vessels. Which fortunately is pretty similar to some of the existing images.

In order to put this in-game, I edited several "Move" animations, specifically the 7 through 11 sequence....for all 5 directions. In order to represent a "ramming" attack, the image sequence is animated as 7-8-9-10-11-11-11-10-9-8-7 (so the ship drives into the enemy using its oars, and then backs out). That alone isn't enough, as it merely shows the movement of oars. So the ship also has to be repositioned in each image. As an example, let's look at how this was done for the SE direction. "Movement" image #7 is the starting position, and doesn't have to be edited. But from there, Image #8 moves down two pixels and two to the right, #9 moves four in each direction, #10 moves six, and #11 is shifted a full eight pixels down and eight to the right.

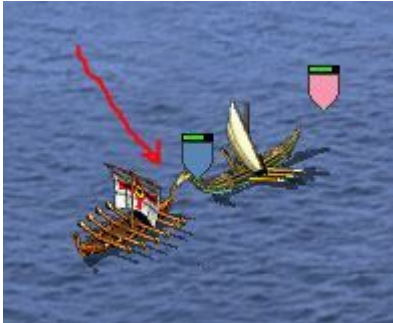
Looking at this in the Naval Combat box, the oars appear to move each Heptireme forward and back, so they no longer sit still like turtles. The attachment gives some indication of this as the Heptireme is contacting the bow of the enemy Bireme, the oars are shifted back and there's whitewater along the sides and to the rear. The final step in the process was to associate this attack with the sound of breaking timbers (another new file), and that completes the effect.

In sum, one of the most important ancient era Naval units is now fully animated.



47. Dromon: Continuing with Naval Units, Cradle uses the Ctp1 Longboat as the "Dromon", and it has problems similar to the "Heptireme" - 5 simple attack images and no movement of any kind (other than sinking). This is especially problematic because the Dromon - in real life - used Greek Fire to attack enemy warships, but we don't see any of that in-game. Conversely, the CtP2 "Fire Trireme" features just such an attack, but it's a complete fantasy - there never was any such unit (although to be fair, I think it was CtP2's way of incorporating a Dromon-like unit with a jazzed up, fancy name). We'll talk about the "Fire Trireme" in a subsequent post, but for this unit I was able to copy the flame portion of the "Fire Trireme" attack animation, and used that to create a new set of attack and idle images.

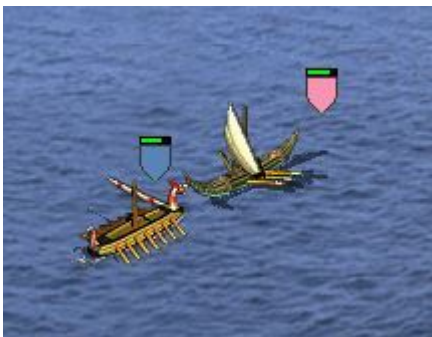
It required a fair amount of graphics work (image count increased from 204 to 286), but the end result was worth it - both of the new animations work nicely. Truth be told, at this scale the fire attack looks a bit anemic (see attached), but it's still much better than what we had. Surprisingly (or perhaps not....), the attack sound of the "Fire Trireme" was NOT "flame-related", so I added a new flamethrower-based sound and placed the appropriate references in sounds.txt (SOUND_ATTACK_DROMON "flame.wav") and Units.txt.



48. Turning the "Fire Trireme" into a "Trireme": Although this CtP2 unit already has an Idle Animation, the "Fire Trireme" is a fantasy creation, as ships of this era did not deploy fire attacks. Until the discovery of Greek Fire, it was simply too dangerous to utilize open flame weapons aboard a wooden ship, plus the technology for naval units to deliver fire-over-distance didn't exist (Hollywood flaming catapults aside). We know from a number of sources that animal-style figureheads were utilized in the early Ancient era, so even though we don't see depictions of dragons (such as the one on this unit), it's not completely unreasonable. Plus it would be very time-consuming to try and replace the dragon with something else.

That said, more can be done to make it "era-appropriate", and so the fire attack animation will be removed and a new "ramming attack" will be added in its place. For one thing, this unit clearly features an extended beak at the bow - as did all Triremes - and it's one of the main reasons why I didn't just swap this unit with the Dromon (which just as obviously did NOT have a beak). As with the Heptireme, several of the "Movement" images have been reworked in order to show oars driving the Trireme toward the enemy vessel, and then backing off to repeat the attack (attachment). Sounds have been adjusted as well, and I think the result is a distinct improvement.

Edit: Since the **Trireme** has now regained its historical functionality, we'll change the enabling advance from the questionable **Alchemy** to **Map Making**, which also places this vessel back into the Naval sequence.



49. Slave Trader: While [working through the "civilian" unit category earlier](#), I broached the possibility of adding an upgrade so the ancient-era CtP2 **Slaver** could transition to the "red-shirted fat guy" from CtP1. And on further consideration, it makes sense to do that. The rationale (as outlined in the Great Library) is that "with the arrival of active anti-slavery opponents such as the Abolitionist, it becomes more expensive to employ those engaged in the Slave Trade, although improved technology means that Slave Raids are a bit more successful and somewhat less risky".

Accordingly, **Classical Education** thus becomes the enabling Advance for both the **Abolitionist** and the new **Slave Trader**. That also obsoletes the **Slaver**, but it can upgrade to the new unit. All the graphics exist, so all that was needed were text file additions (newsprite, gl_str, GL, units, & uniticon)

50. "Age of Sail" warship combat: The last ship without a movement and attack animation was the **Carrack**. I'll discuss the details of that conversion in a subsequent post, but the attack animation in particular seemed problematic. Vessels like the **Carrack**, **Galleon**, and **Ship-of-the-Line** did not fight "head-to-head" like we so often see with Ancient Era vessels and again with ships of the Modern Age. Not always of course, but it was usually the opening phase before combat dissolved into a melee. Not so with the cannon-toting warships of the post Renaissance era. For them, it was "close with the enemy and exchange broadsides". Again, not a universal method of attack, but certainly the predominant form. Except not in CtP2. What we get are engagements like those in the attachment, ships facing one another while their guns blast sideways at the open ocean. Or at least...that's what it used to be. ;-)



51. Carrack: This is the Tom Davies (Morgoth) "Cog", and does not have Idle or Attack animations. There are 54 images to work with and we'll create an Idle from part of the "Death" sequence, so the unit appears to rock back and forth before settling down. Initially I planned to use an attack image similar to that of the **Galleon**, in which the center part of the ship lights up when it "fires", but - as with a similar effect for **Ship-of-the-Line** - it's a custom graphic that's built-in and can't be separated from the whole. As an alternative, I was able to incorporate a few other animations which appear to show a cannon firing, followed by a bit of smoke. Those were added to a few of the existing Move images, and the result works pretty well.

However, as noted in the post above, that still left a head-to-head battle in which the guns fired off to the side. Before we talk about how that was fixed, here's a brief intro on sprite making. Every sprite has movement in 8 directions, but you don't have to create image sequences for those on the left-facing side of the quadrant (see below) - they are simply mirror images of the right. So a NE-facing sprite (#2) is "flipped" and used as the NW facing sprite. Similar with East-facing (#3) and SE-facing (#4).

Code:

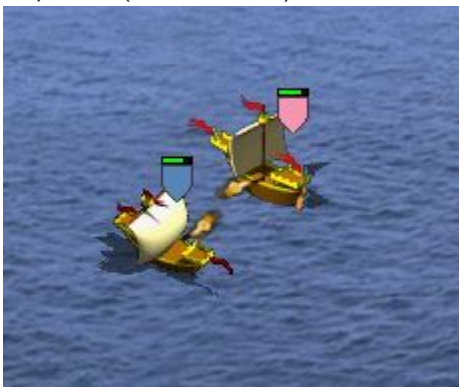
```
      1
2*  |  2
   \|/
3*--+---3
   /|\
4*  |  4
      5
```

Looking at the Naval Battleboard in the image appended to post #50 above, you see the **Carrack** pointing in the NE direction while **Ship-of-the-Line** faces SW. This is true of ALL naval engagements, and means that - at a minimum - you have to build a NE-facing attack sequence AND a SE-facing sequence, the latter being "flipped" to the SW by the game code.

In order to create a broadside attack sequence, the ship image has to be perpendicular to the attack direction, while its gunfire erupts in the original facing direction. As an example, consider the NE-facing attack. To get the correct "look", a vessel with cannons blazing from the **left side** of the ship will have to be facing SE! Even more complicated, the ship firing to the SW is actually using the direction #4 image sequence, and thus the animation is built from images pointing to the NE with guns firing from the **right side** of the ship! Oy vey! In addition, even though North, South, and East aren't used by the battleboard, a vessel using the on-map "Bombard" attack needs to be able to aim in all directions, so a full set of attack animations is still needed.

And that worked, right? Wrong! Apparently, the battleboard code cycles the attack images in a "loop", so the animation repeats itself until all the vessels of one side are destroyed. But it does one thing more. Before running each loop, the code displays the first image from the Movement animation associated with that direction. Of course Movement sequences have to be "head-on", so the result is an UGLY battle in which the vessels fire their Broadsides, flip to face each other, and then flip sideways as the next attack loop plays.

Fortunately there was a solution. Animation sequences don't have to use all the images in that group. So I re-worked the Movement sequences and plugged in a sideways facing unit as the first image in every sequence - but did not reference that image number in the movement animation itself (which is just a string of images that can be arranged in any order). Meaning that BOTH attack and movement animations now work perfectly, and the **Carrack** has a far more realistic battle sequence (see attached).



52. Galleon & Ship-of-the-Line Combat: In the original post which started this thread, I mentioned that working on this mod was like taking "one step forward and two steps back", and this is exactly what I meant. Technically there's nothing wrong with the Galleon and SotL sprites - Movement, Idle, good attack & death animations. Normally I wouldn't dream of touching them. But once the Carrack was reconstructed to include the "broadside attack", well, how could these two not take advantage of that new discovery? And so, two days later, they do.



53. Unit Build Queue data display differences: While working on a large graphics project (more on that soon), I noticed a small issue resulting from a text file error. Several units did not list the "Production" cost above "Attack" when you look at them in the Unit Build Queue (see attachment). This affected Legions, Praetorians, Caravan, Freight Transport, Merchant Trader, Legion Militia, & Caesar. Tracking that down, in each case, "uniticons.txt" had a DOUBLE listing for "UNIT_**_STATISTICS" and NO LISTING for "UNIT_**_SUMMARY". It *should* have "Statistics" and then "Summary". Now Fixed.



54. Tile Files (& new Stone Roads): Most CtP2 graphics can function in-game as individual files. For example, even though all the 2D graphics such as unit and button files were originally located entirely inside a file called pic565.zfs, they can be extracted and altered individually. And most importantly - the game does NOT require them to be reinserted into the .zfs file. Open any mod's default/graphics/pictures folder and you'll see that it's full of individually customized graphics files.

However, the same is NOT true of "tile files". Look inside the default/graphics/tiles folder and you'll see only two files, gtset565.til and gtset555.til (only the first is required by the game). This file contains all the map tiles (which I won't be altering) AND all those images used by map overlays such as "Improvements" (think roads, farms and trading posts),

Goody huts, and Visible Wonders (Hanging Gardens, etc). Additions or changes to these graphics have to be performed on individual files and then inserted into the .til files.

I won't get into the specifics of that process, as it's documented in the **TileEdit** program (<http://www.ctp2.info/database/resour...aphics/2.shtml>) created by Martin B. Vestergaard, but just recognize that Tile Edit is the **ONLY** program which allows you to work with these files. That's a critical point because - for whatever reason - there is a problem with the .til files included with the Cradle 3 and 4 downloads. TileEdit consistently kicks out errors when trying to open those files, and even when it does, the majority of the Cradle-specific improvements remain invisible and unavailable.

The effort to rescue the Cradle files went on for months, and even progressed to the point of mapping out methods to try and recreate them using the Apolyton til files. Fortunately I eventually took a look at Hex's "Lord of the Rings" mod, and discovered those til files are error-free, fully editable, and contain most of the Cradle 3 graphics. Apologies for the long dissertation, but that's why Cradle 5 isn't starting from the baseline Cradle til files.

All that said, the effort wasn't completely wasted as I learned a LOT about successful tile file editing, and most fortuitously, discovered [a set of stone roads graphics from a modder named Tellius](#). Those familiar with Cradle will know that Hex created his stone roads by altering the existing Maglev graphics, primarily by changing the colors from bluish to greyish. While a nice feature, graphically they look more like modern day superhighways than ancient stone roads (see image appended to **Heading 15** above).

There is a LOT more to come with respect to new tile graphics, but we'll start with the lovely look of Tellius' Stone Roads, now fully incorporated in Cradle 5.). **Edit:** These were replaced as discussed in **Heading 284 & 285** below.



55. Maglev as Road Level-4? No matter how long it may take to solve a problem, what's presented in this thread is everything that "worked". But usually there was a lot of failure before it all came together, and some ideas simply never panned out. As an example, wouldn't it be cool if Cradle could have Stone Roads AND Maglevs? A 4th land road level? How hard could that be? Well, so far the results have been less than optimal. Mind you, they WORK, but.....ugh.



56. Maglev as Road Level-4! One of many new features from the Source Code team was the addition of an interesting option to the Tile Improvement Database: **PrerequisiteTileImp**. That means you can't build one tile improvement unless another is already present. If you add that requirement to the Maglev section, and make the pre-req a Railroad.....voila. Maglev graphics WORK! Incredibly simple and incredibly easy to include in Cradle 5. The Maglev button is now the "Level 3 Ocean Road", but all the underlying code make it entirely a land improvement - the "Ocean" part is simply the location of the Maglev building button (see bottom right of the attachment).

In fact, if you look closely at the attachment (red arrow), you'll see that it's impossible to build a Maglev on an open tile. There **MUST** be a railroad in place first. That's the only way to make sure you get Maglev functionality AND perfect graphics. Speaking of which, you'll notice that the original Maglev art has been added to the til file. I tried using Hex's stone roads instead, and while they look nice, there's no "shadow" to indicate that these are elevated transport lines, so the originals have returned.

And while I was at it, the railroads and stone roads have switched position in the build screens (see inset), so now you have the proper sequence of Road (L1), Stone Road (L2) and Railroad (L3).

Lastly, I'll leave you with this tantalizing thought. You'll notice that the "Ocean Road" Level 2 slot is still open. That means it's theoretically possible to add a **FIFTH level of Land Road**! Simply use the same method that activated Maglevs, and it would have perfect graphics and total functionality. I'm not planning to do anything with that idea, but.....it's certainly possible!



57. Dwight Eisenhower Tank Sprite: As noted in **Heading 41**, the Panzer MkIII sprite has replaced the Abrams as a more appropriate WW2-era tank. However, that also meant the Dwight Eisenhower Wonder Unit was now represented by a German tank.....which just didn't seem right. Fortunately the Activision WW2 scenario also contains a US Tank sprite which can be used instead. The sprite has Idle (and the other necessary animation sequences) and looks pretty good (albeit a tad bit cartoonish) but didn't have any 2D graphics, so those had to be created from scratch.

All told, it didn't take long to make all the required changes, and now, what can I say? "I like Ike!"



58. Concepts for "Elites" & "Elite Units": The Great Library had no information on "Elite Units" as a group, and while there was a limited concept entry for Veterans, the new "Elites" promotion (introduced by the Source Code team) was not mentioned at all. Accordingly, I wrote up a detailed description on which Cradle units qualify for Elite Promotion and also explained the difference between the two kinds of Elites, since the shared terminology is inevitably confusing. This includes links to & from the MANY affected units, and involved changes to the GL, gl_str.txt, uniticon.txt, & concept.txt, along with 3 new pieces of art for the Elites, Veterans, and Elite Unit concepts.

One "not-so-side-benefit" from the research effort was the discovery that "Elite status" doesn't just work automatically. The SC guys didn't incorporate it in the base game, but rather set the COMBAT_ELITE_CHANCE setting in "Const.txt" at "0". For Cradle 5, that value is now set to "0.05" (half the veteran chance).



59. Great King Chariot Sprite v2: For reasons that will be discussed shortly, Cradle needed a replacement for the "Great King" chariot sprite. As noted in earlier posts, there weren't a lot of options so this time I modified the "Pharaoh Chariot" sprite and gave it the head of a bearded Assyrian and removed the fancy plumes from the horse heads (see attachment). As a result, it now fights with bow & arrow, is the same size as its Egyptian counterpart, and generally has a more "Near Eastern" appearance. That said, it took an ENORMOUS amount of editing to create, and while the benefits are apparent, it might seem a bit duplicative. After all, this is the SECOND major editing project aimed at developing a sprite for exactly the same role. So why would somebody do that?



60. The REAL "real chariot": As a testament to the blindness that often accompanies single-minded focus on achieving a desired outcome, "Exhibit A" would have to be the "Real Chariot" sprite. As I noted in the thread dedicated to that topic (see **Heading 44**), the sprite appeared to have only two defects - it was a "little small" and the charioteer had a Greek-style horsehair-crest helmet. No problem. I disassembled the sprite and proceeded to modify 165 images to remove that crest. In the process I couldn't help but notice that the charioteer seemed to be very slim, had what appeared to be a flesh-colored breast plate and - based on the buttocks visible in the rear view - was apparently nude from the waist down. Admittedly "Great Kings" weren't known for absence of clothing in battle, but, whatever - I NEEDED a Wonder Unit chariot and these were just minor details, right?

Certainly not worth worrying about anyway, so I finished the unit, put it in-game and thought no more on the matter. Until, while looking through the "Forever Future" mod folder (from which this unit came), I found the large Unit Icon for this chariot (see attached). Whooops! Now don't get me wrong, I like naked chariot girls as much as the next guy. Especially those with an impressive set of "breast plates". But, well, there are some things that - once seen - can't be ignored. And thus, adios to this version of the "Great King" chariot sprite!



61. "Assyrian Archer" unit: One side benefit from recreating the "Great King" sprite - it led me to look more closely at Stan Karpinski's Archer unit from AOM (see attached). It's actually a Civ3 conversion, but either way the images which comprise the sprite are of consistently good quality, and it was pretty easy to add the missing Idle animation and to clean up the very few graphics glitches. It clearly has a more ancient look than the "Nottingham Forester" currently filling the role of "first archer", so I created some new 2D pix and it's now in-game. **Edit:** Didn't blend well with the other units, so not implemented



62. Unit Facing: The only downside to the "Idle Animation" is that once a unit completes its move, the sprite shifts to "Idle" and then faces in one of two directions; SE or SW. Units without the Idle animation display no motion (legs walking, spears moving, heads bobbing, etc) but they do "face" in the direction of their final move, which could be any of the 8 Sprite directions (see post #51 for a small diagram). Personally I consider that a small price to pay in order to regain full on-map motion, but it occurred to me - why not solve the problem by creating Idle Animations for ALL directions?

And that's what I tried, using the Assyrian Archer as my testbed, but sadly it was a total failure. I could not figure out how to code the sprite building process so it would make use of all the new Idle direction images. I even opened up some of the CtP2 sprites which came with an Idle animation, and every one of them uses only the #4 direction (i.e. "SE": As described in the linked post, "SW" is not separate art, but rather the mirror of the SE image). A review of the "MakeSprite" documentation also came up empty, as their examples only included a single facing direction, and there's no hint that more are even possible. So at this point I'm going to assume it is NOT possible, and won't pursue it further.

That said, a really interesting thing happens every time you load a save game. All units - even those with Idle Animations - are facing in the direction they last traveled! And they retain that "directionality" until such time as they move, after which they revert to one of the two Idle facings. However, that is not universally true, and thus perhaps it's a clue that source coders could follow up on.

When you build the Idle animation, there are THREE animation "types" to choose from:

0 = sequential (play through from the first frame to the last defined frame)

1 = looped (starts over at the first frame when it's gone through all of the frames)

2 = back-n-forth (reverses direction of playback when it reaches the last frame, and plays back to the first before reversing direction again).

And here's the clue: If you build the sprite using Idle animation types 0 or 2, the unit does NOT retain directional facing when you load a saved game, you just get one of the Idle facing directions.

Why is that? Who knows, but once I realized what was happening, all my sprites were rebuilt so as to utilize the "looped" animation (#1), so at least directional facing is available whenever a save game is loaded.

63. "Updater.slc" Bug Fix: As I reported earlier in **Heading 10**, the new unit upgrade system does not work for "unbuildable" units like the **Cradle Militia** or **Cradle Elites**, a pair of categories created using SLIC code. The workaround for that involved another SLIC file, "**updater.slc**", but that had one MAJOR bug. If you tried to do a partial upgrade of your units, the code took you through them one-by-one and offered a yes/no choice for each. Or rather, that's what it was supposed to do, except the code threw out errors, collapsed in the middle of the upgrade process, and never functioned correctly from that point forward.

Well, I'm happy to report that as part of the Apolyton Edition project, Peter Triggs, Tamerlin, and Pedrunn created a revised version (**APOL_updater2.slc**) and after extensive editing to insert the Cradle 5 Advances and Elite/Militia upgrade paths, the BUG IS GONE! That's a MAJOR step forward for Cradle 5, as it eliminates an old bug that affected all previous versions of Cradle, and solves one of the biggest remaining issues on my checklist. Because the Apolyton updater2 file has been edited so heavily (it won't work with other mods), the Cradle file has been renamed "**updater3.slc**", but the reality is that all the hard work (ie. the coding) was performed by the aforementioned CtP2 modding gurus. MANY thanks, and a big tip of the hat!



64. Tile Improvements (In-process and Multiple graphics): The "Port", "Trading Post", and "Fortification" are three "early-game" examples of tile improvement which feature "in-process" building graphics. You don't just get the standard "building" graphic (barrels, pile of rubble & stacked lumber) which sits on the map for "x" number of turns until the improvement is completed, but rather can "see" all three of them undergo different phases of construction. Among other things, it's a good reminder of what's being built on that tile (the "mouse hover" tells you nothing), but it's also a pretty cool effect.

Many of the late game improvements are equally generous in that regard, but most of the early game improvements are not. As a result, this latest project created new "in-process" graphics for farms, pastures, advance farms, mines, watchtowers, colonies, townships, shipyards, and even Wonders. Plus some for the modern era as well: Airbase, radar, sonar buoys, listening posts and underwater tunnels.

In addition, I used several of Hex's new farm-type improvements and made them terrain-specific. For example, you can build **Advanced Farms** (a classical era farming upgrade) on Grassland, Plains, and Desert tiles, and now each one of those has a DIFFERENT on-map graphic (see attachment). This really helps reduce the "everything looks the same" effect.

Lastly, I revised a few of the build buttons. They are only 40x30 pixels, and when you try to represent a complex improvement like a colony or township, well....not good. The result is two buttons that look nearly identical. The solution was to select the most prominent building from each improvement (a tower from the colony and a temple from the township), and it's now a much cleaner look.



65. More Cradle 4 features:

1) Economic Building Upkeep: One of the nice things about Cradle 4 is there's no upkeep in Gold for many of the Economic Buildings. Which is good, since these structures are supposed to increase income, not force you to do math in order to figure out if they are worth building.

** Agora: Upkeep from 2 to 0

** Bank: from 4 to 0

** Bazaar: from 1 to 0 or

** Brokerage: from 5 to 0

** City Clock: from 5 to 0

2) Religious Conversion Inhibitors: Another interesting feature is that Walls no longer inhibit religious conversion, but Religious buildings do. That definitely makes sense, and is another change that has been added to Cradle 5, specifically:

** Walls: PreventConversion from 0.3 to 0

** City Walls: from 0.4 to 0

** Basilica: from 0 to 0.2

** Monastery: from 0 to 0.2

** Mosque: from 0 to 0.2

** Shrine: from 0 to 0.1

66. Unit Voices are Back: To begin - for those who don't care for unit voices - there are two ways to silence them. At the main menu, click the "options" button (lower left), click "sounds", and then set the voice volume to zero. This also works DURING a game - hit the "esc" key and you'll get access to the same "options" menu. In other words, it is VERY EASY to shut them off!

I had noticed voices in some of my games - but not for all units or actions - while other games had nothing (different installs, actually). The culprit for the second problem is the absence of a 15.8MB file called "sounds.zfs" which holds nothing but voices, and is now resident in the Cradle5 "sound" folder. Confusingly, this file works in tandem with yet another "sounds.zfs" file (22.8MB) which sits in the base game ctp2_data\default\sound folder and holds all the non-voice sounds like guns, arrows, explosions, walking, etc.

Fixing the first issue was a lot more complicated, since it meant tracking down the individual missing voices and finding appropriate substitutes. Along the way, I made a LARGE number of changes, so that now all the female units (especially the new ones) have gender appropriate voices, the Fascist has a nice German accent, the Galleon captain is Spanish, Alexander has his own voice (from the Alexander scenario, unsurprisingly), the Janissary is at least Indian (better than British), and the Warrior no longer speaks with forked - or rather "Brooklyn" - tongue. And many others.

After playing around with this for a while, it appears that neither of the "SoundSelect" voices (see "sounds.txt") are ever used, which is probably just as well. Conversely the "SoundAcknowledge" plays about half the time you move a unit, and it can get annoying, especially if there are lots of units of a particular type to move, or you have units with long movement allowances (like ships) yet have to constantly start-and-stop them (especially during the early "Explore the map" phase). I can't find a file which controls the frequency with which any voice category is used (or that indicates why the "select" files don't play at all), so maybe that is still hard coded (which was a missed opportunity, IMO). Anyway, I am looking for voices which appear too frequently and in some cases have switched them over to "NULL". Better silence than annoyance.

67. Nets & Fisheries (Existing): One of my long term pet peeves with CtP2 are the as-delivered Tile Improvement graphics which represent "Nets" and "Fisheries" (see attached). What are those things anyway? Red hulled boats dragging net-like things in their wake? Bright Red Buoys with nets strung out between them? Something else? Whatever they may be, "ancient era" they certainly are not. Yet the first set is available with "Sails", in the earliest of early times, while the triple red group isn't far behind. And then? There they stay, in your oceans until "Robotics". Ugh. Can we do better? I think you know the answer....



68. Revising "OceanFarms": This sub-project began as a graphics task, narrowly focused on improving the TIMPs for "Nets" (L1) and "Fishery" (L2). But the more I dug into this, additional questions and issues arose, and as the focus widened, it seemed like a lot more was needed in order to improve game-play in this area. Specifically:

- 1) As shown in the post above - at best, the graphics are of questionable application for the Ancient Era. Something different was clearly necessary.
- 2) Which raised the question - what do these improvements actually represent? Obviously it's the Ocean equivalent of the Land "Farm" - a way to get more food from ocean tiles. But until we resolve the question of what exactly is collecting that "food", we can't create new graphics, nor figure out how best to stat them and deploy them.
- 3) Answering that question also leads to another - what sort of replacement art is needed and can it represent this "ocean food" capability across multiple time periods?
- 4) And the Advances which lead to each TIMP? Are they appropriate or will those need to change as well? And what about the timing and nature of each Advance? Do they reflect the technology being represented by the TIMP?
- 5) What about pillaging? It makes sense, for example, that a "Farm" could be destroyed (less so a "Pasture", but that's another discussion), but what about these ocean TIMPs? Some? All? None?

The posts to follow will answer all those questions, and give you a detailed look at the new "Ocean Farm" system, beginning with "Nets"

69. OceanFarms L1 - "Nets": As the name implies, this tile improvement is a Net (a graphical TIMP from Civ3 - see attached), nothing more, and is a visual representation of the technology used to generate food from this coastal zone. Its use and deployment is now VERY narrowly focused, because - in addition to the improved visuals - the new TIMP can only be built on Beach Tiles. That's also why it is now coded to be "un-pillageable". Historically, pirates and raiders couldn't stop people from fishing from a beach, nor would they find it economically worthwhile to do anything about the nets or weirs deployed in this narrow zone.

Because we are limiting the deployment options (Nets used to be buildable in every ocean tile), we'll now make it available earlier, with **Ship Building** (used to be **Sails**). Since Nets can't be pillaged, the player no longer has to worry about defending them, and accordingly it's a much safer use of valuable "early-game" PW points. The game play change is extraordinary in that regard, as it eliminates an entire category of needless early-game AI conflict.



70. OceanFarms L2 - "Fishery": This next improvement expands the range of food collection to all Ocean tiles EXCEPT Beaches, which means these two TIMPs work together, rather than having one supplant the other. In that regard it is similar to the Cradle land approach, in which Pasture (Plains) and Farms (Grassland & Desert) coexist. The technology which expands the range of this TIMP is "fishing boats", and they are graphically represented by a pair of improvements borrowed (and modified) from AOM (see attached). The smaller vessel appears when a Fishery is constructed on Shallow Water tiles, while the larger one shows up on the Ocean Shelf and in Deep Water. And of course, they harvest different amounts of food from each region. That isn't new, but the graphics now provide a visual representation of that effect.

Not surprisingly, fishing vessels ARE subject to "pillage" since they are easy targets for Pirates or enemy warships. The specific technology of building boats and sending them out to sea in search of fish, well that's hardly an advanced technology, so we'll shift this one to an earlier period as well, making them available with **Map Making** (used to be **Hullmaking**). At the same time, we'll make this a "TIMP-swap" by moving "Shipyards" from here to "Hullmaking (which makes a lot more sense when you think about it). One final point. These improvements WILL need to be defended, but Map Making also gives the player (and the AI) the ability to do that because the Trireme is now available from the same Advance.

This still leaves us with the "multiple time periods" problem. Specifically, the boats used for "Fishery" are clearly ancient, and keeping them on the map all the way until "Robotics" (when the 3rd and last OceanFarms" improvement becomes available) is anachronistic at best. Fortunately the "OceanATM" slot #3 is still available, and can be used for a 4th OceanFarms improvement in the same way that "Special2" allowed a 4th level of Mine and Farm. Which brings us to....



71. OceanFarms L3 - "Trawlers": Trawling was a major improvement in fishing technology that first appeared in the 17th century but didn't mature until the 19th. Initially of course it was deployed by sailing vessels, but eventually they morphed into the various forms of engined trawlers which still set forth on the seas today. And just as "Advanced Farms" effectively merges "Pasture" and "Farms, this new TIMP will do the same at sea.

After due consideration, this new technology will be represented by vessels from the "Age of Sail" (see attached), and will be made available with the **Astrolabe** Advance. Modern-looking fishing vessels would be a better link with the eventual appearance of "Aquaculture" (renamed from "Automated Fisheries"), but that leaves a HUGE amount of time in which the ancient "Fisheries" boats remain on map, long past the time when they were supplanted. Sailing vessels by contrast leave a much shorter "anachronism" gap on the back end of the game, and frankly you can still see vessels like that engaged in fishing activity today, although clearly they are the minority.

Among other things, this new improvement provides incremental food bonus improvements, rather than the previous jump which occurred when going from Fisheries directly to Aquaculture. For example, previously you would see Shallow Water food going from 10 to 30 and Deep Water from 20 to 45. Now there's a "middle ground".

You'll notice that the Beach improvement has changed from a Net to a small open boat, and that signifies not only that it's a technology upgrade, but that boats can be sunk (i.e. pillaged). Which means this region is no longer "safe" - at least not if you upgrade from Nets. Decisions, decisions.

Lastly, I revised the Button Graphics (see red arrow) which now show the fish "goodies" available with each level of Ocean Farm, from the single Grey Fish found on Beach tiles, to the pelagic Tuna and Salmon which can be harvested with Fisheries, and finally the availability of all three with Trawling. Among other things, it's a more intuitive approach to the buttons, and won't have to change if any of the Net or Fishing Boat graphics are altered in the future. You'll also see that Trawlers is the 3rd button in the Ocean Farms group, while "Aquaculture" has shifted to OceanATM.



72. Originally posted by N35t0r

The fishing boats and trawlers are nice, but don't they add to much visual clutter once half of the map is paved with them?

Well, that's always been an issue with CtP2. The new system at least provides visual differentiation. The "old system" (see middle of attachment) paved the seas as well, but it was a uniform appearance. Now that same space has 3 different looks - and after "Trawlers", that increases to SIX. So, yes, a lot of "busyness" in the oceans but at least there's a large mix of graphics, and the TYPE of graphic (Net vs. Boats) actually means something (i.e. pillage-proof or not) AND "amount of food each provides increases with vessel size".



73. Hagia Sophia: The original graphic in Cradle3 was a somewhat modified version of the one in the Apolyton pack (left side of attachment). But it simply didn't do justice to a building that was the Wonder of its era. I was planning to insert revised versions of more Wonders, but it's a LOT of work, even with the availability of good 3D models. It's not the matter of having great art to use as a starting point; it's the process of shrinking it down to fit a 90x72 pixel frame and still retaining the detail (and then identifying and changing all the individual pixels which are reserved for "see-through" alphas or shadows). Anyway, there may be more like this, but....we'll see.



74. Ancient-Era Artillery: Cradle3 started with three ancient-era artillery units (**Belfroi**, **Onager**, & **Trebuchet**) but all of them had "catapult-type" sprites. As described in **Heading 19**, the Belfroi was replaced by the **Ballista** from Cradle4, but that still left two catapults. The third was called a "Trebuchet" - except it wasn't - and the only existing Trebuchet sprite (from AOM) was a valiant attempt but the actions were jumpy and not up to par with the other units in Cradle. Eventually I found a good [3D model at Sketchfab](#) and took screen shots of the unit facing in each of the required 5 directions.

I played around with shadows but couldn't get them to look natural, and ultimately built a sprite with 5 Move images and a single Idle (using the #4 Move). Accordingly it has proper facing in all 8 directions and looks EXACTLY like a trebuchet (see attached). Although it has no actual motion, that is also true of the new Ballista unit and is (I think) an acceptable compromise. I also created the necessary 2D art (using the same unit), recorded a "trebuchet firing" sound for the attack, and made all the required text file changes to put the new unit in game.

As part of this activity, the Cradle "Onager" was removed from the game (a blue catapult from "Age of Empires" with an attack animation but no movement) while the CtP2 "gold catapult" (with a full set of attack, movement, and Idle animations) was changed from Trebuchet to **Onager** (which is exactly what it is). In short, the three major forms of ancient artillery are now properly represented in Cradle 5



75. Cradle5\default\aidata folder: There's no eye candy in this next project - reviewing (and usually altering) all 11 text files in the **aidata** folder. Not sexy and really more of a slog than anything else, but it was essential to make sure Cradle takes advantage of all the new Source Code Team AI improvements. A brief note on terminology. All files that were specifically edited as part of the Source Code project have a new heading section which explains what was done, and these I will designate as **"SC" files**. Others do not have the heading section, but were updated as part of the "Apolyton Edition" project, and these are referred to as the **"AE" files**. The last group are those that come with the Cradle download (**"Cradle" files**), and the goal of this task is to integrate those with the others.

1) "Goals.txt" - Defines the various goals that the AI can pursue, which are then implemented in "Strategies.txt". This was a beast. There are so many changes between the SC file and Cradle that it was impossible to do a line-for-line determination of what to keep or change. Accordingly I'm going to utilize the SC file as-is, and let playtesting determine the result.

2) "Strategies.txt" - Takes the various Goals and gives them priority ratings and other attributes. The SC team made a HUGE number of changes to this file, and there are many comments about how the AI has been optimized to do things like "maintain proper happiness" level, and thus you don't need to drive that behaviour with this file (as an example, Hex sets most "EntertainerPercent" to 0.6, but the SC team sets them all to 0 because "the AI knows how to do this". Once again, the Cradle file was replaced by the SC, but in this case a number of changes were brought over from Cradle, in particular the new Governments along with a large section devoted to the strategic elements of BureauBert's "settling.slc" file (see **Heading 7** for details).

3) "Personalities.txt" - Defines attributes for the various personalities, which are then executed in "Strategies.txt". The SC project pulled a lot of personality settings out of the executable and placed them in this file so that modders can adjust them, if desired. As a result, there are MANY more lines in the SC file, so it will replace the Cradle file entirely "as-is". I did review those lines which are "common" between the two files, and the only change is that Hex set Expansion to "Maximum" for ALL personality types, whereas the SC file Varies between Max and Average. Given the SC attention to improving the AI, I will keep their settings.

4) "DiplomacyProposal.txt" - Lists the various diplomatic proposals that can be made to/from the human player and the AI and probably the AI-AI interactions as well. There is almost no difference between the AE and Cradle file (nothing from SC). Cradle disables the "Research Pact" (that won't change) while the AE file adds conditions to a few of the others, mostly by requiring embassies. That seems like a reasonable requirement, so I'll add that to the Cradle file, thus getting a mix of both. To clarify, 99% of each file is identical, so these are tiny changes.

5) "Diplomacy.txt" - This file has the "hard numbers" associated with player actions that impact the "Diplomatic Regard" level with each AI civ. With one notable exception, there is little difference between the Cradle file and the AE file (aside from a few changes in the Regard bonus/malus values from certain actions), and in those cases I'll keep the Cradle values. The lone exception is that while the bottom half of the Cradle file is devoted to costs associated with AI-AI interactions, that section is COMPLETELY MISSING in the AE file. My initial assumption was that it's simply no longer needed, as per the comment in the Apolyton_README file that "AI-AI-Diplomacy actually happens now". However, the MoT mod - specifically designed to use many of the SC Team improvements - still retains all the AI-AI text in its file. Given

the conundrum, I'm going to retain it in the Cradle file as well, and other than a few small tweaks to some of the regard costs, will keep the Cradle file largely as-is.

6) "AdvanceLists.txt" - Lists every advance, in the sequence the AI should research them. In addition to "Default", there are lists for "Scientist", "Militarist", "Economic", "Ecotopian", & "Diplomatic". Cradle & AE have the same groupings (but different advances and order of advances). There isn't an SC file, so we'll use the Cradle file as it has all the MANY Cradle-specific Advances. It has been updated with the new Cradle 5 Advances (Combined Arms, Legal System, etc)

7) "UnitBuildLists.txt" - Groups the Units into a number of "build list" categories. There isn't an SC specific file, but the AE file is focused on properly categorizing the units into each "build list", whereas the Cradle file tends to put the same unit in a lot of different lists, plus some of the listings don't make sense (f/e why is "Slaver" in the "Special_Peaceful" list?) In addition, the Cradle file had 15 build lists, but AE has 21. For this file we'll follow the AE model and will use their 21 lists and less sharing across categories, but will add all the Cradle units to each list.

8) "WonderBuildLists.txt" - Groups the Wonders into 7 "build list" categories. Again, there's no SC specific file and many of the Wonders are Cradle-specific. When compared to AE, each file has the same seven categories, and while there's a lot more sharing across categories in the Cradle file, I think it was done in order to make the AI more aggressive at building Wonders. At least for now, we'll continue to use the Cradle file "as-is" (no changes), but may revisit this later.

9) "ImprovementLists.txt" - This file is for the terrain improvements (Roads, Farms, Nets, etc) and oddly enough the AE file is extremely minimal. The 4 categories only have 5 improvements, with the majority not listed at all. Once again there isn't an SC file, and I half suspect that the AI improvement covers this without the need for a reference-and-prioritization file. That said, the Cradle file lists all the buildable TIMPs, and I'll make a couple changes but will largely leave it untouched.

10) "BuildingBuildLists.txt" - Groups the different buildings into "buildlists" in support of different goals, for example "Happiness", "Gold", "Production", etc. The SC file has 12 groups, while the Cradle file has 9, so I revised the SC file to keep their categories, but added all the Cradle buildings. Cradle had a lot more "sharing" of buildings across the categories, but I eliminated most of that. Again, the assumption is the new AI does a better job of "following directions", so the less conflicting those are, the better.

11) "BuildListSequences" - This is the prioritized "list of lists" for each of the usual groupings (Science, Gold, Production, etc). For example the "Production" list puts the "Garrison Units" build list at the top, followed by the "Production Buildings" build list, and then another 22 lists for more Units, Wonders, TIMPs, and Buildings. The original Cradle file had 9 groupings, while the SC file has 17, including the new SC groupings for "Dirty Cities", "Small Cities" and "Barbarians", among others. That sounds like a LOT of changes, but the lists within each group are exactly the same, albeit ordered differently. One of the main differences is that Cradle places a higher priority on the building of Wonders. To integrate the two files, I copied the Cradle sequences into 8 of the 9 Groupings that the two files have in common (leaving "Default" and 8 new groupings at the SC settings).

If you've actually read this far, here's the important takeaway. With this task complete, all elements are in place for me to begin realistic playtesting of this puppy. I've been doing that all along, of course, and the game is completely stable and definitely a lot of fun. But now all the truly bad bugs are gone and from this point forward the games will involve fully operational AI opponents - which will be interesting. There's still a great deal more to be done of course, but most of that is "eye-candy" and thus game-play impacts from here on should be minimal.

76. TIMPs - Getting the AI to build them in the right place: One of the more annoying AI activities is when they build TIMPs in the "wrong" terrain, or in quantities that look awful on the map.

*** Example #1 - Mines on Grassland:** Just an ugly look. Why would they do that? The reason is "production uber alles". Fortunately the solution is easy - make it impossible to build mines (of any level) on Grassland. Plains can stay, but not for the first level of Mines.

*** Example #2 - Ports on every beach hex:** This is trickier, because there are no other terrain types these can or should be built on. However, the "food bonus" is the same as "Nets" (+5) so we'll try to mitigate the problem by removing the food

bonus and increasing the Gold bonus from 10 to 15. If nothing else, that might restrict the "Port spam" to AIs pursuing a "Gold" objective.

* **Example #3 - Mines on Horses:** The settings for the new Horse Good were +10 Gold, 0 Food, and +10 Production. Which sounds logical, but the AI builds Mines on top of horses, and that's...just...wrong (albeit understandable from the AI perspective). So I'm shifting the Bonus from +10 Production to +10 Food. Hopefully that results in Pasture/Farm TIMPs being built instead.

77. Status Report - Units without Idle: As reported in various posts, 10 "civilian" units were converted, and now that entire category has the Idle animation (and thus full on-map movement). Only three Naval units did not have Idle, and those have been converted AND given attack animations as well. For Land units, I noted previously (see **Heading 32**) that 7 of them had been converted. And as of today, the remaining 10 non-Idle land units have all been deconstructed and fixed:

- 8) Horseman
- 9) Warrior (Pacal)
- 10) Pharaoh Chariot
- 11) Great King Chariot
- 12) Cataphract
- 13) Crossbowman
- 14) Man-at-Arms
- 15) Janissary
- 16) Arquebusier
- 17) Howitzer

The only exceptions are the Ballista and Trebuchet, which never had motion images to "unlock". Which leaves Air units. The Nuke has been fixed, leaving only the Fighter, Interceptor, Stealth bomber and Spy Plane, all of which are late game units. Even so, I will probably fix them eventually, if only for the sake of "completeness". But the larger point is that every land and sea unit which can move? Does move.

78. Horses: Just to see how it would play out - and it's not like hints weren't dropped - but Horses are a requirement for horse units. How that plays out over the long term we'll have to see, but this much is certain. As the human player, if you don't have them, you KNOW where they are (or will seek desperately until you do)! And if they aren't nearby? You try to imagine distant colonial schemes that will make them yours. A feeling not unknown to devotees of other civ building games, of course, but it's nice to get that from Ctp2. Oh, and building Nukes without uranium? 🤪

79. New Goody Huts: One of many new features added by the SC guys is the ability to assign different goody hut images to each terrain type. This latest project takes full advantage of that, assigning no less than 10 new images to most of the various land terraintypes. "Grassland" retains the existing Easter Island heads and the Megaliths, but all the rest have something new. The more common terraintypes (plains/forest/hills) have two, while most of the rest have one. In the attachment, you can see two of the new ones; a Mayan temple in the forest (R), and a Stone Tower atop a hill (L). The others include different temples, castles, obelisks, an actual hut, and even an igloo. I played around with these quite a bit, and am finally satisfied that each choice matches well with the chosen terraintype.

While implementing these changes I discovered something that has apparently always been true, but I'd never noticed until now - Goody Huts do NOT appear in any of the three Mountain terrain types. You can assign images, but they simply will not show up on the map. This was true even for games using the pre-Source Code ctp2.exe, so it's not something that was recently introduced.

I took the opportunity of this screenshot to show a couple of other changes. The "purple murex" (Dye) has been replaced by a more common variety (see red arrow) while the "Trawlers" image used on Beach tiles has shifted from the modern-looking rowboat to a small brown-sailed vessel (fits better with the other two sailing ships).

Edit: Credit where it's due - all the new Goody Hut images came from Ekmek's Civ3 pack, although every image has been edited to add shadows.



80. CTDs: It's been quite a while since the last update, and that's because I've been engaged with CTDs. For the most part the Cradle 5 updates have been graphical, with only three new advances, one new building, and a number of new units (all of which used tried-and-true capabilities). Accordingly, most of the playtesting had been limited in duration, usually 50 turns or less. After the changes to the 11 files in the aidata folder, I launched some longer playtests, and soon discovered that the game would CTD repeatedly after 2500 BC. Reducing the number of civs from 12 to 8 extended things, once as far as 400 BC, but all "fewer civs" games would still CTD (unrecoverable), while those with 9 or more civs would terminate around 2000 BC (or sooner). Most of the CTDs produced Crash Logs, but they are largely unintelligible to me. Something about an EVENT error, but those are part of almost every slic file, and the specific mentions weren't descriptive enough to hone in on a particular file (see attached for one example).

Researching through the Source Code project threads, there were a number of comments suggesting that "no-longer-required" Slic files might contribute to instability (by interfering with functions now built into the exe), so the next step was a rigorous review of all 35 slic files included with Cradle. I'll list that in the next post, if only so folks looking to modify other scenarios can quickly determine which of the pre-Apolyton Edition slic files to delete. However, cutting to the chase, there was no positive effect. Games with 12+ civs still had unrecoverable CTDs around 2300 BC. By this point I'd been working the problem for almost two weeks, appeared to be running out of options, and was looking at the possibility of a complete rebuild of Cradle 5. Extremely disappointing. As noted above, the slic file review is next, but I'll leave you with this hopeful comment. There is light at the end of the tunnel...

Version 2018-11-28

```

0x007f82ab [?ComputeBestGovernment@Governor@@QBEXH + 0xab]
0x00802d57 [?BeginTurn@CtpAi@@SAXH@Z + 0x127]
0x008020ee [?GEVHookCallback@CtpAi_BeginTurnEvent@@EAE?AW4GAME_EVENT_HOOK_DISPOSITION@@W4GAME_EVENT@@PAVGameEventArgList@@@Z + 0x1e]
0x005823b7 [?Activate@GameEventHook@@QBE?AW4GAME_EVENT_ERR@@PAVGameEventArgList@@HAAH@Z + 0x37]
0x00582d78 [?ActivateHook@GameEventManager@@QAE?AW4GAME_EVENT_ERR@@W4GAME_EVENT@@PAVGameEventArgList@@HAAH@Z + 0x28]
0x00580e9d [?Process@GameEvent@@QAE?AW4GAME_EVENT_ERR@@XZ + 0x2d]
0x005827f0 [?AddEvent@GameEventManager@@QAA?AW4GAME_EVENT_ERR@@W4GAME_EVENT_INSERT@@W4GAME_EVENT@@ZZ + 0xd0]
0x00433405 [?dh_endTurn@@YAXPAVDQAction@@PAVSequence@@W4DHEXECUTE@@@Z + 0x35]
0x0042bac1 [?HandleNextAction@Director@@QAEHXZ + 0xf1]
0x0040c3ab [?Process@CivApp@@QAEHXZ + 0x11b]
0x004070e4 [?CivMain@@YGHPAUHIINSTANCE__@@@PADH@Z + 0x394]
0x00406b15 [WinMain@16 + 0x65]
0x00810c1c [WinMainCRTStartup + 0x134]
0x76d9fa29 [__onexitbegin + 0x763c5971]
0x77237a9e [__onexitbegin + 0x7685d9e6]
0x77237a6e [__onexitbegin + 0x7685d9b6]

```

81. SLIC File reviews (alphabetical): All file numbers preceded by an asterisk were "commented out" and are not used in Cradle 5. That's 14 in total, over a third.

***1) Airunit.slc:** Not Required (per Martin Guhman (2004)): Refuels air units (it actually destroys the unit and replaces it with one of the same kind...fully refueled)

2) Buildingunits.slc: Required. Creates the "Great King" unit when the new "Dynastic House" building is completed. One piece of EVENT code.

***3) Capturecity.slc:** Not Required. Destroys a percentage of buildings when a city is attacked or captured. The percent chance that various attacks will destroy buildings is included in Const.txt (ASSAULT_DESTROY_BUILDING_CHANCE), and the AE Readme specifically mentions that the "DestroyBuilding" function now works.

4) Colony.slc: Required (but modify, if possible). This is a Cradle file that builds a colony when a settler is disbanded inside city limits and it adds a population point when a Plunder II unit is disbanded in the city. However, it also has code for adding pop points when a settler is disbanded, and that *could* conflict with the new "Settle-in-city" function. Preferable if that part of the code could be removed. Since the "build colony" button doesn't work (Danger Will Robinson!), this is the only way to actually get colonies. Has two EVENT sections.

***5) ComImpSForAls2.slc:** Not Required, per Martin Guhman (2004)

6-8) Culture.slc (which in turn activates **culture_funcs.slc** and **culture_msgs.slc**): Required (with caveat). These are the Cradle Religious/Culture Victory files, and thus needed IF you plan to play with that option. If not, it might be best to "comment out" the "#include culture.slc" line in Scenario.slc. There are nine EVENT sections in culture.slc (none in the other two)

***9) Diplomod.slc:** Not Required (replaced by diplomacy.slc)

10) Diplomacy.slc: Required. An AE file which replaces diplomod.slc.

11) Elite.slc: Required (but known to be broken!) This file creates the "Cradle Elite Units", and is thus a key part of the mod. Has two EVENT sections. ISSUE: The code which creates Generals from Heroes is broken. After the first Hero is promoted to General, all subsequent promotions kill the Hero unit but do not provide a General unit.

12) Feats.slc: Required. The Cradle-specific version has more entries, but there's no EVENT code, nor any errors related

to this file.

***13) FortsForAIs.slc:** Not Required. Builds forts for AIs in order to connect separated parts of the empire, primarily so they'll build roads between each area. In 2004 Martin noted that this file was still required, however in 2006 the SC team added the "CanBuildWasteland" code to tileimp.txt, and [in 2007 Ekmek commented](#) that "the AI has built roads through wasteland to connect cities".

***14) Frenzy.slc:** Not Required, per Martin Guhman (2004)

***15) Goods.slc:** Not Required, per multiple sources (now part of the base game)

16) Homeguard.slc: Required. This file creates the "Cradle Militia Units", and is thus a key part of the mod. Has thirteen EVENT sections. Worth noting that SC introduced a feature in userprofile.txt which provides the "cheapest unit" to the AI as a Militia garrison unit (AIMilitiaUnit=No or Yes), but that's a different solution to the problem. I suppose you **could** substitute that feature and do away with this file altogether, but that would be a last resort, and only if it's proven that this file is causing CTDs.

***17) Infrac.slc:** Not Required (probably). A small file which fixes an AI bug involving Infrastructure or Capitalization. One EVENT section. I couldn't find specific mention of this issue, but there are several threads in which the team fixed different Infrastructure/Capitalization problems, and this was almost certainly dealt with as well.

***18) KillCityOption.slc:** Not Required. A file which gave the player a few options after capturing a city (destroy/disband/enslave). Two EVENT sections. "CityCaptureOptions" are now part of the base game, so this file is redundant.

19) Mapwonders.slc: Required. This file identifies the Visible Wonders (a key component of Cradle) and also places them on the map. Four EVENT sections. There were some slc errors related to the Great Wall code (it places two wall TIMPs, one on each side of the city). That feature isn't used in Cradle anyway, so I'll see if that code can be deleted - it almost doubles the size of the file, all to no purpose (in Cradle, anyway). **EDIT:** Great Wall code has been revised as discussed above, and no longer kicks out errors.

***20) Natwonders.slc:** Not Required (but desired). This file identifies the seven Natural Wonders and places them on the map. Nine EVENT sections. This file was kicking out both a "normal" SLIC error and a cascade of EVENT errors. I was able to fix the first one, but I'm not "coding-smart" enough to figure out what's wrong with the Events. It does seem odd though - most of this code is used to deploy the wonders at the start of T2, after which it should shut down - the exception being all the code designed to prevent pillaging and overbuilding. At least for now I'm going to remove this file from the Active SLIC files list. Eye candy is great, but not at the expense of stability.

21) Plunder.slc: Required. A number of the Cradle Wonder Units have the ability to generate "plunder units" of various sorts, and this file controls the type of plunder unit (based on time period). Two EVENT sections.

***22) Pw_cheat.slc:** Not Required. A small file which gives the AI a gold and PW boost to encourage them to build TIMPs. One EVENT section. Not a "bug fix", so not mentioned in the SC threads, but the AI shouldn't require artificial boosts like this, given the many AI improvements in AE. Worth noting that Cradle 5 originally used the similar "pwcheat.slc" from the MoT mod, but that has been deactivated as well.

23) Scenario.slc: Required. An empty file (presumably the code requires its presence) which is populated and used only by scenarios.

24) Script.slc: Required. Most of the file is dedicated to "messagebox" code but it's also where most of the slc files are activated (bottom of the file). BB added two EVENT sections at the bottom of this file as part of the Cradle Scenario conversion, but I'm removing them since they disabled CityCaptureOptions in favor of those in KillCityOption.slc (now deactivated).

***25) Settling.slc:** Not Required. A file from the Mot mod which BB altered for Cradle, intended to improve AI settling location choices. Seventeen EVENT sections. I like the idea, but at least one of the earlier playtest EVENT errors appeared to come from this file, and it has a LOT of EVENT code. Accordingly I'm going to disable it.

***26) Soundfix.slc:** Not Required. A file which adds sounds when tile improvements are built. One EVENT section. The SC project added a sound file link to tileimp.txt, making this redundant.

***27) Springfield.slc:** Not Required. A file which made the AI build a new Capitol improvement if the old was lost. Five EVENT sections. The AE readme specifically lists this as an SC fix from Revision 907.

28) Tilerefund.slc: Required (not really, but it's a nice feature and there's no indication that it's buggy). A file which refunds part of the PW cost of an improvement when it is pillaged or a new one replaces it. Three EVENT sections.

29-30) Train.slc (which in turn activates **trainfunct.slc**): Required. These are the Cradle Military Unit Training files, which increase unit strength by spending gold. Personally I don't use this, but it's an interesting feature and has a really nice graphical interface. There are six EVENT sections in train.slc (none in the other).

31) Traits.slc: Required. Holds the Cradle civ-specific feats and golden ages. One EVENT section.

32) Traits2.slc: Required (with caveat). More Cradle civ-specific traits (gold, pw, and culture). Fifteen EVENT sections. The Cradle2 playtest kicked out two EVENT errors related to this file, specifically the two EVENTS which grant extra population to newly founded cities of certain civs. When you read the code, it's designed to keep the exe from opening the build manager for one turn, so it's not surprising that CTP might see this as a problem. Worst case, those two civ features could be removed, but for now I'll keep this with no changes.

33) Updater3.slc: Required. This file allows the player to upgrade Cradle Militia and Elite units, which - because they are unbuildable - cannot be updated using the new AE upgrade system. The file included with Cradle (updater.slc) did not function properly, so it has been replaced with this modified version of APOL_updater2.slc.

34) Wonderbuildings.slc: Required (???) This file prevents the AI from constructing buildings that are already granted by a Wonder. For example, VoK gives the player the effect of an Apothecary in every city, but even if they have this Wonder, the AI builds Apothecaries anyway. Zero EVENT sections. NOTE: There is new code in the Wonder database, "ActualBuildingEverywhere", which means that when the Wonder is built, it places the actual building in all of the player's cities (the existing code - which still works - is "BuildingEverywhere", and that provides the effect of the building). So changing to the new code would mean this file could be removed. HOWEVER: Since there aren't any EVENT sections in the code, this is not a source for those sorts of errors.

35) Wonderunits.slc: Required. This file creates all the units (not all of which are non-buildable "Wonder Units") given to the player when particular Wonders are built. Seventy-four EVENT sections!!! Certainly that's a LOT of EVENTS, but each is a one-time creation of a single unit and each trigger is disabled right after the EVENT fires. Seems unlikely to be a source of problems.

82. Fixing CTDs: The source of the unrecoverable CTDs was identified (more on that to follow). The first test game used 12 civs and was played on "Hard" difficulty, and in the screenshot below you'll see the "end state" when the playtest terminated in 1500 AD. There were a few CTDs near the end of the game, but all of them were resolved simply by loading the Autosave. I suspect they were the result of a resource overload, as the screenshot sort of attests. Even so, the CTDs were anywhere from 40 to 5 turns apart and all happened on hitting the end-turn button. So not too inconvenient...or surprising. OK, let's talk about what was done and why.

1) First thing! If you plan to run a long test game - especially with this many civs - it's best to "play" as the Barbarians. Which is surprisingly easy to do. For those unaware of the mechanics:

- Start off as any normal civ, choosing all the options you'd like to include in the test game (don't select any of the "extra

Barbarian" options as that will only slow things down).

- After the game loads, I usually found the first city immediately, but it's probably not necessary.
 - Hit the <esc> key and click "Cheat Mode" in the resulting menu and then agree to the conditions.
 - When the "Scenario Editor" window finally appears, click the "EMPIRE" button (top right)
 - In the next screen, go to the "Player" choice in the top left and click the left-facing arrow until the number is "0"
 - Now click the "Exit" button (bottom right) and you'll return to the game screen (now completely black, since the Barbarians don't have any units on the map).
 - Hit the apostrophe key to bring up the chat window.
 - Type /rnd ## (meaning: /rnd<space><the number of turns you want the AI civs to play against each other> and hit Enter (then click anywhere on the map and hit the apostrophe key to close the chat window). That will start the game off, and the first batch of turns will pass VERY quickly, since Barbarian units won't appear on the map for quite a while. Your starting civ will proceed under full AI control, so don't think of it as anything more than an AI civ.
 - Usually my chat window values are "/rnd 100", but later in the game that drops to 50 or even less. After each set number of turns, the game halts on the Barbarian turn and you can use the cheat menu to look around and see what's going on or just repeat the process for the next 50-100 turns.
 - If you want to stop the auto-play, just hit the ESC key and the game will halt on the next Barbarian turn.
- And that's it! Easy peasy, and the turns will fly by....well at least for a while! 😊

2) So what about those CTDs? I spent a LOT of time reading through the Source Code playtest threads, and noticed in particular some comments from BureauBert. He kept "finding" new CTDs and other errors, and every time it happened after he'd made changes to one or more files in the **aidata folder**. As you'll recall, that was a big project (discussed in **Heading 75**) where the Cradle AI files were merged with those that are now part of the AE base game. And on further reflection, it was pretty obvious that I hadn't done a really thorough job. Many of the files were huge and I had no idea what most of the settings meant, and so there was a fair amount of "by guess and by golly". Accordingly all the files were restored to the original Cradle settings (while making necessary changes for things like new units and advances). And when that was done, the very first test game was the one you see here. In short, that was the problem.

3) Going forward, I will have to become EXTREMELY FAMILIAR with all the aidata files, and make changes only where the implications are fully understood. Especially where code sequences from one file are referenced by another. Some of that has already been done, and the result was a second test game (15 civs this time) which reached 1000 AD before the playtest was voluntarily terminated. It's going to be painful, but there's no real alternative. Although each of these games made it very far along, I'm not impressed (to put it mildly) with the AI's performance. So a great deal of changing, testing, and tweaking still lies ahead. Plus I still need to complete the "Special Attacks" project that was underway when this nightmare first reared its head over a month ago. And THAT is proving to be a rat's nest of unparalleled proportions. The SC guys did great work in almost every area....but THIS? Aye caramba



83. Special Attacks: *"A rat's nest of unparalleled proportions"*:

That's a pretty strong statement, I'm sure you'll agree, but is it accurate? Well, let's take a close look at the "Soothsay" attack which is performed by religious units and causes unhappiness in the target city. Looking at just one example, here's the pertinent code for the "Cleric" as listed in units.txt:

Code:

```
CanSoothsay {  
  
    Sound SOUND_ID_CONVERT_CITIES_CL  
  
    Effect SPECEFFECT_CONVERT_CITIES  
  
}
```

Seems pretty straightforward. The "Sound" section points toward the sounds.txt file and sure enough there's a listing for SOUND_ID_CONVERT_CITIES_CL and the associated wave file. That particular file (a thunder clap) is used in a number of places, so for test purposes I subbed in the "elephant" sound, so we can be certain that things are working as indicated.

Next we'll look at the effect (SPECEFFECT_CONVERT_CITIES), which can be found in two files. "SpeceffectID.txt" lists the number of the sprite (similar to the way "newsprite.txt" assigns numbers to unit sprites) while "specattack.txt" assigns both sound and sprites to various special attacks. Which certainly seems superfluous, since that is ALSO being done in units.txt.

Strange, but...whatever. We run a test and have the Cleric "soothsay" in a foreign city. And the sprite we see is NOT the "clouds-with-sunbeam" convert city effect, but rather a puff of blue smoke. And the sound is NOT the elephant but rather....no sound at all! What?

Weird. Well, looking again at the "perhaps-not-superfluous-after-all" specattack.txt file, it does have a listing for the "Soothsay" special attack:

Code:

```
SOOTHSAY { SoundID SOUND_ID_CAN_SOOTHSAY SpriteID SPECEFFECT_CAN_SOOTHSAY }
```

Maybe that's what's controlling this? So I change both settings to match the Cleric listings in units.txt, and NOW we'll certainly hear the elephant and see the clouds-and-sun, right? Wrong. Blue smoke & silence.

Ooooh boy. So, looking once again at the Cleric entries in units.txt, we see there's a rather odd special attack called "CauseUnhappiness". There aren't ANY buttons for ANY units for this particular attack, but it IS the end result of a "Soothsay" attack. And sure enough, there is a listing for this in specattack.txt:

Code:

```
CAUSEUNHAPPINESS { SoundID SOUND_ID_CAUSE_UNHAPPINESS SpriteID  
SPECEFFECT_CAUSE_UNHAPPINESS }
```

So once again I copy in the Cleric's soothsay settings from units.txt, and FINALLY it works. Clouds-and-sunbeams and the triumphal cry of the elephant. So what does that mean? Well this for one: The special attack links for sound and sprites in units.txt DO ABSOLUTELY NOTHING. And not just for Soothsay...for EVERY special attack. In fact, Special Attack sound and sprite effects are entirely controlled (to the extent you can control them at all - and for some you can't) by the settings in specattacks.txt. Period.

But wait! It gets worse! As you saw, even though "Soothsay" IS a Special Attack and IS listed in specattacks.txt, the effects are actually controlled by CAUSEUNHAPPINESS. Which is also true for the "Advertise" Special Attack. Meaning that you have a Commercial AND a Religious attack, and both will play the identical sprite and sound, and there is literally nothing you can do to separate them. Kill.me.now.

If this were the only oddity in the bunch, well, OK. But it's not. It turns out that all the Special Attack messages are

launched from Script.slc, and EVERY ONE OF THEM is hard coded in the executable. Not the text itself, but the fact that a success or failure message even exists. If you add new ones? They don't play. And why do some message texts have code that indicates the location of the attack or the unit which launched it while others are just text? Surely you can stick that same code in other messages, right? Wrong. The ability of some messages to handle code (and only certain kinds of code) is buried somewhere in the executable. What about new special attack cursors? Sorry, the game allows numbers 1 to 89, and that's it. New messageicons? Sorry again, there's 106 entries in that file and no more are allowed, nor can you reference any special attacks other than those which are listed, EVEN IF THEY EXIST.


All that said, it's true that most of the special attacks work as intended. Sprites, Sounds, Cursors, Button Icons, Messagicons & Messages all exist or can be modified. And for those which are problematic (like our good friend "Soothsay") there are workarounds being tested and tested and tested again. And then there's the whole issue of whether the AI will build the special units and perform the special attacks. Which is a whole other animal...

84. Nubian AI - An Interesting Religious Attack:

Speaking of religious attacks, the AI is really good at building prophets and launching religious attacks during the early game. They prefer City Conversions (which is good, because that religious attack has the best long term value), and I've seen many instances of ships dropping off prophets for coastal city attacks. But what the Nubian AI is doing with the Patriarch in this screen shot is SERIOUSLY impressive.

Some background. The Patriarch is a powerful religious unit that cannot be built, but is granted as a Wonder Unit when various early-game religious Wonders are built. The Nubians received theirs after building the Code of Hammurabi at an inland location (not visible in the attached screenshot). After which the Patriarch moved to a coastal location where it embarked on a Coracle.

From there, the Coracle proceeded to move West, South, and North along the coast of the continent which Nubia shares with the Sumerians (orange). Along the way, the Patriarch disembarked and converted Ur (bottom of screen shot) and then got back on board and headed for the Western coast. There we see the same pattern - disembark and convert Eridu, get back on board and do the same at Nina (both circled) and then continue up past Umma - without stopping. Which is REALLY smart because that city is "watchful" (blue eye) following a Slaving attack.

Anyway, I noticed this while running a new test game (20 civs this time) and it's a nice counterpoint to the earlier rant. 



85. Special Attacks - Assassinate Ruler:

Getting some of these Special Attacks to work properly requires (to borrow a quote from one of the CTP2 programmers) *"more workarounds than you could shake a lemur poo at"*, and there's no better example than "Assassinate Ruler". The attack itself is quite interesting (more on that later), but we'll begin by examining the MANY graphics and messaging issues:

- "AssasinateRuler" is not listed in specattack.txt, but rather borrows pieces from two that are - ConductHit and BombCabinet.
- There are two "success" messages listed in script.slc, and of those one doesn't work (it's not part of the executable) and the other one plays on every ATTACK, not every SUCCESS ("misleading" aint the half of it)
- There are also two "failure" messages, one of which does not work.
- The two that "work" utilize different "messageicons", one for ConductHit and the other BombCabinet.
- The sprite comes from the BombCabinet attack - literally a bomb with a burning fuse.
- The sound comes from the same attack, and features a "ticking clock" <facepalm>
- The cursor (which displays over the target) is the "skull-and-crossbones" from ConductHit.
- The attack icon on the buttonbar is the same "skull-and-crossbones" (albeit from a different file)

I'll spare you the details on the long convoluted process which finally unearthed that trove of information, and in all honesty, most of the issues involved a dog's breakfast of mixed up graphics. The BIG problem was the messaging. How would you EVER know if the attack was successful or not? Not to worry, it all came together:

- Both messages were re-written. Since you're going to see the success message no matter what, it now serves as a precursor, "reminding" the player that there won't be a notification if the attack succeeds, only if it fails (see attachment). In addition, the message code was altered to "pop-up" the "success" message first, while the "failure" message just appears in the messagelist (which reverses the earlier, more confusing order of message receipt)
- As noted above, there were two different messageicons ("success" was MessageType "Conduct_Hit" (MGMI031.tga) while "failure" was MessageType "Bomb_Cabinet" (MGMI028.tga)). To synch them up, the "success" message type was changed to Bomb_Cabinet and now both display a new "knife" messageicon (MGMI048.tga).
- A new sprite (GX30.spr) was created, showing the knife in a downward plunging motion (see red arrow). It replaces #23 (bomb-with-fuse) as the "effect" sprite associated with SPECEFFECT_PLANTBOMB in speceffectid.txt.
- An existing knife/sword sound (GUAX04.WAV) was linked to SOUND_ID_BOMB_CABINET in sounds.txt, but it didn't work! I had to rename it to GXXX23.WAV (the existing "ticking bomb" sound) in order to make it play during the attack.
- A pair of new "knife cursors" were created and replaced the two "bomb-in-briefcase" cursors as linked in orders.txt (i.e. they use the same numbers, UC050.tga and UC051.tga, since the game won't accept new ones). Worth noting that the cursor numbers listed in orders.txt have to be two digits higher than the actual cursor numbers (thus "52" and "53"). Why? Why not! <facepalm>
- The skull-and-crossbones button icon (upsi22.tga) was replaced by a new "knife" button (upsi45.tga) in the ORDER_ASSASSINATE section of orders.txt (see red arrow)

The result of all this is a coherent era-independent attack, with messaging that won't confuse the player and which uses a common set of graphics.

As I mentioned earlier, this attack is very interesting since it switches the target nation's gov-type over to "Anarchy". Under the previous Cradle rules, that was a KILLER attack since it would automatically disband EVERY government-specific unit, and hence the price was astronomical (10,000 Gold per attack). That also meant the AI would NEVER use it even if they might otherwise be coded to do so. Thus it was a human-only attack, and roughly akin to nuking your opponent - worse, actually, since the AI opponent would lose a large portion of its entire army. Under the new system, Anarchy is now an included gov-type for all Gov-specific units, and thus the attack is no longer as devastating - although it's still pretty painful! Anyway, I haven't figured out what to use for the cost, but that will be tested. If it's low enough that the AI will actually use this Attack, that would be a feat all by itself!



86. Liberate City Issue:

One of the new features added by the SC team are three options after the player captures an enemy city: 1) Keep it, 2) Raze it, or 3) "Liberate" it. The last choice gives the city to the Barbarians, which is a neat option. I played around with this during a playtest, and used it to hamstring an AI opponent by capturing a group of cities and "liberating" all of them. Which gave that civ something besides me to worry about for a while. The problem ([as reported elsewhere](#)) is that your victorious army is trapped inside the city, and can't leave - at least not by "walking out".

The attachment has 4 screenshots, and the first three illustrate the problem. After conquest, you can't even select your army. The following turn it's still directly unselectable, but if you hit the space bar, eventually it will be that army's turn to move, and the game selects it for you. Trying to move the army into an empty tile doesn't work (2nd pic) as indicated by the red line. If you have a unit in an adjacent tile - and even though the line is now green (3rd pic) - movement is still prohibited. The ONLY way to evacuate the army is to load the units into a ship (4th pic). Which means that if you plan to "Liberate" any cities, it's only feasible with cities on the coast.

There is ONE OTHER OPTION. If you add "NoZoc" as an attribute for "UNIT_CITY" in units.txt, that solves the problem, and the entire army can leave without any difficulty. The problem is that cities have a ZOC specifically so that units and

armies can't just waltz past them. As a possible alternative, I removed "NoZoc" from the Cradle Militia units (which are immobile city garrisons), but that didn't make any difference. Their ZOC effect is countered by the lack of same from the city. Anyway, while it's possible to remove ZOCs from cities, it would require extensive playtesting in order to determine if there are any unintended consequences. Or rather, how MANY there are, and how serious might they be? All in order to preserve the functionality of a little-used human player option, and one which the AI will NEVER use.

Accordingly I'm not going to make any changes here, other than putting a warning into the GL and identifying the "load into a ship" workaround for coastal conquests.



87. Special Attacks Project Overview: To give you some idea of the process being utilized as the "Special Attack" sub-project continues, we'll start with the "orders.txt" file which has 47 orders or "attacks". Nineteen of these are standard unit orders (Move, Attack, Settle, Board, Unload, etc) or obsolete (Airlift, Ranged Attack, etc). The remainder can be categorized as follows:

- 1) Religious Attacks (5)
- 2) Commercial Attacks (2)
- 3) Legal Attacks (3)
- 4) Espionage Attacks (3)
- 5) Diplomacy "Attacks" (3)
- 6) Slave-related Attacks (4)
- 7) Terror Attacks (6)
- 8) Military Special Attacks (3)

Of that group, I'm conducting a DETAILED analysis on each individual Order or Attack:

- How (and if) it works.
- Whether the graphics, messages, and sounds follow the same theme (and which are wrong, don't mesh, or don't work at all)
- Determine if the graphics, messages, and sounds are appropriate for all eras, and if not what can be done?
- Does the AI use each attack, and if not, why not (as much as that can be determined)
- Study the impact of each attack's "cost to perform" on whether a given attack is used by the AI.
- Look at the capabilities of the units which deploy each attack and see if they help or hinder.
- Deal with "other problems" that pop up during testing.

As each analysis concludes, I then go through and make the improvements and changes resulting from that review, and then run playtests to see if those changes actually work. In short, it's exhaustive and exhausting, especially since so many of these orders or attacks are, well, problematic.

Coming down from the overview level, let's take a look at **Diplomacy**. There are three purely diplomatic "attacks": "Establish Embassy" (provides better intelligence on the target civ), "Hold Reception" (aka "Throw Party"; improves relations with the target civ), and lastly "Hear Gossip" (possibility of learning one of six categories of information about the target civ). The diplomat can also "Investigate City", but that's more of an Espionage Attack and will be reviewed as part of the Spy group analysis.

1) "Establish Embassy": At first glance, this "attack" seems like a no-brainer. It's used by three units (Diplomat, Ambassador & Empathic Diplomat) and has a Button icon (building w/flag), Messageicon (flag), Cursor (building w/flag), Sprite (trumpets), Sound (trumpet fanfare) & Messages (all of which exist and display when required). Best of all, the AI knows how to do this, and builds Diplomats and deploys them appropriately (see attachment).

The problem is that AI civs tend to have very few established embassies. Part of the problem is they are at war with so many of their neighbors, and the Embassy Mechanism does not operate when that is the case between sending and receiving civs. The cost was low enough not to be an issue (250 gold), but the real problem - as testing eventually showed - involved the unit capabilities.

Diplomats are not Stealthy, so when the AI would see a foreign Diplomat, inevitably they would Expel it from their country. Oddly enough, Diplomats could see stealthy units, but did not have invisibility themselves. So I reversed the capabilities. With the new settings, Diplomats can't see stealth units since, after all, they aren't spies. But now they are stealthy and while they retain the ability to move two squares, they no longer have a vision range of 2. In the same way that "stealth vision" is more appropriate for spies, "distance vision" is a feature of Military Scouts - and Diplomats shouldn't be statted like that. With these altered capabilities, the Diplomat should be able to arrive in a foreign country, move to a city without interference, and once there, establish an embassy. If the two civs are at war, the Diplomat can park nearby, where it is unlikely to be seen and expelled. And once the war is over? Embassy.

And that's what testing showed. In a twenty civ game, by 1000 BC there were less than one embassy per civ, in spite of having potentially 19 "neighbors" each. By contrast, after altering the diplomat unit stats, a follow-on playtest resulted in

an average of 4 embassies for every civilization. And they were much less likely to be at war or stay at war with distant civs, as indicated by a large number of ceasefire icons.



88. 2) "Hold Reception/"Throw Party": This is an interesting capability, but one which I had never seen used by the AI. The party improves relations with the target civ, but has an odd mix of graphics. The Button icon and Cursor both used the "Handshake with \$\$" while the Messageicon featured a Martini Glass (w/ olive). The Sprite had the same "blue cloud " you get from Selling Indulgences (a religious attack) while the sound is that of people cheering. The martini glass is a holdover from CTP1, but it's a better way to convey the idea of a party. Admittedly that's a modern drinking vessel, but the archaeological record offers conclusive proof that fancy drinking cups have been a feature of elite ceremonial gatherings from the most ancient of times. Conversely, the handshake icons seem more appropriate for bribery, but that's not what's being represented.

Making new "martini-based" cursors and buttons was easy enough (and another for the Great Library), but there's a limit on "cursor count", so I had to find a set that was not being used and substitute the new ones (see top image in the attachment). As for the sprite, I changed that to the CTP1 "space explosion" (see bottom image) as you could loosely associate that with a celebratory bonfire or fireworks (as opposed to the "blue cloud" which represents...what?)

Cost was a bit confusing since "const.txt" places a "Max Cost" of 500 on each party and the associated text implies that one can spend less. But you can't. The cost per party is set in "orders.txt" and cannot be changed (well, other than by

altering values in the file itself). Also, you can hold only one party per civ (diplomats stationed at other cities of this civ cannot throw a party after the first one is held), and it turns out there's a time limit before the next is allowed. Which is 10 turns. That value is listed NOWHERE, but repeated testing confirmed that it's a hard limit.

Lastly there was the question of AI usage. As noted earlier, I've never seen the AI use this capability and while lowering the costs might make it more attractive, I decided to keep them as-is and see if the new "stealthy diplomats" might hang around foreign cities long enough to try this. And in fact, that's what happened! Still pretty rare, but during the playtest there were two instances where I heard the "party cheer" sound - a wav file that is activated by this order and none other. So...it worked!



89. 3) "Hear Gossip": To begin with, this is technically NOT a special attack, but rather two different mechanisms by which the Diplomat can gain information on the target civ. There isn't a listing in orders.txt and there is not a button to activate it, but there are plenty of indications that it was coded to be in game:

- There are two settings in "const.txt", the first is the "percent chance" that a Diplomat will "Hear Gossip" when throwing a party. The second mechanism is a different percentage which is applied to Diplomats on every turn they are located adjacent to the capital city of another civ.
- The "specattack.txt" file controls the sprites and sounds applied to all active Special Attacks, and "HearGossip" is one of only 25 listed attacks.
- The existence of Special Attack messageboxes is hard coded in the executable and MUST be listed in script.slc. That file has messageboxes for SIX different types of Gossip, and the text of these is contained in cut_str.txt

To test this in-game, I changed each "chance" to 90% (setting them to "0.9" in const.txt) which should guarantee that gossip happens with almost every party and on almost every turn for a Diplomat parked next to the capital city. Next I ran a 20-civ game down to 500 BC before taking control. 5 Diplomats were stationed next to the Capital cities of 5 distant civs, established embassies, and then held a party. No gossip was heard. The diplomats stayed in position for the next 11 turns, yet not a single Gossip message appeared. And finally, each Diplomat held one last reception, and again, no Gossip. Unfortunately, it appears that Gossip is broken.

So that was very disappointing, ESPECIALLY since the new unit settings make it possible for Diplomats to sit undisturbed next to foreign capitals for long periods of time, which is exactly the requirement for the second Gossip mechanism. And of course, the AI is actually throwing parties and parking Diplomats next to foreign capitals, so it would not be a "human-only" benefit. Oh well...win some, lose some. **Edit:** Gossip DOES work - see **Heading 91**.

Anyway that should give you a small taste of what I've been dealing with for the past few weeks. The good news is that every attack in every category except "Espionage Attacks" and "Terror Attacks" has been analyzed and tested and altered where necessary. And yes, there were a few real eye openers along the way. Calling this code a "rat's nest" is an insult to rat's nests.

90. Military Special Attacks (4): I completed this group a while ago, but let's take a look at them in more detail. I won't share the full autopsy results, just the more interesting findings. Also, far more than four orders exist for military units, but most of them are simple and obvious, like "Fortify" or "Sleep" or even "Attack". They work as expected and aren't worth digging into.

1) Pillage: The pillage attack is pretty straightforward. Military units with the **CanPillage** attribute in "units.txt" use this to destroy Tile Improvements - usually those belonging to an enemy, but it's also one of the rare attacks you can direct at your own assets. The main finding is that a successful attack features a sprite (trumpets) and sound (trumpet fanfare), and BOTH are hardcoded. More specifically they use the "General Success" sprite and sound, so if you altered that for this attack it would also apply in all other cases where "General Success" is used. Not a big deal, but it limits the ability to customize this attack.

2) Intercept Trade: This is the "Piracy" attack (hijacks profits of the Trade Route for 1-turn) performed by all units which have the **CanPirate** attribute (primarily military). Has a Button icon (pirate flag), Cursor (pirate flag), Sprite (pirate flag) and Sound (slaver whooshing net). There are no messages for pirating trade routes, either as attack or victim. There are two messages in "script.slc", but neither is listed in the exe, so they can't be made to work. Accordingly, there's no Messageicon either. The interesting finding here is that Piracy is not listed in "specattacks.txt" and thus **the sprite and the sound are hardcoded by file name**. That's not a problem for the sprite (pirate flag is perfectly appropriate) but the sound is a different story. It uses the file linked to SOUND_ID_SLAVE_RAIDS (in sounds.txt) and there's no way to change it.

That's a problem because it's also the sound used in a successful city slaver attack. On the surface that might not seem like a big deal, but one of the really neat features of CtP2 is that even though much of the map is obscured by Fog-of-War (FOW), you can still hear the sounds of AI-on-AI special attacks during the "end-turn" gameplay. But in this case you wouldn't know WHICH attack is happening sight unseen. Are slavers at work, or is the AI busy pirating trade routes? For

me it's quite important since - among many other things - I'm trying to determine which special attacks the AI is using, and when.

Fortunately there was a solution. The city slaving attack is listed in "specattacks.txt", and that allowed me to change the sound file link from SOUND_ID_SLAVE_RAIDS to a piece of unused code called SOUND_ID_RAILLAUNCH. That new code was then linked to the "slavernet" sound file (GXXX14.WAV) while the old code - now used only by the Piracy attack - was linked to the "evil laugh" file from CtP1 (guax09.wav). Sounds complicated but it's not, and the end result is that each special attack now has a different and unique sound. And sure enough, during the next playtest there were a lot of whooshing sounds in the early game, but later on - once Trade Routes had been established - you began to hear the evil laugh. Very nice.

3) Expel: Units with the **CanExpel** attribute are able to "boot" certain foreign units back to their nearest city (used against units which have the **CanBeExpelled** attribute - mostly civilians). As with "Pillage", the main finding is that once again the successful attack utilizes a hardcoded sprite (trumpets) and sound (foghorn). Not really a problem, but once again it limits the ability to customize this attack. An interesting discovery is that you can expel units from neutral territory as well as your own land.

4) Bombard: This is an interesting feature, as it allows units to attack those in an adjacent hex, and it's used by land, sea, and air units to represent such diverse weapons as rock throwers, anti-air missiles, torpedoes, and modern artillery. The attack can only be launched by units which have one of four **CanBombard** attributes (Land, Mountain, Water & Air). But that alone is not enough. Units also need settings for **BombRounds** (usually 5) and **BombardRange** (typically 1), while those with the **CanCounterBombard** attribute are able to respond in kind. This is one of the few instances in which combat between units does not take place on the "battleboard"

I bring this up because 4 of the Ancient-era naval units (Tireme, Heptireme, Longship, and Dromon) have the CanBombard attribute, but they do NOT have BombRounds or BombardRange. So if you click the Bombard button on these units and place the target icon over an adjacent unit, they move into that hex and conduct a standard battleboard-type attack (see attached). Historically three of these units did not have ranged attacks, so the solution for them is very simple - remove the CanBombard attribute. By contrast, the Dromon used an attack which spewed Greek Fire from a tube and immolated target vessels, so - even though the range of that attack was limited - it's reasonable to retain it here. In this case the solution involves adding the necessary BombRounds and BombardRange values.



91. "Hear Gossip" is now Functional: A few weeks ago I reviewed the Diplomatic "special attacks", and sadly reported that "Hear Gossip" didn't work (see **Heading 89.3**). Even so, yesterday evening - on a hunch - I added the **HearGossip** attribute to the Diplomat entry in "units.txt". To be clear, that is not [a listed attribute](#) and no units have it, but it did appear in a text file search of the executable. So I ran a quick playtest and parked a Greek Diplomat next to several foreign capital cities, and - voila - Gossip messages appeared! Unfortunately the code for the civ names didn't work, but eventually the problem was solved by moving the message text from "cut_str.txt" over to "info_str.txt" AND using a different format for the civ identifier code. The message icon originally defaulted to the "red exclamation point", but it was possible to create a new one using an "ear" icon borrowed from CtP1. The messages themselves were rather boring and generic, so those were spiced up as well, and you see the result in the attachment.

Per the earlier review, there should be a chance to **HearGossip** when a Diplomat uses the **ThrowParty** attack, or passively when a Diplomat is positioned outside a capital city. So far it does NOT work as an adjunct to **ThrowParty** (possibly something to do with stringing two attributes together) and it's worth noting that Diplomats parked outside a non-Capital city will never hear gossip. But in this one specific instance it DEFINITELY works, and that includes the sound (whispering) and the sprite (blue puff of smoke).

As a result, this attribute will be added to the other "diplomat-type" units (Ambassador and Empathic Diplomat), and I'll drop the percent chance in "const.txt" from .9 (used for testing) down to .05 since it should not be a common occurrence (the AE default was .02). In addition, I'll add some references to the Great Library so players are aware of the mechanism.



92. Espionage Attacks (4): Here's the latest group of Special Attacks, and again I'll spare you the detailed autopsy and will focus on the highlights. First however, let's talk about a common feature of many such attacks - the existence of **EliteChance** (in both "units.txt" and "const.txt") which is the likelihood that the unit can be promoted to "Elite" status in the event of a successful attack. Many attacks include this and after extensive testing on ALL of them, I can report that not a single unit was EVER promoted. Not one. By contrast, **DeathChance** and **Chance** (of success) all work exactly as intended. It's not a serious problem because other than a few instances itemized in "const.txt", there's no difference between the capabilities of "Un-promoted" vs "Elite" civilians anyway.

EDIT: Just to be clear, the above comment refers to the possibility of **civilian** units being promoted to "Elite Status" as a result of a "special attack". That does not work. By contrast, **military** units which have "Veteran Status" and participate in successful combat DO have the possibility of being promoted to "Elite Status". That does work.

1) Investigate City: An espionage attack (shows internal information on the target city) used by the "spy-types" (Spy, King's Eye, Secret Agent & Cyber Ninja) but also shared with all the Diplomatic units.

- A successful attack pops up a window showing internal information on the target city (see attachment). Very important to be aware that this information is only available while the window is open. If you close the window without recording the information, it can't be retrieved from anywhere else! As a workaround, I use the "printscreen" button to get a screen capture so I can review the details later.
- The original sound ("mission accepted") is also the "Acknowledge" voice used by Spy units, which was potentially confusing. At first I shifted it to the "Gossip Whisper", but now it uses the sound of a large gate being opened. As with most of these attacks, the intent is to have unique sounds which clearly associate them with ONE activity, not several.
- The AI definitely uses this attack. After changing the sound, I heard a LOT of whispering during the next playtest. That said, it seems unlikely that the AI can process this information in any meaningful way. However, it probably incentivizes the AI to park diplomats next to cities, and that's a desirable outcome (see the Diplomacy review posted earlier).

2) Steal Technology: An espionage attack (steals an advance from the target civ) used by all the spy-type units. This attack works as expected, but the main issue was the messaging.

- An attack that failed because there were no Advances to steal would not notify you with a "pop-up" window, but it did leave a message in the messagelist (which allows you to access it again, if desired).
- By contrast, if the target civ DID have Advances available for theft, successful and unsuccessful attacks would provide a "pop-up" message....but nothing would appear in the messagelist. That was pretty confusing, but eventually I discovered they were coded as "alertboxes" (which, by definition, NEVER appear in the messagelist) whereas the vast majority of special attacks use "messagebox" code. Anyway, it was possible to change that, so now all the technology theft messages "pop-up" and appear in the messagelist.
- That also meant a messagicon was needed, and of course there wasn't one which matched the "open safe" graphic used by the button, cursor, and sprite - but there is now!
- In closing, this attack was originally coded to give the player a choice between stealing a "random" technology, or picking one from a list. The chance of success being lower if you select a specific advance. But all the "choice" code has been commented out in "script.slc", and the same is true in the AE file (so not something specific to Cradle). Anyway, I thought about trying to reactivate that, but - at least for now - there's other fish to fry.

3) Incite Revolt: An espionage attack (causes foreign city to revolt and become a new civ) used by all the spy-type units. Even though "orders.txt" says there is a fixed cost for this (5000), the cost is actually a formula derived from city size and happiness level (usually multiple thousands). This attack also works as expected, but there were a few minor issues.

- Interestingly, in a recent playtest the AI used this against another AI civ, so it's definitely something they know how to do. Not common, however.
- Confusingly, the sprite and sound play regardless of whether the attack succeeds or fails - unless the attacking unit dies. The messaging is correct in all cases, but had a typo (now fixed).
- This attack does NOT result in a Declaration of War, regardless of success or failure or the agent being caught or not. That seems strange, but there's no way to change it.
- Most of the graphics are consistent (waving pitchfork and red flag), but the messageicon graphic comes from the "Slave Revolt" group, so I created a new one to match this graphic set. The sound featured shouting and gunshots, which is not appropriate for an attack that can be used in the Ancient Era, so that was altered as well. Worth noting that you get the same sound and sprites from a spontaneous "unhappiness-based" Revolution.

- 4) Plant Nuke:** An espionage attack (places nuclear bomb in a city) used by the Secret Agent, Cyber Ninja & Empathic Diplomat units. With one exception, the graphics, messages and sound are consistent.
- The pre-requisite for this attack is the discovery of "Nuclear Power". Until that occurs, the button will not appear.
 - AI has never used this attack in any of my games, but none have reached this far into the future, so that's not dispositive. Cost is VERY HIGH (8,000) however, so even if the AI is coded to use it, most AI civs don't have that much gold available.
 - Not surprisingly, War results from both Success and Failure.
 - It seemed odd for the Empathic Diplomat to have this capability, since it's contrary to everything the GL says about this unit (imagine the "empathic shock" from killing/maiming so many people!) Accordingly, I removed it.
 - A successful attack displayed the "bomb-with-fuse" sprite, which is wrong on several levels. It now uses the "nuke explosion" sprite, which is clearly a better match.
 - This attack includes an **EscapeChance** percentage (for the attacking unit), but I have yet to see ANY attackers survive. Doubtful that it works.



93. Special Attacks Project Status: This took a LOT longer than I'd ever imagined, but the Special Attacks project is complete. Quite a few surprises along the way, so before moving on to the next big task let's review what was done.

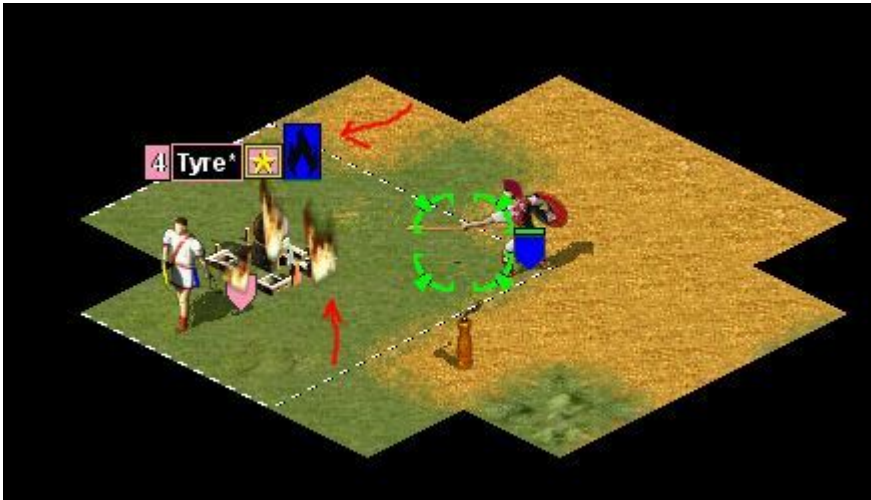
But first, we'll talk briefly about a conundrum which initially appeared "unsolvable" - the fact that Cradle has repurposed many of the modern era attacks into ancient equivalents. For example, Lawyers in CtP2 deploy the "Injoin" attack as a means of disabling production in an enemy city. In Cradle however, the attack is called "Sabotage" and is used by the "Assassin" unit to do exactly the same thing, except the messaging and some of the icons (but not all) use a "building-on-fire" motif. The problem is that once the specialist units of the modern era begin to arrive, you have - for example - lawyers who are setting fires instead of using legal attacks (see attached). Which is disconcerting at best and a real hit to gameplay and immersion. That has been addressed, but for now - to keep the focus on the Special Attacks themselves - I'll simply point out those which have an "Era-dependency" and will address the solutions later.



94. Legal Attacks (3) - All three of these have an "ancient equivalent" in Cradle:

1) Injoin (Sabotage): A legal attack which halts production for 1 turn and is used by the Assassin, Poisoner, Lawyer, Legal Team, and Cyber Attorney. As noted above, Cradle has re-purposed this attack as "Sabotage" and while it did have "flaming building" iconography for the Button & Cursor (along with "fire-related" messaging), everything else was modern (mostly "Gavel" related). The changes include:

- * Created a new "burning building" Messageicon
 - * Sprite shifted from the "swirling papers" to an existing sprite which shows fires burning on all sides of the city (see attached)
 - * Sounds changed from the "whooshing" of swirling papers to the crackling sound of a large fire
 - * A successful attack appends a new "fire" icon (see attached) to the side of the city status bar (instead of a gavel)
- This attack is controlled by settings in "units.txt", success is 100% and there's no danger to the attacking unit. Cost is 300, duration is 1-turn (unfortunately not adjustable), and the good news is the AI performs this attack frequently. It has a strong era-related dependency.



95. 2) Sue (Assassinate Great Leader): A legal attack which kills units that have the "CanBeSued" attribute, and is used by the Assassin, Poisoner, Lawyer, Legal Team & Cyber Attorney units. The "Great General" also had this ability, but no longer (you'll soon see why). As envisioned in Cradle, this attack is used by "assassin-type" units in order to kill the various Wonder Units (Sargon, Atilla, Caesar, etc), hence the name. However, in the course of MANY playtests, not once has the AI used this attack to kill a Wonder Unit. Additionally, many civilian units also have the "CanBeSued" attribute, making the title rather misleading. My guess is the AI doesn't use this attack because the cost is exorbitant - 3000 gold per attack (whether it succeeds or fails). However, dropping the cost precipitously would make it too easy to dispose of those valuable special units.

A conundrum, but one which was addressed by extending vulnerability to most of the civilian units (+14), removing susceptibility from all Wonder Units, and dropping the cost to 300 Gold. The cost reduction will encourage the AI to use the attack, while expanding the civilian "target base" allows devious rulers to avoid the "reputation hit" which comes when civilians are killed by military units. The "Expel" attack remains, so the player also has the ability to pursue less violent (and less expensive) means when dealing with troublesome foreigners. As for enemy Wonder Units? The player (and AI) will simply have to deal with them militarily.

Cradle used the "crossed swords" iconography for this attack, but the same imagery was used by army-on-army military attacks, and unique imagery is always preferable. Accordingly:

- * An old Ctp mod included a "knife" cursor, and that is now used by this attack (see attachment)
- * New Buttons and Messageicons were created, and use the same "knife" imagery.
- * Messages were altered to emphasize the utility of this attack against civilian units. In addition, the messages were "backwards" (and still are in AE), and listed the performer as the victim, so that had to be revised as well. For example, "We have successfully killed Assassin". Um, no!

* The sprite (trumpets) and sound (fanfare) are hard-coded to use those assigned to "General Success" (as listed in specattacks.txt) and cannot be altered.

To reflect these changes, the Ancient Era attack has been renamed **Assassinate Civilian**, and yes, it is heavily era-dependent.



96. 3) Sue Franchise (Assassinate Dis-Loyal Governor): As [reported in the Source code forum](#), this attack was broken at some point in the development of the Apolyton Edition. "Sue Franchise" is a legal attack intended to counter the commercial "Franchise" attack, and both were repurposed in Cradle as Ancient Era mechanisms for extorting tribute on the one hand and killing those who paid it, on the other.

Since this attack doesn't work, the only actions necessary are to remove the buttons which would allow a unit to try (and fail) to implement it. We'll explore the larger ramifications as part of the Commercial attack reviews.

97. Commercial Attacks (2): Only two attacks of this type, and both had an "ancient equivalent" in Cradle. However, for reasons discussed below, that will no longer be the case and both attacks will revert entirely to the Modern Era.

1) Franchise (Demand Tribute): A commercial attack which diverts 10% of the production from an enemy city and is used by the Trade Emissary, 4 Wonder units, the Corporate Branch and Subneural Ad. As noted in the previous post, this attack cannot be countered and dealing with that issue has several ripple effects:

- * The Trade Emissary - a unit the AI has shown no ability to utilize - only has two attacks, and removing this leaves him with one.

- * It's also an important attack for the Corporate Branch and Sub-Neural Ad, but both of those are late game units and by that point the implications of an un-removeable franchise (a small loss of production output at a time when most cities are awash in excess capacity) are marginal at most.

- * Four Ancient-era Wonder Units also had this ability, but now must lose it. The good news is that while the human player

might mourn the loss, the AI didn't use it anyway.

* On the plus side, eliminating the Ancient-era version means that all the graphics and sounds can revert back to the originals. All ancient-vs-modern discrepancies are thus avoided.

* Name of the attack reverts to "Franchise".

The player should be aware there aren't any attack messages (the absence is hard coded and unchangeable). However, a successful attack places a "Gear" icon on the city status bar, so you DO get a visual indicator. Worth noting that while a Franchise cannot be removed, other nations can perform the attack and replace the old franchise with one of theirs (the background color of the icon tells you which nation controls the Franchise - see attached).



98. 2) Advertise (Establish Trade Center): A commercial attack which causes unhappiness in a foreign city for 1 turn and is used by the Trade Emissary, Corporate Branch and Subneural Ad. As discussed elsewhere, Advertise and Soothsay both utilize the "CauseUnhappiness" attack, and while their icons & messages are separate, they share the same sound and sprite.

Now that "Demand Tribute" (Franchise) has been removed from the early game, this calls into question the presence of "Establish Trade Center" in the early game. The effects of the attack are identical to Soothsay, and it's only used by a single unit - the Trade Emissary. Playtesting has shown that the AI doesn't use this unit as intended and this is his only

remaining attack, so it seems only logical to remove the Trade Emissary from the game. That is doubly beneficial, since the sprite and sound are shared by both Soothsay and Advertise, and now both effects can be purely religious. In addition, playtesting has shown that the AI will use Soothsay, albeit less frequently than Convert City.

The cost of this attack was a bit confusing since it appears in both "units.txt" (500) and "orders.txt" (200), but the latter is the controlling file (which means the cost can't be altered on a per-unit basis). Conversely, "units.txt" controls the "chance of success" (which can be different for every unit) and the duration of the effect (default is "1-turn" for all units).

The changes are as follows:

- * Trade Emissary is removed from the game
- * Most icons revert to the originals (billboards)
- * Reactivated an existing (but unused) "blimp" messageicon since CtP2 (and AE) use the wrong one (gears) - see attached
- * Created a new "grayscale" button for "Buy" (upsi20d.rim) since there wasn't one in "pic555.zfs" (i.e this fixes a very minor bug which is also present in AE)
- * Name of the attack reverts to "Advertise"

Although the ancient-era version of "Advertise" has been removed, "era-dependency" remains since the sprite and sound are different from those used by Soothsay.



99. Religious Attacks (5): Our first introduction to the "rat's nest" involved an analysis of the Soothsay attack (see **Heading 83**) and how it actually functions. To the extent possible, many of those issues have been resolved so let's give it another look.

1) Soothsay: A religious attack which causes unhappiness in a foreign city and is used by the Prophet, Cleric, and Televangelist. The Button, Messageicon, and Cursor use a "grinning skull" icon and (along with the messaging), are unique to this attack. As noted in the earlier post, the Sprite & Sound are shared with the "Advertise" attack. Cradle dealt with the problem by disabling the sound and changing the sprite to the "blue cloud", which is also used by Indulgences. However, "Advertise" has an interesting sprite, in which commercial items revolve above an unhappy face. For Cradle 5, I modified the sprite so that a skull revolves over the same face (see attached) and implemented a chant-like sound which now plays during the Soothsay attack.

This attack is controlled by the settings in units.txt, specifically the presence of "CanSoothsay" and "CauseUnhappiness". The latter includes "Chance" (of success), "Amount" (the amount of unhappiness in the target city resulting from a successful attack), and "Timer" (how long the unhappiness lasts). These settings can be different for each unit. Playtesting has shown that the AI will use this attack, but rarely. Accordingly, the cost was reduced from 500 to 300 to try and spark greater usage.

Since "Soothsay" and "Advertise" no longer co-exist in the same time frame, it's possible to give them unique sounds and sprites, but that also makes them era-dependent (so the solution will be discussed later)



2) Convert City: A religious attack which converts a foreign city to "your" religion and is used by the Prophet, Cleric, Patriarch, and Televangelist. The sprite, sound, icons & messages are all unique to this attack and required no alteration. It is controlled by the settings in units.txt, specifically the presence of "ConvertCities", which includes "Chance" (of success) and "DeathChance" (possibility that the unit could be killed when carrying out the attack). Each of these can be (and are) different for each unit. As with "Franchise", there is no time limit associated with the results of a successful attack - the city will remain under foreign religious influence until it is "reformed".

The AI uses this attack extensively, and it is not "era-dependent". A rare example of "no changes necessary!"

3) Reform City: This attack counters the results of "Convert City", and removes foreign religious control. It is available to most units, but primarily the military ("CanReform" is appended to the bottom of each unit record in units.txt). The sprite, sound, icons & messages are all unique to this attack and required no alteration.

The AI uses this attack extensively, and it is not "era-dependent". Another example of "no changes necessary"

4) Sell Indulgences: A very simple religious attack that extracts a small amount of gold from rival civs and is used by the Prophet, Cleric, and Patriarch. Controlled by the presence of "IndulgenceSales" in units.txt, it is always successful and costs nothing to perform - the AI does use it, but rarely. The Button, Messageicon, and Cursor use "ankh+coins" icons which are (along with the messaging), unique to this attack. Although the Sprite (blue cloud) is shared with a few other

attacks, it hasn't changed (couldn't think of an obvious alternative). The sound file has been shifted to a new "Gregorian chant" (it previously played the CtP2 "marketing" sound).

Very little was needed here, but there is an "era-dependency" with "FaithHeal"

5) Faith Heal: Does exactly the same thing as "Indulgences" and is used only by the Televangelist. The button, cursor, sound & sprite are the same as "Indulgences", but the message icon and messages are different and are triggered by the "isTelevangelist" attribute. I'll spare you the details, but despite strong indications that "FaithHeal" was an independent attack which could be separated from Indulgences (and thus get a full set of unique graphics and sounds), in the end I couldn't make it work. However, you get much the same result from utilizing the "era-dependent" solutions deployed elsewhere:

- * Activates the existing (but unused) "hands-on-head" Button
- * Activates the existing (but unused) "hands-on-head" Cursors
- * Enables an existing Televangelist voice to serve as the "Attack" sound

100. Slave-related Attacks (4): Two of these involve capturing slaves, while the others involve freeing individuals or instigating a slave revolt.

1) Slave Raid: A slavery-related attack which turns a citizen from the target city into a slave in one of yours, and is used by the Slaver and Slave Trader units. All the graphics (ball&chain related) and sounds are appropriate and required no editing. The attack is controlled by the "SlaveRaids" settings in units.txt, to include "Chance" (of success), "DeathChance" (possibility that the unit could be killed when carrying out the attack), "Amount" (the amount of unhappiness in the target city resulting from a successful attack), and "Timer" (how long the unhappiness lasts). All of these can be different for every unit. The cost is fairly low (250) and the AI uses this attack frequently.

In the original CtP2 code, the "victim civ" would always declare war, but Source Code changes make it no longer automatic. However, in my experience it still happens in most cases, probably because my civ usually has a dismal relationship with its neighbors. Also, the "whooshing net" sound was shared with the Piracy attack, but as discussed in **Heading 90**, each attack now has a unique sound. Otherwise, the only visible change is there are now different entries in the GL for "Slave Raid" and "Enslave Settler". This attack is not "era-dependent".

2) Enslave Settler: A slavery-related attack which turns a foreign settler into a slave in one of your cities, and is used by the Slaver and Slave Trader units. It uses the same graphics as the "Slave Raid", but the sound ("who's next?") is different. That's helpful, because during the end turn phase you'll hear either whooshing sounds or the Slaver's voice, and that tells you which of the two attacks is being carried out by the AI. And in fact, the AI is very good at both.

This attack is controlled by the "SettlerSlaveRaids" setting in units.txt, is always successful, and poses no danger to the attacking unit. Unlike the "Slave Raid", it always results in a Declaration of War (the only exception is in cases where the victim civ is unaware that your civ even exists). Given that (and the certainty of success), the cost has been reduced to 100 (just be aware that there isn't an on-map display of the cost, unlike what you see with "Slave Raids").

Lastly there is an issue with the "Success" message. Both attacks use the same messagebox code, and although the text can be edited, the existence of the shared message is hardcoded and can't be altered. Which is unfortunate, because the message includes a code link which gives you the name of the destination city (i.e. where the slave is going). For "Slave Raids", that city name is always correct. But for "Enslave Settler", the city is ALMOST ALWAYS WRONG! I considered removing that information from the message altogether, but since it works perfectly for one, the player just needs to be aware that it doesn't for the other. This attack is not "era-dependent".

3) Free Slaves: An attack which frees slaves owned by a different civ, used by the Patriarch & Abolitionist. All the graphics ("breaking chains") and sounds are appropriate and required no editing. The attack is controlled by the "UndergroundRailway" settings in units.txt, to include "Chance" (of success) and "DeathChance" (possibility that the unit could be killed when carrying out the attack). In playtesting, the AI has never used this attack, but that is probably related to the late appearance of the Abolitionist (the cost is only 50 gold). Even though the early-game Patriarch also has this ability, there are very few of those units (awarded only when certain Wonders are built), and they seem to prefer using their religious attacks instead.

There is one oddity - a successful attack causes TWO sprites & sounds to play - the "breaking chains" sprite first (with dog barking), and then "waving trumpets" (with fanfare). The second set of effects is hardcoded to play and are associated with the "GENERAL_SUCCESS" settings in speceffectID.txt and sounds.txt. Since they are also used by other attacks (such as "Pillage"), they can't be changed. Not a big deal, but rather a "coding curiosity". This attack is not "era-dependent".

4) Incite Uprising: This attack - when successful - causes a city with slaves to revolt and become a new civ, and is used exclusively by the Abolitionist. Although the sprite is shared (appropriately) with "Free Slaves", the buttons and cursors feature something modern, a "handing-down-a-rifle" graphic. This is fine, because the Abolitionist is a post-gunpowder era unit. The existing sounds were hard to pin down, but seemed to include whips and a creaking cart. Given the rifle symbology, I replaced that with a different file which includes rifle shots amidst a screaming crowd.

The attack is controlled by the "SlaveUprising" setting in units.txt, and can only be performed on a slave-holding city. There isn't a fixed cost for this attack - it's a formula based on count of slaves and distance from the nation's capital. It always results in a Declaration of War, regardless of success or failure.

Unlike many special attacks, there isn't a fixed chance of success. Rather, it appears to be related to the settings in "const.txt" which control "random" slave uprisings. First is SLAVES_PER_MILITARY_UNIT, which is set at "12" in Cradle (vs the CTP2 default of "3"). That means a city with 12 slaves can be safely guarded by 1 military unit. If there are 13 or more, the additional slaves are considered "unguarded", and the second setting comes into play, UPRISING_CHANCE_PER_UNGUARDED_SLAVE. The Cradle number is "2" (which I think means 20%) while the CTP2 default is "5".

Because of the "Victory Enslavement" feature (creates slaves simply by engaging in battle) and the large number of units which have this attribute, slaves are more common in Cradle games. In addition, prior to the Source Code fixes, all slaves would accumulate in the city nearest to the action (those gained in battle AND those from Slavers). So it was very easy to have individual cities with vast slave populations. Factor in the inability of AI civs to properly manage garrison counts, and large AI civs were soon torn apart by revolts of all sorts, which tended to make victory much easier for the human player. The AE version addresses most of that, so these settings will DEFINITELY be re-examined, and almost certainly revised for Cradle 5, at least in part because there is one more issue, and it specifically affects this attack.

A "random" slave revolt is always successful. If the combination of unguarded slaves plus successful "uprising chance" come together, you get a revolt. The code does not allow for unsuccessful revolts. By contrast, "Incite Uprising" forces a revolt to be attempted and when it fails (as it will certainly do since the Source Code AI is EXCELLENT at maintaining large garrisons), two things will happen. All slaves in the target city are killed and it PERMANENTLY removes one unused civilization from the list of those eligible to form new nations in the event of successful revolts.

So what does that mean? Let's assume you start a game with EIGHT civs and set TWELVE as the "maximum number that can be in the game at the same time". The code will invisibly set aside FOUR civs - by name - as those which are "eligible to appear". When an Abolitionist-inspired revolt fails, one of those names is removed. You'll even get a message saying that "<Target Civ> have conquered the nation of <Revolting Civ>", after which that "nation" will never appear in your game (see attachment). After only four failed slave revolts, it will be impossible for new civs to appear, and all revolts henceforth (even if "random" or non-slave related) will produce only Barbarians.

Sorry for the long dissertation, but players should be aware that unless you choose a target city with a large population of

slaves, and actively attack the city with an army in order to drive the size of the garrison down to one unit and ONLY THEN attack it with your Abolitionist - the attack will ALWAYS fail. Which makes it hardly worth doing, but I will (reluctantly) keep it in-game. Albeit with a "Caveat Emptor" warning in the GL. In closing, this attack is not "era-dependent".



101. Terror Attacks (5): Most of these are "future era" attacks in AE, but several have been repurposed to the Ancient Era in Cradle.

1) BioTerror (was "Create Atrocity", is now "Siege"): A biological attack which reduces city production and happiness for 5 turns and has a chance of affecting additional cities linked by trade routes. Originally performed by four Wonder Units (Sargon/Hannibal/Attila/Genghis), plus the late-game "Infector". This attack offered a mix of graphics (mostly "skull & crossbones") but also included a Sprite (rising green gas), Sound (screaming populace) and Cradle-specific Messages. After a successful attack, a blinking bio hazard sign appears next to the city status bar (in the color of the attacking civ).

The attack is controlled by the "BioTerror" setting in "units.txt", to include "Chance" (of success). Additional settings are present in "const.txt" which allow you to customize the duration of the event (5 turns), unhappiness level (-5) and the amount of production loss (30%). To my knowledge, the AI has never used this attack, but that could be because so few units can perform it in the early game. Also the cost is high (1,000 - same in AE) and it is considered an Atrocity. Unfortunately there isn't a way to "flag" particular attacks as "Atrocities", although it would be nice to have that as an option.

I always found this to be a rather disconcerting attack, especially as redefined in Cradle. How exactly would a "Wonder Unit" go about creating an atrocity like this? There are certainly tales (albeit mostly from medieval times) of armies hurling infected carcasses into a besieged city. But even when that occurred, it ALWAYS meant the besiegers were infected as well, and just looking to share the misery. Which is not how this attack works, since the attackers are always "disease free". Also, why those specific units? Hannibal but not Caesar? Sargon but not Rameses? The more I looked at it, the less I liked it. Which eventually led to a new approach - **the "Siege"**

Historically, the population effects we see from this attack would definitely apply to Cities under Siege. And in fact that is how the attack is deployed in CtP2. The army has to be adjacent to the city, and the Wonder Unit has to deploy the attack against the city itself. Which is the very definition of a "siege", especially since there isn't any way to perform an actual siege in CtP2. Armies can either assault cities directly or they sit outside conducting bombardments and pillaging tiles, but there's no way to affect productivity or the civilian population. Whereas this attack reduces production and makes people unhappy for five turns, which very much sounds like the effects of being under siege. Even the "chance of spread" makes sense in the context of the Ancient Era. As other cities learn of an ongoing siege (and how better than via trade routes), fear and loss of production will definitely affect those who think "we might be next!"

The new "Siege" concept required a number of changes:

* **Graphics:** The existing "fortify unit" button features the "tower" portion of a city wall and there's also a cursor (unused) with the same graphic, so I decided to use these for "Siege". Since the "fortify unit" command places a small brown berm around the unit (representing either wood or earth), I took a copy of that graphic from the TIMP file and created a new button image (and another for the GL) which matches the in-game appearance of unit fortifications. However, I discovered during playtesting - to get ahead of things a bit - that there was a strong mental association between the "tower" button image and its former purpose. To eliminate that confusion, I added flames around and behind the tower, and it's now a much better representation of a city under siege. That in turn was extended to the messagicon and the GL picture. This attack also places a small icon on the city status bar, which appears for the duration of the Siege effect (5 turns). Previously this was a blinking bio-hazard sign, which was not only inappropriate as a representation of the new attack, but the blinking effect was EXTREMELY annoying, almost game-killing! Anyway, I created a new icon which represents a city tower and gave it an unchanging background, so no more blinking (thank god!)

* **Sound:** The "screaming populace" likewise was no longer appropriate, so I created a new "moving siege tower" sound.

* **Units:** It now makes sense to give this attack to most of the Wonder Units, with the only exception being the two modern ones (Eisenhower & Schwartzkopf) since sieges of the ancient sort aren't really a feature of modern warfare. Surrounding a city and bombing it into oblivion, sure, but not for the purpose of starving the population into submission. Also, since even Ancient-era Wonder Units can co-exist in time with the Infector, we'll remove this attack from him, rather than restoring it's modern appearance at some point.

* **Chance of success** can be different for each unit, and in fact it already was (settings of .25, .33 and .5) I'll keep those three levels and will grant them to the various units based on an estimate of their efficacy at siegecraft.

* **Button-location issue:** As with most other unit types, Wonder Units utilize the second tier of the "Button screen" (bottom right of the interface) for their Special Attacks. The current button location (2-1) is shared with two other attacks used by Wonder Units: Pillage and Convert City. The latter is an important attack for Wonder Units with a religious aspect (David, Muhammed, etc) and those units should ALSO have the "Siege" ability so we'll look at moving the "Siege" button to one of the other locations on the row, which are 2-2 (Piracy), 2-3 (Expel) and 2-4 (Reform city). Of those, "Reform" is a

necessary complement for the units which have "Convert". "Expel" is harmless enough and there's plenty of other units which could do this, but ultimately I think that "Piracy" is the one which needs to go. The main reason is that AI units tend to park on trade routes and keep pirating them for multiple turns, but we want Wonder Units to be included in moving stacks, and not encourage the AI to keep them immobile for extended periods. By contrast, Expel and Reform are "one and done" activities that don't include an incentive for "parking".

- * **Cost** reduced from 1000 to 700 (might help stimulate AI usage)

- * All five **Messages** have been revised to fit the "Siege" attack narrative.

- * Changed the **GL entry** to describe the concept behind the new "Siege" attack

- * This attack included a "terrorist death chance" of 10% in "const.txt", but I reduced that to ZERO as it's no longer a biological attack delivered by terrorist-type units

- * **The Sprite** has also been revised and now features the "metal-mask" from the "Reform City" sprite, in combination with a different fiery effect sprite from CTP1.

In closing, both the "BioTerror" and "Plague" (to be reviewed next) special attacks use the BIOTERROR entry in "specattack.txt" as the link to their (shared) sprite and sound. Unfortunately these cannot be separated but there is an "era-dependent" solution which should suffice.



102. 2) Plague (was "Create Plague Conditions", now reverts back to "Plague"): A biological terror attack which kills a percentage of the city population, and is performed by three Wonder Units (Hannibal/Attila/Genghis), plus the late-game "Infector". As with BioTerror, this attack utilized "skull & crossbones" graphics and featured the same Sprite (rising green gas), Sound (screaming populace) and Cradle-specific Messages (but nothing on the city status bar).

The attack is controlled by the "Plague" setting in "units.txt", to include "Chance" (of success). An additional setting is present in "const.txt" which allows you to customize the death rate (currently 20%). As with BioTerror, to my knowledge the AI has never used this attack, probably for the same reasons. Again, the cost is high (1,000 - same in AE) and it is considered an Atrocity.

As with "BioTerror", I found "Plague" to be an unlikely "attack" for ANY units in the Ancient Era. Again, there were similar concerns about the deliberate spread of disease in a way that was so controllable as to leave the attacking army completely unaffected. While it was possible to contrive a realistic disease alternative for BioTerror (i.e. "Siege") there was nothing equally plausible to explain this attack. The solution I chose was to dump the whole idea and just restore the attack to the modern era (along with some of the graphics, and all the sounds and messages).

Interestingly, in CtP2 (even AE) this is actually not a "Modern Era" attack at all, but rather one which only becomes available with the discovery of the Far Future "Nano Warfare" Advance and the accompanying advent of the Infector unit. That didn't make any sense because the Infector doesn't utilize any Nano Tech special attacks. Even worse, the reality is that Biological Warfare is not something that might appear in the distant future, but (sadly) is available RIGHT NOW (hello, COVID). I gave the whole matter some thought and decided to separate Biology from NanoTech in the following way:

* A new Advance ("Biological Warfare" - see attachment) will become available after "Modern Medicine" (the first pre-req), but also requires "Global Economics" (which contributes to the easy spread of a manufactured disease). In addition, it will be a "Dead End", so it can be researched (or not) as the player desires, but is not a pre-req for something else. That also allows us to place it on the list of technologies which the AI "seeks to keep from enemies" (see the bottom of "AdvanceLists.txt"). All the required text file changes have been made to activate this Advance, including a new GL entry.

* The Infector is now available with the discovery of "Biological Warfare". Although he loses the "BioTerror" attack, "Plague" is sufficiently deadly to justify his existence, especially since it is available to no other units. Whether the AI will use the attack is an open question, but the far earlier availability of this unit will give us a much better chance of learning the answer.

* The original button, cursor, and messageicon for this attack utilized the CtP2 "Gas Mask" graphics. However, the mask looks like something intended for fending off a Chemical attack, where-as this is clearly biological. Fortunately, the BioTerror attack had a full set of BioHazard symbol graphics (no longer needed since the attack is now "Siege-based"), and those have been switched over to "Plague"

As noted in the last review, "Plague" is hardcoded to use the same sprite and sound as "BioTerror" (now "Siege"), so an "era-dependent" solution is required in order to restore the originals. And one final thought. If you were to infer from this screenshot that a fully revised Tech Tree will be included with the Cradle 5 download.....well, you wouldn't be wrong!



103. 3) Nano Infect ("NanoTerror"): A terror attack which has a chance of destroying improvements in the target city and can spread to additional cities linked by trade routes. It is used exclusively by the late game Eco-Terrorist unit. With one exception, all the graphics ("gears"), messages (3), and sounds are appropriate and required no editing. Successful attacks place a blinking red "nano symbol" on the city status bar (background color is that of the civ which performed the attack) while both success and failure put the "watchful" (blue eye) marker on the target city.

The attack is controlled by the "NanoTerror" setting in units.txt, to include "Chance" (of success). A failed attack generates the "red X" and the "general fail" sound. War results only from Success. There are several additional settings in const.txt:

- Duration of the event (5 turns)
- Chance of destroying an improvement (30%)
- Terrorist Death Chance (25% - this does work, as I've seen an Eco-Terrorist die after a failed attack)
- Chance of spreading to additional cities (20%)

This is another attack which I've never seen the AI use, but that's not a surprise since there isn't an Ancient Era version in Cradle. Also the cost is VERY HIGH (4,000 - same in AE) so even if the AI knows how to use it, they are unlikely to have that much gold available. Apparently (per the GL) it is considered an Atrocity.

As with "BioTerror", this attack places a small icon on the city status bar, which appears for the duration of the Nano effect (5 turns). This too was a blinking icon (displaying a nano-hazard sign), and again it was practically seizure-inducing. According I edited out the "blinking effect" (see attached), and even though that eliminates the background color-link to the attacking civ, the symbol is now easier on the eyes (and the brain).

Although it seemed possible to develop an Ancient Era version of this attack, in the end I opted to keep everything the same and move on. (I am soooo ready to finish up the special attacks!) Accordingly, this attack is not "era-dependent".



104. 4) Nanite Cleanse ("CreatePark"): A terror attack which causes the target city and surrounding units and improvements to disappear. It is used exclusively by the late game Eco-Ranger unit. With one exception, the graphics ("highlighted tree"), message (1), and sounds are appropriate and required no editing.

The attack is controlled by the "CreateParks" setting in units.txt. Although there are no settings for chance of success or death (nor is there anything in const.txt), testing shows that success is 100%, death of Eco-Ranger is 100%, and there's no limit to the number of "Nanite Cleanse" attacks that can be launched in any given turn (Yikes!)

Although the AI has never used this attack in any of my games, none have reached this far into the future. I suspect that since it is only available to one unit and one gov, that it's probably been hardcoded for the AI to use it. Cost is ZERO, so that makes it even more likely.

Even though there's only one message (sent to the victim), the messageicon used "Gears", so I created a new one which uses the same "highlighted tree" symbology as the others. There's not an Ancient Era version of this attack, so as you might expect, it is not "era-dependent".

105. 5) Assassinate Ruler (Conduct Hit/Bomb Cabinet): A terror attack which switches the target nation's gov-type over to "Anarchy", and is used by the Assassin, Poisoner, & Eco Terrorist units. Surprisingly, whether the attack succeeds or fails, it never results in a Declaration of War! This attack was previewed in a rather tongue-in-cheek fashion [way back in Post #93](#), when I was first unveiling the many issues associated with these Special Attacks. I won't repeat any of that, but will instead focus on some of the changes implemented since then.

* The new icons (a knife pointing up) were also given to the "Assassinate Civilian" attack. Since the same units could perform that attack AND this one, the use of identical icons for two different attacks was potentially confusing. Accordingly I created a new set (button, cursor, messageicon, GL pic) which use the same knife, but now pointing down (see attached), which also matches the "angle of attack" used by the knife sprite.

* The AI has never used this attack, but that may be driven by the extremely high cost (10,000). As previously discussed, that was understandable under the old system - a switch to Anarchy would cause all the gov-dependent units to disband! As that is no longer the case, the cost has been reduced to 500 (see attached). Since the AI is very good at using Assassins to perform "Sabotage" (cost is 300), there's a decent chance that a lower cost will spark usage.

* The knife is a weapon which will probably always be with us, so there's technically no reason not to keep these graphics for the duration of the game. However, the "BombCabinet" graphics are excellent, and a bomb-based attack is a more likely assassination tool for the modern era and beyond. Given that "Era-dependent" switches are planned for a number of other Special Attacks, it's easy enough to implement that process with this attack as well.

Ok, that completes the individual "Special Attacks" reviews, but we aren't quite done yet. Next up is a discussion of the approach I'm taking to resolve the Era-Dependency problem. The issues range from cosmetic (such as with Assassinate Ruler) to fundamental (such as the shift from Sabotage to Filing Injunctions), but the solutions are identical.



106. Population Pollution: In response to the comment posted below.

Originally posted by [Cyberguy](#) [View Post](#)

What I'm getting at is that there are city improvements that can reduce a cities population pollution to 35% of its level without the city improvements/ However there is no way, short of reducing the population size to get below 35%.

I took another look at this, and your statement is incorrect, at least insofar as it applies to Cradle. Take a look at the attachment. The inset has the list of all Cradle Buildings which can reduce population pollution, and they total up to 95%. The majority of the Screenshot shows the City manager screen for the city of Ebla. It has 19 total citizens and is generating 252 points of population pollution. However, it also has 6 buildings which together reduce that pollution by 85% (Green rows in the inset). The combined effect of those six buildings should reduce actual Population Pollution to 38, and if you look at the number circled in Red on the City Manager screen, that is EXACTLY what they have done.

From a game realism perspective, the Ancient Era offers 4 structures which together provide a 40% reduction in population pollution. I think that's a good number for the era, as it will encourage the player to be cautious about building large Super Cities, as otherwise the pollution numbers can quickly spiral out of control. Not until the Modern & Future Eras will additional structures become available, finally taming the problem

To that point (and for the sake of completeness), I will add a 5% reduction to the "Body Exchange" improvement, thus eventually making it possible to achieve 100%, albeit only near the end of the game.

CITY MANAGER

Optimize Specialists | Ebla | Mayor

Category	Value
Citizens	19
Workers	10
Slaves	6
Population	193991
Efficiency	79
Entertainers	0
Farmers	1
Laborers	1
Merchants	0
Scientists	1

Growth Turns: 9
Crime: 8%
Conversion Loss: 0
Franchise Loss: 0

Happiness:

Category	Value
War Discontent	-4
Workday	-3
Pollution	0
Rations	+2

Pollution: 38

Pollution from Population: 252
Physician: -25
Apothecary: -25
Aqueduct: -25

Buildings with "PopulationPollutionPercent" Reductions

Building	Reduction
IMPROVE_APOTHECARY	10%
IMPROVE_AQUEDUCT	10%
IMPROVE_PHYSICIAN	10%
IMPROVE_BATH_HOUSE	10%
IMPROVE_DRUG_STORE	20%
IMPROVE_HOSPITAL	25%
IMPROVE_PUBLIC_TRANSPORTATION	5%
IMPROVE_ECO_TRANSIT	5%
Total Actual	85%
Total Possible	95%

Ebla Population Pollution: $252 - (252 * .85) = 38$

107. Pollution: The easiest way to deal with it is to toggle "Pollution Off" from the Rules screen when starting a new campaign (see attached). If you still want to play with "Pollution On" and have a situation where pollution can increase for some period after which something will drive it down to zero, that is something you would have to mod into a game. Fortunately the mechanics aren't that difficult to understand. They use the same mechanism which reduces population pollution - an attribute assigned to one or more buildings in the "buildings.txt" file. As an example, let's look at the "Aqueduct" in Cradle:

Code:

```
IMPROVE_AQUEDUCT {
  DefaultIcon ICON_IMPROVE_AQUEDUCT
  Description DESCRIPTION_IMPROVE_AQUEDUCT
  EnableAdvance ADVANCE_AQUEDUCTS

  PrerequisiteBuilding IMPROVE_GRANARY

  ProductionCost 1200
  Upkeep 3
  FoodPercent 0.15
  StarvationProtection 5
  PopulationPollutionPercent -0.1
  ProductionPollutionPercent -0.4
}
```

In reality the Aqueduct doesn't affect production pollution, but I added that to this example so you know it exists. Anyway, you can add those attributes to ANY building, and in ANY percentage. Also, the AI will construct EVERY building, so eventually these will appear in every AI city, and do their reduction "thing". So you'll get the "across the board" result you are looking for. The AI won't "know" it is doing good things to abate pollution, it will just happen.

The design part would be if you assign these attributes in different values to structures which become available at different times, so you can have the effect of "pollution grows and then at some point begins to decrease". For example, if 7 structures each reduced population pollution by 20%, eventually they would all be built and the net effect would be a city-by-city process in which they produce zero population pollution and THEN provide a 40% decrease (into the environment).

Best of all - if you have an ongoing campaign and fear that pollution is about to destroy it, you can make these adjustments in "buildings.txt" and the next time you load a save game, they will take effect immediately! For example, I changed the PopulationPollutionPercent in Aqueduct to -1.1 and it took effect right away.



108. **Siege Attack Redux:** Originally the far future "Bio-Terror" attack, this was reconfigured into an Ancient Era special attack and was extensively reviewed in [Post #127](#). First the good news. As playtesting has shown, the AI can and WILL deploy this attack against the human player. In the attached example I altered the effect to -10 unhappiness (and also noticed the name of the attack needed to be changed in the "exp_str.txt" file), and you can see the result. Huge levels of unhappiness that can't be managed at the city level and require an Empire-level happiness boost to offset. And the building of the Nomad was locked at 14 for the next five turns. Soooooo, it works right?



109. Siege Attack Redux (continued): Well...yes and no. In playtesting, the AI used the attack several times against AI opponents, which was a good indicator that the attack was working as intended. Not much use spending time and effort to make this thing look good if the AI won't use it, amirite? Unfortunately, that highlighted a problem. A big problem.

In the example below, a Carthaginian Wonder Unit deployed a Siege Attack against the Assyrian city of Arbela. You know the attack is successful, because the red "Siege Symbol" can be seen on the Arbela City Status Bar (failed attacks do not display this icon). However, the "Happiness" window does NOT show any effect from this attack, and the Happiness level itself is still quite high (78). At the time of the attack, Arbela was building a Slinger (top picture) and - even though all production is supposed to halt for 5 turns - we can see (bottom picture) that the city has completed the unit and started work on a Shrine. Meanwhile the happiness level remains solid at 78.

Unfortunately this is NOT an outlier. I tested it again and again and again, altering settings every time, and got the same result every time. Siege attacks deployed against AI civs, whether by the human player or another AI, have NO EFFECT. Really disappointing. That said, I will keep the attack in Cradle 5, because it is one of those rare instances where the AI has an in-game advantage over the human player. In other words, given half a chance, the AI WILL deploy this attack against you, so....player beware!



110. Special Attacks - "Era Dependency" Fix:

ISSUE: I've talked about this throughout the individual Special Attack reviews ([and more specifically in Post #111](#)), but let's go through it once more. In Cradle, many of the special attacks were repurposed so they could apply in the Ancient Era. The idea being that - for example - a Modern Era legal attack (Injunction) which stops production for one turn could also be used in the Ancient Era as a form of sabotage. The effects of the attack are IDENTICAL, but the graphics, sounds, and messages were all changed to reflect the Ancient Era version. The problem of course is that eventually the Modern Era arrives and Lawyer units appear, but instead of filing Injunctions or issuing Lawsuits, they are setting fires and assassinating civilians.

SOLUTION: I'll go into more detail below, but the solution involves saving the game at a specific point and then copying in a "Swap Folder" which contains a revised set of files. Specifically, when the player gains the "Age of Reason" Advance, that is considered the beginning of the "Modern Era" for file swap purposes. These new files contain everything necessary in order to change all the graphics, sounds, and text from the Ancient to the Modern Era. I've tested this and it turns out that you can swap almost any file and see the changes immediately simply by loading your Save game. No other actions are necessary. The exceptions to that are slic programming files (anything with an .slc suffix) and several of the "string" files, "info_str.txt" in particular (the file which holds the message text). The former requires the player to use the /reloadslc command, but I wanted to avoid even that, so there are ZERO slic files included in the Swap folder. As for info_str.txt, the problem is that even a ONE WORD change to a SINGLE MESSAGE results in the corruption of EVERY MESSAGE! Accordingly, that file is also not included. Fortunately there were only 4 messages which had a strong Ancient-Modern dichotomy, but even with those I was able to craft generic alternatives which work in any era. **Edit:** Message corruption is actually caused by adding NEW lines, not editing existing – see **Heading 207** for details.

PRELIMINARY FIXES: To reduce the number of File Swap changes, I was able to create alternative Great Library entries, so that BOTH "Sabotage" and "Injoin" AND "Assassinate Civilian" and "Sue" appear in the GL at the same time, regardless of era. In similar fashion, all required sound files and almost all graphics are already present in the appropriate game directory. Which means all that's necessary is to swap the text files which link to them. Apologies if that sounds a bit esoteric, but trust me - it reduced the number of required file swaps by a factor of ten!

ERA-DEPENDENT SPECIAL ATTACKS: Not all special attacks have this problem, but here are those which do:

- * Sabotage/Injoin: Almost everything associated with this attack has to change. To include the sound and ALL the graphics (button, cursor, messageicon, sprite & city status bar icon)
- * Assasinate Civilian/Sue: Same with this attack. Have to change the sound and all the graphics (button, cursor, messageicon & sprite)
- * Soothsay/Advertise: The change affects only the sound and the sprite
- * Indulgences/FaithHeal: A relatively limited change which affects the sound, button & cursor
- * Siege/Plague: Actually these are completely different attacks, but they share the same sound and sprite. Since the first is primarily Ancient while the second is Modern, we need a sound & sprite swap.
- * Assasinate Ruler/Bomb Cabinet: The name of the attack stays the same, but the graphics & sound will take advantage of the File Swap process to shift from "knife" to "bomb" at the start of the modern Era.

UNIT CHANGES: A small number of units are able to deploy ancient era special attacks and yet still exist in the time period after the "Age of Reason". However, there is a solution which prevents them from deploying inappropriate special attacks from that point forward

- * Cleric: A revised "units.txt" file removes his ability to Sell Indulgences (which otherwise will feature "FaithHeal graphics and sounds). There remains a small disconnect since this unit will retain the "Soothsay" attack, but the only difference is that you'll now see and hear the Advertise Sprite and Sound. That's not optimal, but the problem eventually goes away when "Cleric" upgrades to Televangelist (who does not have Soothsay).
- * Patriarch: A revised "units.txt" file removes his ability to Sell Indulgences (which otherwise will feature "FaithHeal graphics and sounds). Does not have the Soothsay attack, so that's not an issue.
- * Poisoner: A revised "units.txt" file removes her ability to Sabotage and Assasinate Civilians since those become purely legal special attacks. She still retains the ability to Assasinate Ruler (now with a bomb) and is the only unit with that capability. It's also possible that the AI will use this unit more if that's the only thing she can do.
- * Wonder Units: Actually NONE of their abilities will change, however just be aware that the sound and sprite for the

"Siege" attack will shift over to "Plague". All other graphics remain the same.

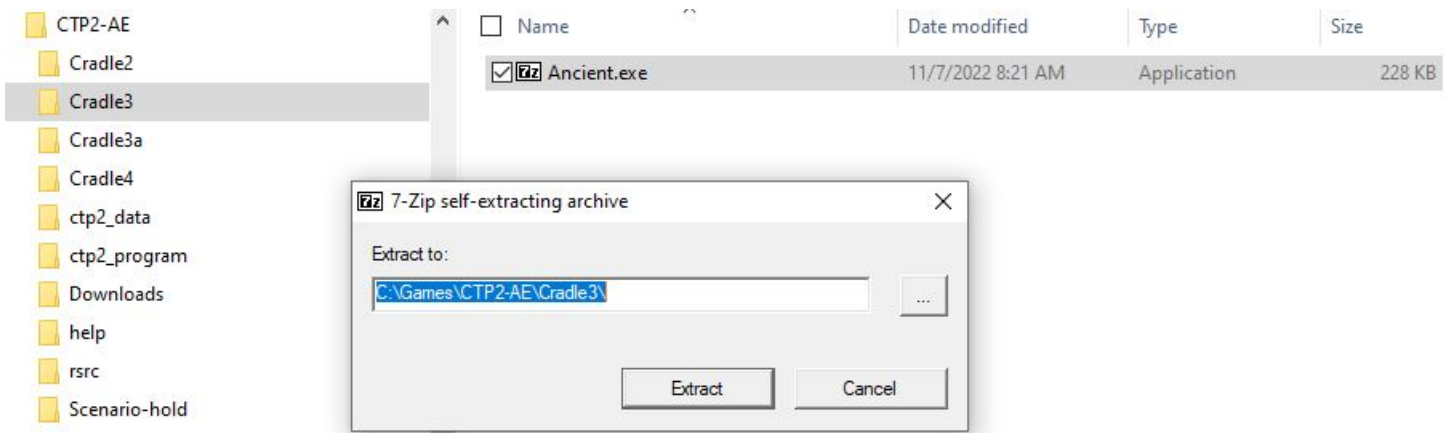
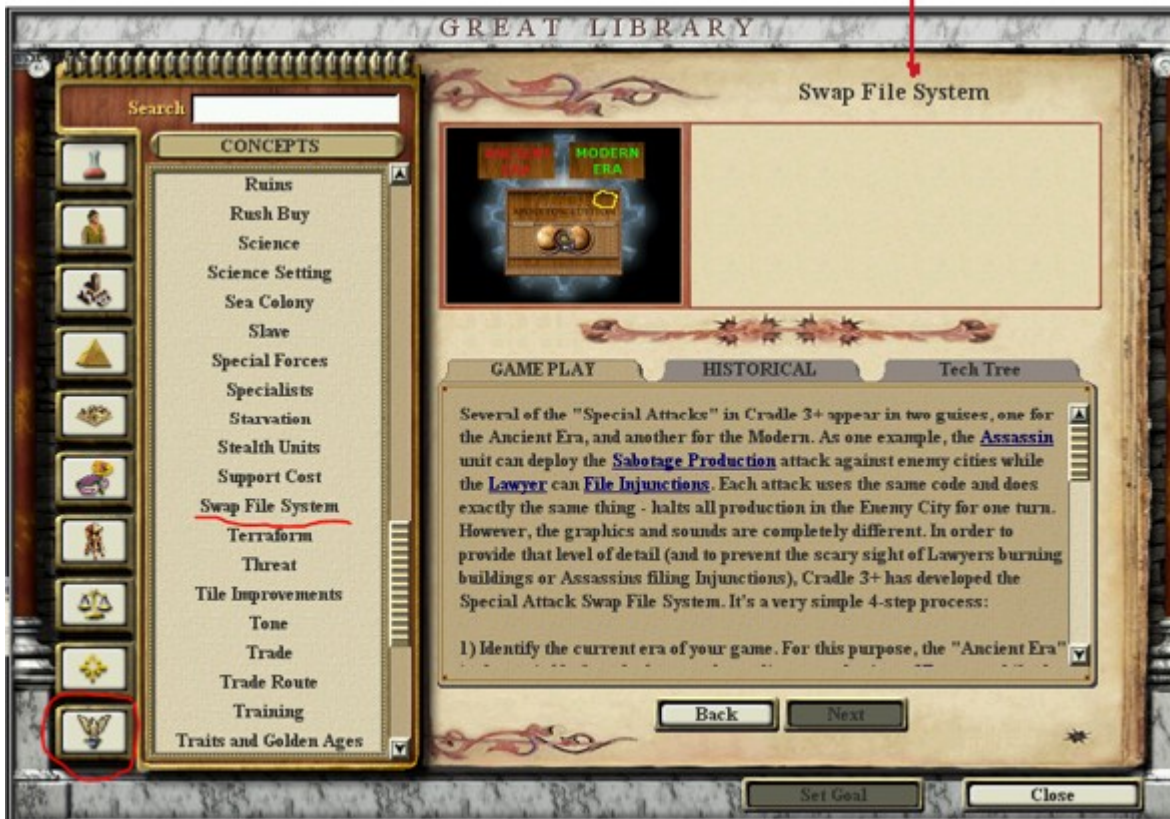
FILE SWAP MESSAGING: This does not refer to the special attack messages themselves, but rather the messages and visual cues which tell the player which File Set is active and when it's time to make the change.

- 1) The Main Menu will have a graphical indicator telling the player that files from either the Ancient or Modern Era are active (**see attachment - 1st pic**)
- 2) There is a message which pops up on T2 and tells the player that yes, you have the correct Ancient Era files or no, you are using the Modern Era ones and need to swap back. Since the "as-delivered" mod will start with the Ancient Era files already active, the latter issue would only occur when a previous game had moved into the Modern era and files were swapped, after which the player decides to start a new Ancient Era campaign. This message includes a message icon which also tells you which swap file is active (**see attachment - 2nd pic**)
- 3) There is a second pop-up message which plays after "Age Of Reason" is discovered, telling the player that it's time to do a file swap.
- 4) A new GL Concept entry describes the Swap File process, and each of the new messages has a "Library" button which pops open a window containing this entry (**see attachment - 3rd pic**)

FILE SWAP PROCESS: As the above section clearly indicates, although we've been talking about File Swaps which shift certain sounds and graphics from the Ancient to the Modern Era, the player ALSO needs to be able to transition from Modern to Ancient (for example, when starting a new campaign). Performing this task is extremely easy. The Cradle 5 directory contains two self extracting archives that will automatically copy the swap files into the correct directories. For the Ancient Era, just doubleclick the file called "Ancient.exe" (**see attachment - 4th pic**) and click the "Extract" button. And that's it. The Modern Era file swap works exactly the same, except instead you will doubleclick the file called "Modern.exe"

In closing, this process is ENTIRELY OPTIONAL. It is typically performed only once per campaign, can be done in any year, and - most importantly - is not necessary in order to play Cradle 5. Your game will not crash or fail in some fashion, but the "immersion factor" will be reduced if you are using the wrong set of files for your era.





111. AI Gameplay & Frenzy:

Eliminating CTDs is obviously important, but that couldn't be the "end state" for the AI. I spent a lot of time tweaking the unit build lists, AI personalities (more on this later), and AI priorities so the end result is that all civs are NOT carbon copies of one another. Inevitably there's a lot of visible commonality since all civs must choose from the same pool of unit sprites, but now some civs are more focused on religious units, others on diplomats, some more willing to explore than others, etc.

The one area where I couldn't move the needle involved AI conquest. AI civs certainly go to war with each other (more often than not) and are fully capable of invading enemy territory and waging stack-on-stack combat and pillaging. But cities rarely changed hands and there didn't seem to be much I could do to change that.

So, reluctantly, I took a look at the **frenzy.slc** file. Again I'll spare you the details, but eventually I settled on a modified version of "APOL_frenzy.slc" since the base file was presumably created to be at least somewhat compatible with the AE version of CtP2. But regardless of which file I chose, ALL frenzy files generate an enormous number of circular errors, and the only way to stop them is to disable the Debugslc setting in userprofile.txt. That is completely sub-optimal for mod development, but there was literally no alternative. Worth noting that Frenzy has the exact same errors in a "standard" AE game, so it's not something unique to Cradle - the frenzy code just doesn't play well with AE.

That said, eventually I was able to develop a working version of Frenzy (still requires "Debugslc=No") and played a number of campaigns. Enough to be quite confident in saying that while "Frenzy" does appear to make the AI more aggressive (some cities do change hands, albeit no more than two per playtest), that comes with FOUR downsides:

- 1) The biggest issue is that game turns start to take MUCH longer to complete. Having two minute "end turns" starting around 1800 BC is really awful, and it only gets worse. Admittedly it might not seem so bad during a normal game, but it makes playtesting EXTREMELY time consuming.
- 2) The Frenzy code inserts FAR more civilian units into military stacks than you would see otherwise, and that reduces the number of special attacks one might otherwise see per turn. You also don't see many Diplomats, Slavers, or Prophets traveling far from the homeland. They go after neighboring civs, but that's about it.
- 3) AI Map Exploration seems to be hindered. Ships continue to explore, but not as many or as far, and most are unoccupied. Meanwhile, Land Units rarely move too far from the homeland & border areas. Probably because the frenzy code is grabbing them and pulling them into stacks.
- 4) The AI is extremely aggressive with ALL civs, so embassies with other civs are rare, and they go to war with all their neighbors. It makes for a much less interesting game.

It's possible these results are driven at least in part because the "human" player is the Barbarians, and frenzy is primarily intended to go after a normal Human civ. Even so, I don't like a lot of what I'm seeing, especially since Martin Guhmann put a lot of effort into fixing the AI and explicitly said that Frenzy isn't needed with the SC fixes. In addition, it wouldn't be surprising if Frenzy and the SC AI are fighting each other, and thus making both of them less effective.

Another factor is that most of my games involve large continent size islands, and historically the CtP2 AI works better when cross-water algorithms are minimized. Potentially therefore, "more land" would help Martin's improved AI to function better. In the attached example, we see that Babylon controls most of the northern continent, and while Egypt was able to colonize the southern shore, they have already lost Amarna and would probably lose more cities if the playtest had continued.

*** **FINDING:** At this point, I'm pretty sure the modified "Frenzy" code is not going to cause CTDs, so I'll keep it as a deliverable with Cradle 5, but will NOT activate it in the default game settings. However, players that want Frenzy can easily activate it themselves by editing a single line in "script.slc".



112. Frenzy Revisited: After taking another look at the Frenzy file, I was able to identify the section of code which causes the slic errors (lines 244-250). It's supposed to identify the civilian units which should not be pulled into stacks, but we know from the previous playtests that the errors kept that from working anyway. Accordingly, I commented that section out and ran another playtest. The only noticeable benefit is that by 1800 BC (and continuing for the next 300 years until I ended the test) turns were only taking a minute and a half, which is about one minute faster. I was also able to run the test with the "Debugslic=Yes" setting, so that confirmed the errors have been removed.

As a "control", I removed Frenzy from the next playtest and ran that down to 1500 BC as well. Turns are definitely faster - about 50 seconds to go through all 12 AI civs. As with previous playtests, the absence of frenzy led to more special attacks and better naval searching. The most obvious difference is that - aside from Nomads - civilian units are not included in military stacks.

City conquests were absent from both playtests, but there are contributing factors such as fewer continents, lack of a "true" human opponent (both tests used the "human-Barbarian" process), and the larger garrisons one typically sees in the improved Source Code version. I'll continue to look for possible AI improvements, but at least for now the game is solid and the AI appears to be competent in most areas. This revised Frenzy file will be packaged with the download, but will not be part of the default game - I'll leave that choice to each player. Anyway, it's definitely time to get back to the other improvement options that have been on hold for months now.

113. Ten Improvements: Even though most of my recent attention has been focused on the "big issues" (CTDs, Special Attacks, AI performance), quite a few "small" improvements have been implemented along the way. Some were simple, others pretty extensive:

1) AI Leader Gender & Personality: With few exceptions, until recent times the vast majority of world cultures have been male dominated, and their actual historical "leader lists" reflect that. For every Hatshepsut or Semiramis, there are hundreds of males. This is especially true with a predominantly "Ancient Era" mod like Cradle. Given that one has only two choices for Named Leaders to represent each culture from beginning to end, it's highly inaccurate to pretend that there's a 50-50 chance that one of them was - or could have been - female.

Accordingly, I've selected two of the more famous male leaders from each of Cradle's 33 civs and altered the gender sections in "civ_str.txt" and "ldl_str.txt" so that all pronouns and other descriptives are male.

Additionally, I altered many of the AI personalities as well, trying to match Leaders with their personalities (as far as we know them). For example, Carthage is now led either by Hannibal or his real-life rival Hanno. Historically, Hannibal was focused on aggressive conquest and is thus a "Strangelove" personality in CtP2. By contrast, Hanno represented the group which wanted Carthage to focus on farming and mercantile growth in the North African hinterlands, and is thus a "Medici". In general, most of the Cradle civs will have similar personality dichotomies, so the strategies that your AI opponents follow will in large part be dictated by their personalities, and those can shift radically depending on which leader is selected.

2) History Sections: There are now History entries for ALL Units, Buildings, and Wonders in the GL. Roughly half existed in "vanilla" CtP2, but Hex removed all of them. Those have been reinstated along with quite a few borrowed & edited from AOM, and a large number of entirely new ones created to fill in the gaps. It's mostly a "nice-to-have" feature but those descriptions which apply to the "future" are actually quite helpful as they provide the "back story" behind those otherwise unfamiliar units and structures.

3) Heptireme becomes Quinquereme: While researching the historical background for various units, it soon became obvious that the "Heptireme" (or Heptere) was an extremely rare design, achieved by adding a second set of rowers to the Quinquereme (or Pentere). Heptiremes were just one of many odd designs employed purely by the Greek Successor states (those which grew from the splintering of Alexander's vast empire), but they were always few in number.

By contrast, the Quinquereme was the true Iron Age successor to the Trireme. Thousands of them were built and employed by a wide range of different cultures, and they ruled the Mediterranean for centuries. Accordingly, Cradle 5 will

replace the "Heptireme" with the "Quinquereme". This is a "name only" change as all the graphics and statistics will remain the same.

4) Trireme Movement: The movement points for this unit are 3, where-as the earlier Bireme is 5 and the subsequent Quinquereme is 8. Even the Coracle has 5. By contrast (and as you would expect), the attack/defend numbers improve incrementally from Bireme>Trireme>Quinquereme. Having such a disparity in movement points makes the Trireme almost useless, and there's no historical reason behind it, especially when compared to the other two. Accordingly I doubled the range from 3 to 6.

5) Visible Wonders: Visually speaking, there are two fundamentally different types of Wonders - those with an "on-map" tile improvement, and those without. The TIMPs are quite valuable, adding significant food, production and commerce increases to the tile on which they appear (**see attachment**), and that remains even if the primary Wonder Benefits expire. Accordingly, it can be helpful to know which Wonders have a Visible component, so all their GL entries have been updated with that information.

6) Globesat Wonder: While adding "Visible Wonder" text, I noticed that the late game "Globesat" Wonder uses the Shakespeare "Globe Theatre" TIMP. Which is really strange, since there IS a "Shakespeare's Theatre" wonder already in-game...and it doesn't have a visible wonder! Anyway, I made the fixes to mapwonders.slc, gl_str.txt, and tilimp.txt so the Globe Theatre is properly linked and now appears with the building of Shakespeare (**see attachment**).

7) Lighthouse of Alexandria: Speaking of Wonders, the "Lighthouse" could be constructed anywhere, including inland cities. Which is an odd location for a structure that was designed to assist Naval navigation. Anyway, there is a building attribute used by the "Battlement" which restricts it to coastal locations, and testing showed that it works equally well with Wonders! So now - appropriately - the Lighthouse of Alexandria can only be built in coastal cities.

8) Actual Building Everywhere: Several of the Cradle Wonders provide the powerful benefit of creating the effect of a particular building in all cities owned by the Wonder-owner. Thus "Valley of the Kings" puts a "virtual Apothecary" in every one of your cities, the "Great Wall" does the same with "Walls", and there's a few others which do likewise. This is controlled by the "BuildingEverywhere" attribute in the "Wonders.txt" file, but the downside is the AI can't process that information and will still construct the unnecessary building, even if it owns the Wonder.

As with many CtP2 bugs, a slic file was developed which prevents the AI from doing that, but there is a new attribute in AE which solves the whole problem. As the name suggests, "ActualBuildingEverywhere" creates the actual structure in every city owned by the civ which built the Wonder. It seems like a much better solution to the issue, plus it allows us to remove yet another slic file.

9) Garrison-to-Slave Ratio: In AE the AI is MUCH better at managing happiness in its cities, and thus I haven't seen any spontaneous revolts in any playtests to this point. The AI is also better at using slavers, and thus you see a lot more cities with slaves. In addition, AE is coded to "spread the slaves around", so you don't have just one or two border cities acquiring huge slave populations. And lastly, the new AI is VERY focused on maintaining large city garrisons, which means that Slave & Unhappiness Revolts in AI cities are extremely unlikely anyway.

Accordingly, it seems appropriate to revisit the following settings in "const.txt", especially since (given most of the above) they are more likely to benefit the human player than the AI:

* UPRISING_CHANCE_PER_UNGUARDED_SLAVE 2 # from 5

* SLAVES_PER_MILITARY_UNIT 12 # from 3

Clearly those settings make it much easier to maintain large Slave populations in Cradle than the base game. My initial thought was to restore the AE settings, but instead opted for more of a "middle approach" and changed the "uprising chance" from 2 to 3 and the "slaves per unit" from 12 to 6.

10) "Illegal Move" sound: One of the interesting game features is that when the AI performs certain activities (not all), the associated sound is played, even when it occurs somewhere hidden by the "Fog of War". This is actually quite helpful, as it gives an audible clue to the human player that yes, the AI now has active Slavers or Prophets, that Piracy has begun,

or that certain Diplomatic activities are underway.

The exception to all this is the "off-key piano chord" sound associated with an "Illegal Move". This was previously [reported as an annoying issue that gets worse as the game proceeds](#), and I can confirm that it REALLY gets old. Not only is the sound rather jarring, but actually - who cares if the AI tries to perform an illegal move? Even when the human player does it, sound isn't necessary since there's plenty of visual indicators that, no, you can't perform "action X". Anyway, sounds.txt has been altered so that SOUND_ID_ILLEGAL_MOVE is now "NULL.WAV", and the "end turn process" is now a lot less annoying.



114. Apologies for the long stretch of inactivity (between 12/19/22 and 2/2/23), but I was engaged on completing an important piece of a different, even larger project involving another game. With that submitted, it's time to re-engage here, and we'll begin with something that's fairly uncomplicated, but important in terms of adding depth and improving immersion:

City Names & Numbers: Cradle has 33 civilizations, and originally included 1163 cities (about 35 each). That's probably fine if you are playing on a smaller map or with a large number of civilizations, but on a gigantic map it doesn't take long before the names run out and you start to see cities with names like "Athens2" or "Rome2".

Exacerbating the problem is the large number of duplicate city names, which is almost inevitable when you have a variety of ancient civilizations occupying the same geographic region. For example the heartlands of Sumer, Babylon, & Assyria were all located in modern day Iraq, and historically they owned many of the same cities. And we see the same sort of thing with Shang/Han, Turks/Hittites, Rome/Etruscans, Greeks/Macedonia, etc.

Rather than address this as a single project, I've been "working the issue" from the beginning, usually dealing with one geographic group at a time, often prompted by the appearance of duplicates during the extensive playtesting periods. Anyway, I don't have a firm count of how many were eradicated, but it was a LOT! The most recent exercise involved the Byzantines, who shared city names with their early predecessor Rome, and also with geographic neighbors such as the Turks, Hittites and Arabs. 7 of 45 city names were duplicates (15%), and had to be replaced. At this point I'm confident that while some repeats have undoubtedly escaped discovery, they are few and far between.

As for the count of cities per civ, that was also addressed, often at the same time. Currently there are 1369 cities for an average of 41.5 per civ. In many respects the increase is even larger, because "popular" civs like Rome & Greece used to have only 35 cities, but now have 50 each. And most of the rest have also grown, from as few as 30 to 40 or 45. All of which improves the immersion factor.

115. Assassin/Poisoner: One benefit from letting a project sit for a while is that you come back to it with "new eyes", and sometimes what seemed like a finished project is ripe for a little tweaking. In this case, the **Assassin** and **Poisoner** units. Or more specifically, their names



As discussed in **Heading 28**, the original Cradle Assassin is a military unit who stomps around carrying a Sword and Shield, dispatching foes at the whim of his Leaders, and looking the very antithesis of a secretive "Assassin", operating unseen from the shadows. This is actually OK, because ancient rulers wielded near absolute power and most didn't seek to hide what they were doing. They employed brutal "Hired Thugs" to carry out their dirty work, and that is exactly what this unit looks like...and is now named as (see red arrow in the attachment).

With the advent of Monarchy, the **Hired Thug** is succeeded by the "Poisoner", who certainly has a stealthy appearance. But she lacked one important attribute - her Attack animation used a knife, not the "poison" implied by her name. But now that "Assassin" is available once more, she can be given that far more appropriate name, and in the process she can carry a blade and look a little more sinister in her unit picture (see attached).

116. Colony TIMP Bug: First, some background. In the original CTP2 game, there is an "End Game" victory option which involves building the **Solaris Project** Wonder along with two types of Buildings (**Gaia Computer & Power Satellite**) and a Tile Improvement (**Obelisk**). In Cradle, this project has been re-purposed as the **Birth of an Empire**, which essentially equates to setting up the Roman Empire and winning the game as a result. In the original versions of Cradle, the buildings were renamed (**Arch** and **Monument**), as was the TIMP (**Colony**), and they could be built regardless of whether the player owned the Wonder. The buildings have no ancillary benefit (in fact they add a great deal of cost), but the TIMP is quite valuable as it delivers an additional +10 to the food, production, and commerce values of the tile on which it sits.

The "Colony" build button becomes available with the discovery of "Civic Engineering", and that's where the "bug" first appears. Even when the player has the 7000 PW required to build it, the button remains "greyed out" (see attachment).



And the same is true even if the player builds the **Pax Romana** wonder (which triggers a possible "Birth of an Empire" victory). Interestingly, I found the same to be true in the base-line source code game - Obelisk buttons were not active even when the player discovered the pre-req Advance and had the necessary PW. Further research showed that the same issue affected the two associated buildings. By contrast, there was no impediment to constructing the buildings or the TIMP in non-Source Code CTP2 games. After a great deal of testing, I finally discovered the problem: The Source Code Team added an undocumented feature - the player **MUST** own the Solaris Wonder in order to unlock the ability to construct the associated buildings and TIMP. Going one step further, they added a line of code ("StartGaiaController") to the Solaris section in "Wonder.txt". Without that line of code (which was not present in any of the Cradle files), the player will **NEVER** be able to build any of the structures required for the "Birth of an Empire" victory. And adding it? Made the Bug go away! So, problem solved, right? Well, sort of.

As I noted earlier, any civilization could construct the buildings or the TIMP, even if they never built the Wonder, but that is no longer the case. These are now "Wonder-owner-only" buildable items, and there's no way to change that since it's hard-coded into the executable. Considered purely in the context of the base game's "Solaris Project", that is not a terrible decision since it prevents the AI from building structures which (absent the Wonder) provide little or no benefit. However it does hurt modding since (as we see in Cradle) it's possible that the buildings and TIMP could be given other uses. And doing this and **NOT** documenting it? Well, really unfortunate.

For Cradle 5 I've added the necessary code to Wonders.txt, which activates the Colony button for the wonder-owner (and not incidentally, makes it possible to achieve the "Birth of an Empire" victory). Additionally, as I discussed obliquely in Item 4 of **Heading 81**, the colony.slc file allows players to disband a Nomad/Settler and thereby build a Colony. This system still works as designed and does **NOT** have a "wonder-owning" pre-req but the coding is a little wonky and the player **REALLY** needs to understand the intricacies (now fully detailed in the Great Library) as otherwise it's easy to lose your Settler and get nothing in return. And as you might expect, the AI is completely clueless and cannot utilize this system.

117. Colony from Settler: As Cradle was upgraded over the years, one of the most recent improvements involved Colonies. In the original Cradle v3, they are a Tile Improvement like any other, which means they can only be constructed within city limits. And this limitation extended to those created by the disbanding of Nomads or Settlers. However, Cradle v4 added "fort-like" code so that Colonies now have a 2-hex vision component **AND** they have a 1-hex border on all sides.



As you can see in the attachment, a Nomad was disbanded 2 hexes outside the Etruscan borders, but once the Colony was built (inset), the Etruscan boundaries were extended. Given the high cost of building a Colony (and what it's supposed to represent), this is clearly the better approach, and will be adopted in Cradle 5. The "Disbanding Settler" mechanism still requires Civic Engineering and 7000 PW, but a Nomad is no longer lost when it disbands outside the national borders. In addition, once a player builds the Pax Romana Wonder and the Colony button activates, that too allows the construction of Colonies outside the civ's boundaries.

The slic code itself was pretty confusing, so that was cleaned up as well. Previously the player needed to have 12,000 PW available (even though only 7000 was used) AND the code required at least 500 Gold in the Treasury even though NONE OF IT was used, and in fact the code ADDED 1000 Gold when the unit disbanded. All of that has been fixed, and the Great Library updated accordingly.

118. City Specialists on the Tech Tree: The player can tweak the output of individual cities by using any of 5 different **City Specialists**, depending on the desired outcome. For example, if the player wants increased "Production", assigning one of the "Workers" to the role of "Laborer" (see attachment) generates additional Production (albeit at the cost of reduced output elsewhere). This all happens as part of the normal game code and I haven't changed any of that! However, each type of Specialist only becomes available once certain Advances have been researched, and as such they appear in the Tech Tree. In the old document, Specialists had the same icon as Units so it was a bit confusing as to whether, for example, a Laborer was much the same as a Hoplite. Anyway, Specialists now have their own icon so it will be easier to find them when looking at the new Cradle 5 Tech Tree (see inset).



119. Ulysses Grant Sprite: Another fairly small project, but I only recently noticed that the Ulysses Grant Wonder Unit had the same sprite used by the CtP2 Cavalry, basically a helmeted British Lancer (see attached). The CtP1 Cavalry sprite has a red uniform as well, but the broad-brim hat is more in keeping with a Civil War General (and in fact, a blue version of that is used for the Grant unit pic, see bottom of attachment). As with most CtP1 sprites, this one did not have the Idle animation (and thus had no movement), so it was disassembled and rebuilt. There are two animations (Move & Attack), comprising 120 images (plus another 120 shadow files), and a new Idle animation was created which uses 6 files that allow the horse to shake its head and tail. The only change needed was to reference the new creation in "newsprite.txt", and so the new Grant sprite is now in-game.



120. Goods Improvements (Gold): This was another one of those ideas which start off with a limited objective and then slowly grow and expand, folding in more "improvement opportunities" along the way. Earlier in the project, after making a number of changes to the graphics and even adding a few new Goods, I proclaimed those changes at an end and moved on to other things (see **Heading 40**). However, in the course of many playtests I couldn't help but notice that the "Gold Good" graphic was almost invisible when seen against the background of Alpine Mountain terrain (see attached).

The first idea was to substitute the "Gold Bars" sprite from Cradle 4, but that is actually a gold-colored version of the gems used by the Emerald Good, and in that context it didn't look very accurate. In addition, all the other metal goods in Cradle 5 have a more natural appearance (like handfuls of ore), so the gold "Bars" didn't match the other metals.

Of course that took us right back to the original problem, since granular piles of yellow ore aren't visible in Mountain terrain. Accordingly I tested the sprite with several other terrain types and determined that it looks best against the Brown Hill (Sand Dune) background. Which was a logical substitution since Silver was the second, "rare" good in that terrain, and it already was used as the rare good in Brown Mountain terrain. Problem solved, yes? Well not entirely....



121. Goods Improvements (Copper): The problem was - and I hadn't really noticed this before - but the "Copper" sprite appeared to be "more gold" than the Gold! Accordingly I created a new granular Copper sprite, using orange tones and mixing in a fair amount of bluish-green to give it a hint of the tarnish-look so common to copper. And as a final touch, I shifted the old Copper sprite to Gold. As you can see in the attachment (Gold left, Copper right), they clearly have a different appearance, even against the same background. So all's well....except for one thing. There was now a gap in the Mountain Good sequence.



122. Goods Improvements (Deer): For some time I'd been thinking about adding "Deer" as a new form of good. They have a long history as a food and trade resource, and exist in almost every part of the planet. But the best location for them would be "Forest" terrain, and that already had four Goods. However, one of those was "Bear" and that animal can be found just as frequently in Mountains as Forest, so.....suddenly it all came together. And now Deer can be seen and heard in the Forests of Cradle 5 (see attachment) while Bears stalk the Alpine Mountains.



123. Goods Improvements (Oil): Lastly, there was the matter of "Tundra Terrain". There's only one Good there (Caribou), but it seemed logical that Oil should be as well. In a purely Ancient Era mod there's a degree of sense in excluding Oil from that sort of terrain, but Cradle 5 has greatly expanded the opportunities in the Modern portions of the game, so it seemed appropriate to add Arctic Oil availability. But try as I might, the game would simply not display the new Good. Long story short, the "missing link" was found in the **terrain.txt** file. All terrain-types are listed there, and that includes enumerating the number of Goods available in each. And of course, "Tundra" was set to allow only one....but not anymore!



124. More Sprites: As a general rule, Cradle tries to avoid situations where different units use the same sprite. The exceptions are:

1) **"Elite Units"**, for example when "Spearman" is upgraded to "Elite Spearman". All of the unit stats, GL text and 2D art is altered but both units continue to use the same "Spearman" sprite. It's not optimal, but there isn't much choice given the limited number of "good" CtP2 sprites.

2) **"Wonder Units"** also frequently make use of sprites that are used by "normal" units, for example "Hannibal" uses the same sprite as the "War Elephant". This is even less of a problem because each Wonder Unit is both unique and rare, so consequently the player is usually well aware of their location and doesn't confuse them with the "normal" sprites. And, as with "Elite Units", these have different stats, GL text and most importantly - unique 2D unit art.

There were a few other cases, but those have already been resolved so that now the Patriarch and Televangelist have different sprites, as do Cavalry and the Ulysses Grant Wonder Unit, the various Pharaoh/Great King units and the Chariot, and a few others. However, there are two cases in which a total of 6 units share two sprites, but even worse - the 2D unit art is the same. Which makes it very difficult to tell one from the other without seeking out the text descriptions.

The good news is, all 6 units now have 6 different sprites AND all the text and 2D art is different as well. So let's go through them, beginning with....

125. Plunder I - The Goat: As discussed in **Heading 37**, several of the Cradle Wonder units have the ability to generate "Plunder" after winning a battle. There are 4 different Plunder Units, but all of them used the CtP2 Settler sprite and the 2D art associated with it. Again, there's nothing inherently wrong with that, but it was a bit confusing, and since each Plunder unit is "era-specific", it makes sense to look at them individually in the context of the era in which each becomes available.

The earliest is **Plunder I**, which appears until the discovery of "Copper Smelting". Historically, this was a time when armies were largely composed of poorly trained peasants, and Plunder was whatever they could glean from the surrounding countryside. Of those, the most desirable items would be small or easily transportable. And in that sense, nothing could be more useful than livestock of the sort they knew intimately in their civilian lives. Something like a herd of Goats.

Which is the new sprite which represents the "Plunder I" unit. This is an "all direction" sprite (thank you, [Sketchfab](#)), so while there's no moving parts (well beyond my skill level), the goats point in all directions they travel, and you'll hear them trot and bleat as they move.



126. Plunder II - The Captive: Most Plunder units are disbanded in one of your cities thereby providing a Production Boost (i.e. additional shields) to whatever is under construction. But from Bronze Working until the advent of the Dark Ages, you will receive **Plunder II** units which are "Captives" - not Slaves - and as such when this unit is disbanded it provides new citizens to the city.

Thinking historically, what sort of person goes from captive to citizen in this time frame? And the answer is that while captives typically became slaves, most of the women - whether as wives or slaves - produced children who DID become citizens (a class of perpetual slaves was usually not a feature of this era).

Representing these women is the **Mistress** sprite from the "Forever Future" mod (see attached). As you may recall from **Heading 28**, that mod already provided the female sprite for the new **Assassin** unit and they do so again here. Like most sprites developed for Ctp1, the Mistress did not have an Idle animation and thus had no motion, so the sprite was deconstructed (108 images, no shadows) and a 4-image Idle animation was created in which she leans forward seductively. After adding several appropriate sounds, new 2D artwork and an updated GL record, the unit is now in-game.



127. Plunder III - The Cow: Back in the mists of time (i.e last summer), my exploration into the mysteries of Sprite Development began, and the first unit to fall "under my knife" was the CtP2 "Cow" unit. Apparently the game developers intended to include "cattle rustling" as a game feature, but the whole concept landed on the cutting room floor, and the only tangible benefit was the inclusion of the cow sprite, along with a document which used it as part of the tutorial on sprite building. The unit did not appear in the game but was beautifully designed with lots of great movement. But - as you can probably guess - there was no Idle animation. Long story short, that was fixed and the lessons learned helped enormously as I delved further into sprite deconstruction and creation. But otherwise, the unit remained unused until now.

So why now? Well, **Plunder III** encompasses the Middle Ages (from Chivalry until Trade Guilds) and while armies might have more professionals than they did way back in the earliest of ancient eras, "Plunder on the hoof" has never gone out of style, as there's nothing easier to confiscate than items which can follow you home under their own power (and can browse for food along the way). Since Plunder III generates more production when disbanded, that calls for a more valuable creature, and the "Cow" certainly fits that description (see attached).



128. Plunder IV - The Truck: In the Modern Era (beginning with Economics), the **Plunder IV** unit appears. As we see even today in the Ukraine, invading armies rely on vehicles to spirit off their loot - specifically, the "Truck". I looked around for a good truck unit in the various CtP2 mods, but the only ones in existence used a single image. Once again, Sketchfab came to the rescue and I was able to build an "all-direction" sprite using screen captures from a 3D model of a military 2.5 ton truck (see attached). Zooming in on the same model also provided a slightly larger version of the vehicle which worked nicely for the 2D unit art.

Sounds were also necessary, and here [Pixabay](#) saved the day. There's a ton of audio clip sources out there, but most of them force you to jump through hoops before making a clip available. Pixabay conversely makes it easy to find and download the sounds you need - in this case a truck in motion (Move), crashing (Death), and even a nice "Engine Start" (Acknowledge).



129. Settler Sprite & 2D Art: Now that all four Plunder Units have their own unique sprites, the **Settler** Sprite and Art can be reallocated back to the Settler Unit (which currently uses the "Nomad" Sprite and Art). Previously it was a bit confusing during the game when the player transitioned from building Nomads to Settlers, since both units were identical (including the 2D unit art). Fortunately in this case the Sprite and 2D art already exist, so the change was very simple. In Newsprite.txt the Settler sprite shifted from "111" to "2" while in Uniticon.txt the graphic links changed from "upup111*.tga" to upup002*.tga. And that's it!

This series of improvements means that the group of units which once shared a pair of sprites now have 6 unique sprites and sets of 2D art.



130. Replacing the Scout Unit: Cradle 3 (and later, Cradle 4) feature the **Scout**, a very useful unit that is available right from the start (with **Toolmaking**). The Scout is stealthy and cheap, and is the perfect unit for exploring the map, since the stealth features mean that an encounter with wandering Barbarian units is usually not fatal. However, despite all the pluses, there are a number of issues:

- 1) The unit does not have Attack points, but it's not actually a civilian, so other civs view any territorial incursions as a military violation and your diplomatic relations suffer accordingly.
- 2) Scouts cannot be expelled, which means they have to be tolerated unless you (or the AI) want to start a war.
- 3) Because they are so cheap, the human player inevitably will build quite a few of them to use as "stealth border defense", since they can spot incoming stealth units from other civs. The problem is that the AI is really good at deploying Stealth units but using "Scouts-as-Stealth-Defenders" is an easy counter. Even worse, this defense tactic is used by the human player, but not the AI.
- 4) Eventually the Scouts upgrade, but when they do, it is to a military unit (Javelin Cav) and the AI immediately uses them offensively against any civ whose borders they happen to be within. The sudden transition from invisible Explorer to military Attacker doesn't make a whole lot of sense, and it results in wars between civs who otherwise were getting along fine.
- 5) The sprite is the CtP2 "Zulu Warrior", who is carrying weapons. A really minor point of course, but it's misleading to see an armed sprite that is actually defenseless.
- 6) Historically there's also the issue that a unit with these capabilities has no counterpart in the dawn years of the Ancient World. "Secret Military Explorer" simply wasn't a "thing" in pre-Dynastic times, and using the same unit to detect enemy stealth units is even less accurate.

For all those reasons, I've been playing around with this concept from the very beginning, but could never come up with a solution which addressed all the problems. Five different alternatives were plugged into the test bed at various times, but none of them could solve every issue. I'd even considered just dumping the "Scout" altogether, but MOST of the fun during the early game comes from map exploration, and I wasn't keen on making the game LESS interesting. Anyway, it eventually hit me that there WAS a historical path available, a suitable sprite existed, and the CtP2 game mechanisms could be tweaked to emphasize the desired characteristics while removing the problematic. Accordingly, in Cradle 5, the Scout unit is now replaced by the **Emissary**.

131. The "new & improved" Emissary Unit: Looking at the same list of "problem issues" which beset the **Scout**, here's how they play out with the **Emissary**:

- 1) The Emissary is a civilian unit, and as such is not seen as a threat by other civs.
- 2) It can be expelled
- 3) There is a marginal increase in cost (from 90 to 110), but the biggest change is that while the Emissary is stealthy, it cannot SEE other stealth units. Thus it keeps the survivability feature so helpful in Exploration, but does not have the unrealistic "Secret Police" aspect which made them desirable as border defenders.
- 4) The Emissary gains the "Investigate City" special attack, which is appropriate for a unit whose primary purpose is Exploration. In addition, this also aligns with the new upgrade path to a similar civilian unit - the **Diplomat**.
- 5) As described in **Heading 98**, the Cradle 3 **Trade Emissary** (the CtP1 Diplomat) was removed when it was discovered that the "Franchise" mechanism was broken. Accordingly, that sprite (armed only with a scroll) is now available to fill this new role.
- 6) Lastly we come to the issue which is most important to me personally. Desirable game mechanism aside, what is the historical basis for an Exploration-type unit at this point in time? As outlined in its new Great Library entry, *"the Emissary is a unit who carries out the earliest form of ancient diplomacy. Long before resident diplomats were assigned to other nations, rulers would send "gifts" to one another, which - despite claims of being tribute - in most cases were actually a form of elite-level trade. In the process of moving from place to place, these emissaries took the opportunity to explore the regions they traversed and would report their findings when they returned home."*

As that implies, historically "Emissaries" carried out both a trade and a diplomatic function, and this was helpful when it came to determining an appropriate Advance. Scouts were available with **Toolmaking**, but there's no obvious connection between that and this new unit. In fact none of the early advances (those without pre-reqs) seemed like a good fit.

Fortunately there was not a "Level One" Advance in the Economics group, so a new one has been added - **Exploration** (see attached) - and thus the Emissary is buildable very early in the game.

The final task was to run playtests with this new set-up, the last of which ran down to 2550 BC. In that game, 7 of 12 civs had built Emissaries (anywhere from 3 to 5 each), and many of them were sent to border regions and beyond, including quite a few being carried off in Coracles. There was even one instance of an "Investigate City" sound, so the AI is able to use the new skill. In every case, the civs which built Emissaries also deployed **Prophets** and **Slavers**, so the new unit is not taking the place of these more valuable Special Units. All-in-all, a good result.



132. Hero Promotion Bug: As I reported back in item 11 of **Heading 81**, "elite.slc" is an important Cradle file since it contains the code which upgrades eligible units into their "Elite" counterparts, along with Elite-to-Hero and Hero-to-Great General. However there was a nasty bug which allowed one promotion from **Hero** to **Great General**, yet all further "Hero Promotions" killed the Hero but did not give you the Great General. I couldn't see anything obviously wrong with the slc code, but didn't know how to pursue it further.

Anyway, recently I've been working on a different project, part of which necessitated some changes to the elite.slc file, and decided to take another look at the "Hero Bug". A lot of the Cradle slc code comes from similarly named files in AOM, so this time I decided to compare the two files, and immediately spotted something interesting.

In AOM, the code is identical to Cradle right up until the point where it uses "KillUnit" to remove the Hero Unit. After that however, it has 8 different promotion possibilities, starting with "if(HeroChance==1){}" (the same code used by Cradle), but then runs through SEVEN other possibilities from ==2 thru ==8. In fact, the code appears to be designed so it only works 8 times, after which it stops. That's why in Cradle it's always successful the first time, because HeroChance starts off as "1" and increases incrementally from there. In Cradle however, the only choice is "1", which means that every subsequent promotion has a number of 2 or higher, so it does NOT create the new unit after destroying the Hero! Thus all the "HeroChance" code is not required in Cradle, since the whole purpose in AOM was to create 8 different kinds of Generals based on the sequential increase in the HeroChance value.

Accordingly, the next step was to alter the code so that Hero *Promotion-to-General* is IDENTICAL to Elite *Promotion-to-Hero*. For test purposes I made that change and also improved the chance of promotion and then used cheat mode to run 40 battles (mostly 3 on 2) in which every one of my armies had at least one Hero. The result was 6 promotions to "Great General" (see attached), and all of them worked. So the "fix" is a success, and that's one more bug banished forever.



133. Altering the CtP1 Pikeman: This unit is very similar to the **CtP2 Pikeman**, but has several noticeable graphical differences. The CtP1 unit has orange sleeves, pants and a white neck-cloth while the CtP2 version has blue sleeves, pants and a black neck-cloth (and greater detail on the armor). However both carry the same weapon and use it the same way. Which suggested an interesting idea.

The fact is that neither unit carries a true pike. Like the "sarissa" carried by the Macedonian Phalanx, the pike is a long spear which is designed to keep cavalry at a distance. And in fact, neither of the CtP pikemen are carrying pikes, but rather "halberds", which are similar weapons except they have an axe blade and a hook near the tip; adaptations designed for hacking off the limbs of enemy knights and pulling them from their mounts.

Interestingly, the halberd was an invention of the Late Middle ages whereas the pike has antecedents stretching back into ancient times. Accordingly there is an opportunity to have both a pikeman and a halberdier in-game, and to have one available very early while the other arrives much later in the Medieval era. I'll explore those ramifications in a subsequent post, but for now let's talk about the process of turning the CtP1 Halberdier into a true pikeman.

There are two animations (Move & Attack), comprising 96 images (plus another 96 shadow files). I opened each image and edited out the axe-head and the hook, turning the halberd into a pike. Likewise I edited the CtP1 unit card and did the same thing (see top image in the attachment). The attack still used a "chopping-and-then-stabbing" animation, so I edited the sequence, and now the CtP1 pikeman assumes a "crouching-and-stabbing" position and maintains that throughout the entirety of a battle action. As you can see in the bottom two images of the attachment, the CtP2 "Halberdier" has a completely different attack animation, so there's no confusing them, even when they encounter each other in battle.

Lastly, the CtP1 unit did not have an Idle animation (and thus did not "walk" when moving across the map), so I added a small sequence in which the unit fidgets with its pike, and now the new CtP1 Pikeman is a fully functional sprite.



134. Revised Medieval Unit structure: As part of the Military Unit reorganization (see **Headings 33 and 34**), the **Man-at-Arms** was chosen as the Medieval-era "cannon fodder" infantry unit. At the time that seemed like a logical choice since the sprite represented an early Medieval Northern European armored axeman of the sort one might encounter during the Dark Ages. The only other choice was the CtP2 **Pikeman** but his halberd weapon clearly came from a much later era. However, the choice was still troubling. The Man-at-Arms is heavily armored, which is the antithesis of the poorly armed infantry one would expect to see in this role. And even his very name is often used as a synonym for "knight". However, the conversion of the CtP1 Pikeman into a spear unit (see Heading above) changes the dynamic completely, and allows for a number of game-play improvements. Let's go through them, one-by-one:

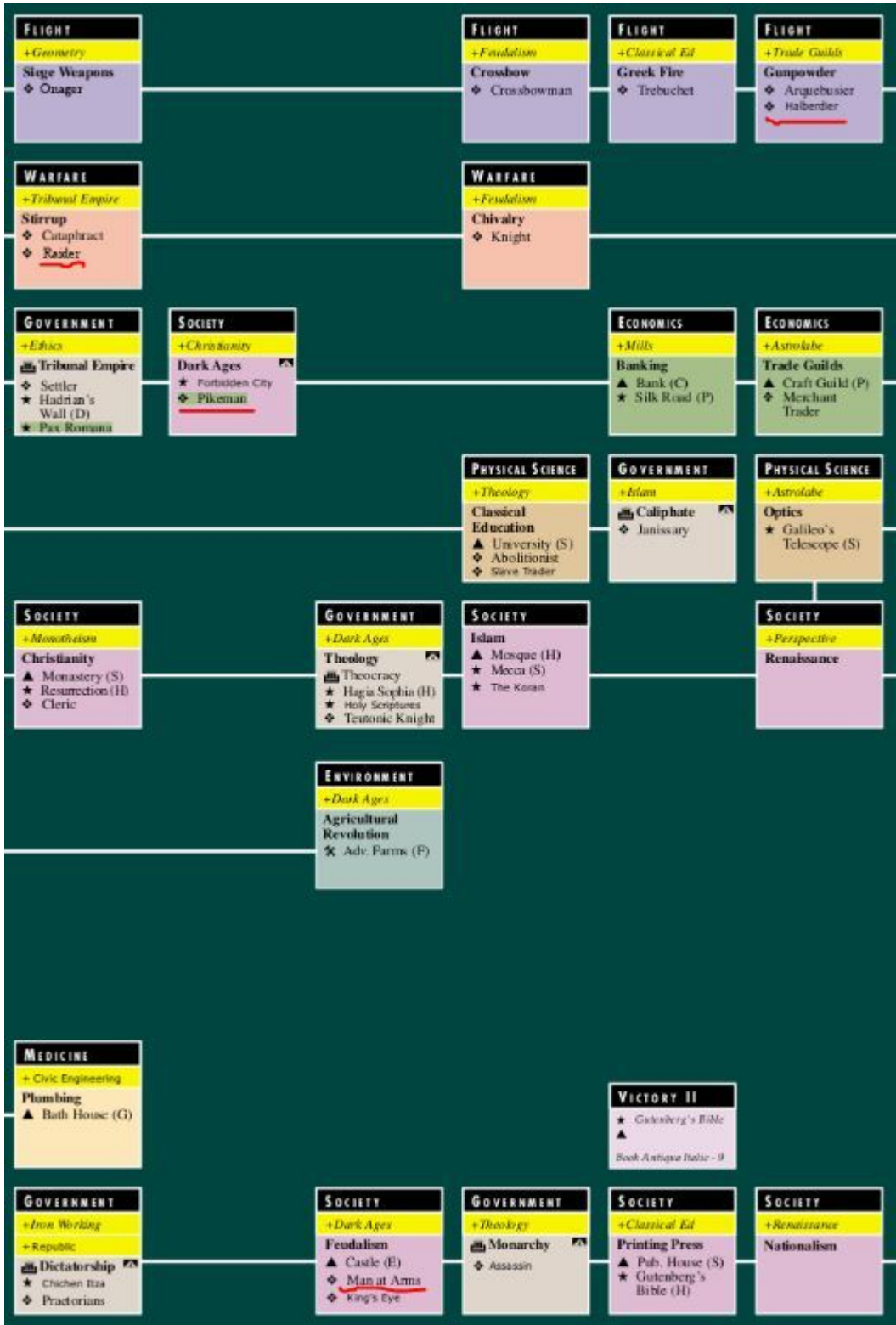
1) Pikemen: The new Pikeman sprite is the logical successor to the Man-at-Arms as the generic infantry unit available with **Dark Ages**. It's probably a bit early for a unit which looks like this, but it uses an old technology which is not much different from the Phalanx (except obviously in tactics). In the initial Cradle 5 system, the stats for Man-at-Arms were significantly reduced in order to be more of a logical upgrade from Spearman, so they will be assigned as-is to the new unit.

2) Pikemen Militia: The Medieval Militia Unit was the Man-at-Arms, but with Pikemen becoming the new "basic" unit with Dark Ages, that also means replacing the Man-at-Arms Militia with Pikemen Militia. No change to any of the stats.

3) Halberdier: The CtP2 Pikeman will now become a new unit, the late Medieval **Halberdier**, which historically was an improved type of pikeman and carried a weapon specifically designed to deal with mounted knights. This unit will fit into a new upgrade path which progresses as follows: **Spearman > Pikeman > Halberdier > Infantryman**. Under the old system, the Man-at-Arms was still prowling the battlefield into the early Modern Era, but the upgrade to Halberdier (with the discovery of **Gunpowder**) is a better fit, since historically they DID co-exist with primitive matchlock infantry of the **Arquebusier**-type. Also, none of these units are "disbanding", so we can chain the availability-to-obsolescence Advances together (and even have gaps) without any worries.

4) Man-at-Arms: As noted above, the Man-at-Arms sprite has the look of a Viking-style armored axeman, and would have been available around 900 AD. Accordingly it will be associated with the **Feudalism** advance, and the stats will revert back to those in the original Cradle 3. The Pikeman unit it replaces was gov-specific and available only to Monarchy and Theology, but some changes are needed. In order to build this with the discovery of Feudalism, it has to be available under **Tribunal Empire**, or it can't be constructed before the other two govs are discovered and implemented. Fortunately there is a solid historical analogue in the "Varangian Guard" (axe-wielding Northmen employed by the Byzantine Empire), so it's clearly appropriate as a "Late Empire" unit. And thus definitely a "disbanding gov" unit, and NOT a "special". That also means it cannot upgrade but it can be promoted to Elite, and will become obsolete with Caliphate. Lastly, we'll remove the "bonus vs. mounted" attribute, which isn't appropriate for a unit bearing an axe of this sort.

5) Raider: All of that looks good, but it highlighted the previous (and continuing) inconsistency in Gov-specific unit allocations. The reality is that even this new set-up provides two Gov-specific units to **Theocracy** (Teutonic Knight & Man-at-Arms) but only one for **Caliphate** (Janissary). The previous "work-around" was to make it theoretically possible for the Caliphate to employ the Raider unit, but it was a kludgy mechanism and unlikely to work in-game. However, with all these changes it makes sense to revisit the Raider, and the solution is to change its expiring advance from Feudalism to Gunpowder. That way the Raider will still disband if the player implements Monarchy or Theocracy, but it will be buildable again if the player changes govs to Caliphate. Kind of unusual for a unit to disband and then come back, but it DOES work, and solves the "units-per-Gov-type" discrepancy.



135. Three fixes: It's been a while since the last update (no posts between 5/14/23 and 7/19/23), so I'll begin with two minor fixes and a gameplay enhancement:

1) Settler & Patriarch appear as "Land" Units instead of "Special":

- Oddly enough, two civilian units (Settler & Patriarch) appeared in the Editor as "Land" units instead of "Specials", making them the only civilian units to appear in this category. In normal play, this isn't an issue but it was curious and I couldn't figure out why at first, but eventually spotted the issue.
- Both units are civilian, but they also have "Attack" values of "5"! Now why they were set up that way I don't know, but the values are tiny and unlikely to ever be useful offensively, since there's nothing they could defeat in battle. Also, they are the ONLY civilian units with attack values greater than Zero. Additionally, the presence of an attack value *might* affect the way in which the AI analyses these units and/or uses them in-game.
- Anyway, I can't think of any positive benefits and LOTS of possible negatives, so both units had their Attack values reduced to Zero.

2) War Elephant (name change):

- A really minor point, but the "Elephant Warrior" unit has a poor name. Historically these have always been known as "War Elephants", so the unit name has been changed.
- The Code name (UNIT_ELEPHANT_WARRIOR) appears in 8 files, so rather than change them all, the easier fix is to alter only the visible text, which means changes to gl_str.txt and Great_Library.txt

3) DiffDB.txt Revisions:

- After creating the new Exploration Advance and adding it to "DiffDB", I noticed that the human player never had to research it as the Advance was always granted at game start (like Toolmaking, and several others). The concern is that the game moves pretty fast through the eras as it is, so gifting lots of advances just accelerates that. Giving the AI a research bonus is fine, but extra advances is maybe a step too far (especially at the lower difficulty levels), and certainly it's worse to do so for the human player.
- This particular file controls the benefits provided when selecting one of 6 difficulty settings at Game Start (from "Beginner" to "Impossible"). There's a large number of variables here, ranging from pollution factors to the number of starting units, but for this exercise I was only concerned with the chances of being given new Advances at game start. These factors are different for the human player and the AI, but even on "Impossible", the human player had a 100% chance of gaining two advances, and fairly high probabilities on others. And while the AI had better chances, they weren't dramatically better.
- Accordingly I tweaked the "Advance Award Chance" settings at all difficulty levels except beginner, and now there's a much smaller likelihood of the Human player being granted freebies while the AI has significantly better odds at Impossible, but these chances decrease in a systematic way as difficulty levels drop (which wasn't always true before).
- I've run several playtests with the new levels and it DEFINITELY has an effect. The impact at each difficulty level is noticeable, and "Impossible" - for once - probably is.

136. Administrative Note: Given the lack of objections from the mod creator, and in recognition of the fact that this mod has long surpassed anything that could be considered an "incremental" upgrade to Cradle 3 (not to mention that "Cradle 3+" is the name **BureauBert** assigned to his "Source Code compliant" version of Cradle), then it's clearly time to start referring to this mod as "**Cradle 5**".

That's going to require a few file changes in the mod (not a big deal), but the documentation (mostly a cleaned up and reorganized version of this thread) is going to need a lot more, lol!

137. Seven Ancient Wonders of the World: As I indicated during the earlier discussion with Hexagonian, the next big project involved adding a number of new Visible Wonders. Since Cradle is an "ancient era" mod, the primary impetus was the desire to have a complete set of on-map graphics for all of the "Seven Ancient Wonders of the World". Cradle 3 already had four of them:

- **Pyramids of Giza**
- **Hanging Gardens of Babylon**
- **Lighthouse of Alexandria**
- **Statue of Zeus at Olympia** (in game terms this is represented by the Temple containing the statue)

The three missing Wonders are (or were):

- **Temple of Artemis at Ephesus** (see attachment, center left)
- **Colossus of Rhodes**
- **Mausoleum of Halicarnassus** (see attachment, bottom right)

Although two of those exist in Cradle 4, the til file for that mod is not editable so I had to re-create the 3D graphics, but at least the 2D art and the text descriptions were available (some of it borrowed from AoM). As for the Mausoleum, it wasn't present in any other mod, so everything for that had to be researched and created from scratch. Included in this exercise was the development of three new movies and updates to the new Tech Tree. Also worth noting that - as with the "Lighthouse" - the Colossus can only be built in seaside cities.

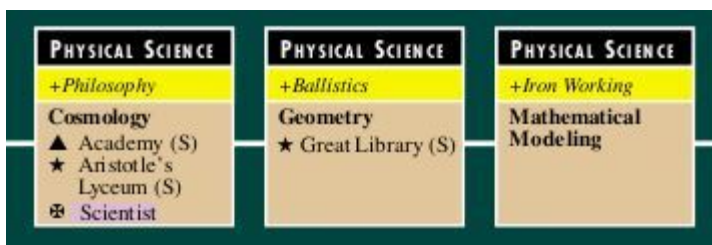
As for pre-reqs, the enabling Advance for Colossus is **Iron Working**, the same as it was in Cradle 4. Artemis however was linked to "Architecture", which is a problem because that Advance already grants four other benefits, so in Cradle 5 the Advance has been changed to **City State** (it was, after all, built in one). Mausoleum has been assigned to **Oligarchy**, since in many ways this structure represents the sort of personal glorification that was (and is) the hallmark of Elite governance.



138. Revised "Physical Sciences" Advance: Although not an official "Wonder of the World", it seemed appropriate that in a game whose help file is called the "Great Library", that the real **Great Library of Alexandria** deserved a place of its own. As with the others, this required the development of a 3D on-map graphic (since it is a Visible Wonder) along with 2D art, text and a new movie. The enabling Advance in Cradle 4 was Geometry, and that has been retained.

However, that caused me to take another look at the Tech Tree, specifically the "Physical Science" series of Advances, and in particular the sequence of "*Alchemy first, Geometry second*". By any measure, that is a strange choice for the Ancient era since **Alchemy** is usually associated with the Medieval-era pursuit of the "Philosopher's Stone" (i.e. the failed attempts at turning base metals into Gold). Accordingly it has been replaced with **Mathematical Modeling**, which reflects the Ptolemaic developments in 100-200 AD. This also requires moving **Geometry** back one space, as it was discovered and refined during the earlier classical Greek era and was a precursor to Ptolemy's efforts. With that, several changes are needed to other Advances:

- **Iron Working** currently requires Alchemy. Change this to Geometry.
- **Siege Weapons** currently require Geometry. Change this to Iron Working (since the Onager was an Iron Age siege engine)
- **Hullmaking** currently require Geometry. Change this to Iron Working (the Quinquireme was an Iron Age vessel, so this also makes sense)
- **Classical Education** currently requires Geometry. Change this to Mathematical Modeling.
- **Civic Engineering** currently requires Geometry. Change this to Mathematical Modeling.
- **Chemistry** currently requires Alchemy, which was completely redundant since Alchemy was 4 Advances earlier in the same "Physical Science" chain. Anyway, **Gunpowder** is a better pre-req.



139. Wonders - In addition to the four new Ancient Wonders discussed above, quite a few other changes were made in this area:

1) Temple of Zeus to Philosophy:

- "Masonry" has two Wonders, two Buildings, and a TIMP, which is a lot to get from a single Advance. Of these, the Temple of Zeus Wonder doesn't have anything to do with Masonry (its fame came from the golden Statue within, not the building which housed it), so it has been moved to "Philosophy", which only had one associated benefit (the Cyrus Cylinder wonder)

2) New art for Lighthouse of Alexandria: The Cradle 3 Lighthouse is a Visible wonder showing the correct building sitting in what appears to be a small lake. The Cradle 4 image is superior, but can't be pulled from the til file. Despite that limitation, editing the on-map image from a Cradle 4 game provided the improved image I was looking for, and it's now part of Cradle 5.

3) Olympics to Bronze Working: This wonder was originally associated with "Drama" (which already has the Ramayana Wonder), and although there is a certain degree of historical linkage to that Advance, "Bronze Working" is a better fit (where it appears along with the "Hoplite", which seems more appropriate).

4) New art for Hagia Sophia: I previewed a new piece of art back in **Heading 73**, but it was still based on the look of the structure after it had been converted to a mosque. The new image is based on descriptions of the original Christian church (see upper right of the attachment).

5) New art for Hadrian's Wall: The current image is a generic wall, whereas the new one is based on a reconstruction of a section of the actual Hadrian's wall (see lower left of the attachment).



140. Wonders - Continuing our review of the many changes to the Cradle 5 wonders:

6) Great Wall: A few issues here. As noted in item 19 of **Heading 81**, even though this was not a Visible Wonder in Cradle 3, it still had a large coding section in mapwonders.slc, and that was generating EVENT errors. I recently identified and removed the offending sections of code (no more errors), and was still able to have it appear on-map as a Visible Wonder. The existing art in the til file was poor (a mirror image of the incorrect Hadrian's Wall), so I created a new piece of 3D art, again based on images of the actual structure.

7) New art for Mecca: The art for this visible wonder is a weird mix of Dome of the Rock and an Egyptian temple, but the 2D art and text descriptions refer to the structure at the center of the mosque complex, the building known as the **Kaaba**. Accordingly, I was able to create a new set of art, which looks a lot more accurate (see attached).

8) Great House Wonders: None of the eight "Great House" Wonders were linked in the Great Library to the Advance which makes them available, nor were they listed on the Tech Tree. The links have all been added to the GL, but rather than using text descriptions on the Tech Tree, I've added a "pyramid-like" icon to every enabling Advance, so all 8 are easy to spot (see inset on the attachment).

9) Taj Mahal: The number of "mid-game" wonders was lacking in Cradle 3, so adding the Taj Mahal was kind of a no-brainer (especially since the 3D art already exists in the til file). Cradle 4 included it too, but made it available with "Gothic Architecture", which just sounds strange. Instead, it's now available with "Perspective", which is only one step down the line and doesn't have any associated benefits. This is another new visible wonder, and features new 2D art, text, and a new movie. For the record, adding a new Visible Wonder requires changes to these files:

- * tileimp.txt
- * mapwonders.slc
- * gl_str.txt
- * great_library.txt
- * Wonder.txt
- * uniticon.txt

10) Eiffel Tower: I liked the idea of a new "Industrial Era" wonder (there aren't many), and again the 3D art was already present in the til file. The enabling advance in AOM (this wonder is not present in Cradle 4) was "Electricity", and that will stay (although the cost and benefits have been reduced so they are more in line with other wonders of this era). This too is a visible wonder, and features new 2D art, text, and a new movie.



141. Revised Crossbowman: Cradle 3 (along with most other mods) uses the sprite created by **Immortal Wombat** for the medieval era crossbowman. It's pretty well made, and has the vibrant colors one would expect to see from an Italian mercenary crossbowman of this era. Unfortunately it's about half the size of most other infantry units (see inset, upper right of attachment) and has a strange walking motion where the crossbow is held up in the air and waves from side to side (the latter problem was actually invisible until I added the missing Idle animation, LOL!)

Fortunately the CtP1 "Forever Future" mod has an interesting Crossbowman which is the correct size. It appears to be a modified WW1 British infantryman (so the colors are a bit too drab for this era), but the crossbow animation works perfectly during battle sequences (see lower portion of attachment), and the helmet is exactly correct for a medieval-era English crossbowman (see circled 2D unit pic).

This sprite was also missing an Idle animation, but it was easy enough to add (giving the unit full motion in all directions). The new unit is now in-game, but for those who might wish to use the original IW sprite, it's an easy fix:

1) newsprite.txt: Delete the entry which reads "SPRITE_CROSSBOWMAN 187" and then remove the ## from the "SPRITE_CROSSBOWMAN 188" entry

2) uniticon.txt: Find the "UNIT_CROSSBOWMAN" entry, which has four references to upup187*, all of which will change to upup188*

To clarify, the new FF Crossbowman is already activated, so the above instructions are only needed if you wish to replace it with the original.



142. Two New Buildings: With the addition of the "Dynastic House" (see **Heading 3**), Cradle 5 reached the hard code limit of 64 buildings. Or at least that was the limit as described by one of the CtP2 developers, but Martin Guhmann looked a little harder at the code, and [added this caveat](#):

"Actually there is no database limit for buildings or wonders, it looks like the problem is that there is a limit of buildings a city can own, you can build the additional buildings but the city won't get them."

That's very interesting, because it suggests that additional buildings ARE possible. Specifically, in Cradle 5 two of the buildings ("Capital" and "Dynastic House") are restricted to just one city (the capital), so if there was a way to exclude two other buildings from that particular city, it would open additional building slots everywhere else! Fortunately the Source Code team added a new flag, "ExcludedByBuilding", which prevents a building from being constructed if another is present.

The most obvious candidates for exclusion are the "Arch" and "Monument", which are of limited use anyway, since they can only be constructed by the civ which builds the "Pax Romana" wonder ([as described in Post #155](#)). So in "buildings.txt", both structures now contain this flag: **ExcludedByBuilding-IMPROVE_CAPITOL**. That means we now have 66 building slots, and after due consideration, the extra ones have been assigned to a pair of late-game structures that were part of the baseline CtP2, but excluded from Cradle 3 & 4.

Edit: There is NO WAY to exceed the 64 building limit (see **Heading 170** below for details) so the method described above does not work. That said, the two new buildings (below) have replaced others and are still part of Cradle 5.

1) Matter Decompiler: A very desirable addition, given that Cradle still had the "Central Matter Decompiler" Wonder, which grants this building to each city owned by the wonder-building-civ. Thus kind of odd that (until now) no other civs would be able to build the individual structure. Also, it seems likely that we'd see errors of some sort from a Wonder which tries to replicate the effect of a building which is NOT in the game, possibly even a CTD. Anyway, the CtP2 base game makes this available with "Ecotopia", but in Cradle 5 we'll change the pre-req to "Nano-Assembly".

2) Micro Defense: Previously there wasn't any defense against bio or nano agents, so this brings that back. CtP2 has it appear with "Nano Warfare", and that still works (especially because that Advance had no associated benefits after the "Infector" unit was moved to "Bio Warfare").

ENGINEERING	ENGINEERING	ENGINEERING
+Digital Encryption	+Technocracy	+Plasma Weaponry
Nano Assembly	Nano Machines	Nano Warfare
✂ Sea Tunnel	✂ Sea Mines (P)	▲ Micro Defense
❖ Sea Engineer	★ Nanite Def. (D)	
▲ Matter Decompiler (P)		

143. Religious Victory: One of the neat features included with Cradle 3 are several SLIC files which look at all civs (human and AI) and award points based on the existence of Religious Buildings and Wonders. Any civ which accumulates 5000 "points" can start work on the Wonder called "Gutenberg's Bible", and the first to complete it wins the game.

Unlike the Scientific & Diplomatic victories that are part of baseline CtP2, this is a new feature and is controlled entirely by SLIC. I like the feature a LOT, since the coding is crisp and bug-free and even includes an in-game "chart" which is easily consulted (it displays when you click the "Happiness" status window at top right of the game screen) in order to determine how many points every civ has accumulated toward the goal (see attachment).

The problem is, you cannot "shut it off". For example, the "Birth of an Empire" victory (the reconfigured CtP2 "Science Victory" requires not just the Wonder, but a number of additional buildings and TIMPs before it actually takes effect. Accordingly, even after the Wonder is built, the player can choose not build the additional required structures, and also has time to intervene against any AI civ which is on the verge of completing enough of them. **Edit:** See **Headings 193 and 194** for a complete description of the "Birth of an Empire" victory option.

But there is no "pause button" effect with the Religious Victory. Even if the human player is the first to 5000 points, should you choose not to build the Wonder, eventually many of the AI civs will also surpass the "point" count and can then build the Wonder themselves. Which means this "Victory" option essentially guarantees that EVERY Cradle game will end at some point in the Middle Ages. That is simply not acceptable in Cradle 5, especially with all the attention paid to improving the middle and late game periods.

Accordingly I dug into the problem and eventually identified a way to incorporate a "pause button" effect which will allow this Victory option to remain in Cradle 5. More to follow...

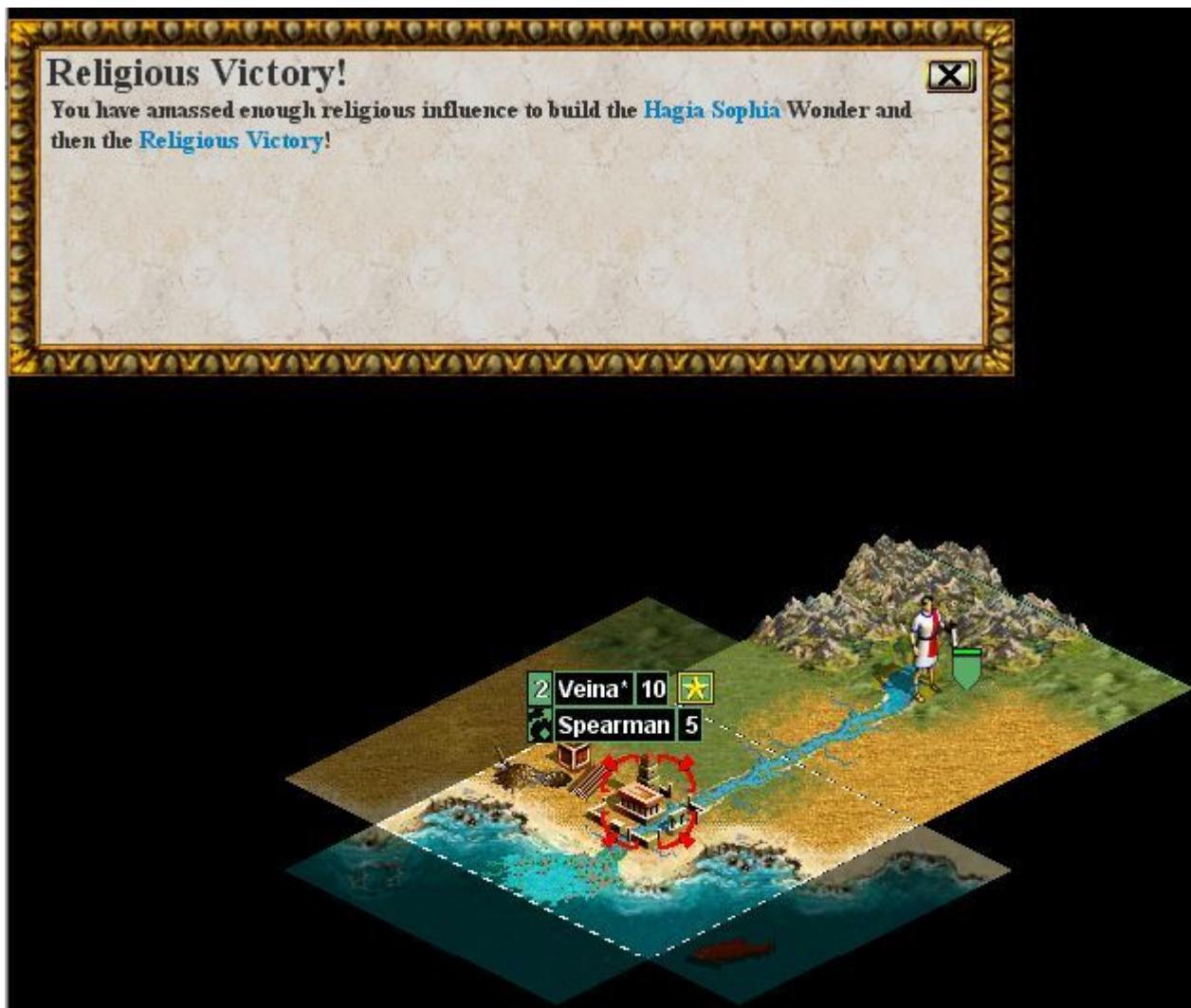


144. Religious Victory (continued): The first (and in many ways the most important) discovery was that a new Source Code flag which supposedly applies only to Wonders, ALSO works with Buildings! Testing showed that if you add the "PrerequisiteWonder WONDER_CHICHEN_ITZA" flag to ANY structure in **buildings.txt**, it cannot be built unless the Chichen Itza Wonder is located in the same city. No other city can ever build it.

The second discovery was that **cultures.slc** (the file which contains most of the Religious Victory code) has two sections specifically pointing at the "Gutenberg Bible" wonder. The first section keeps track of the points and triggers the ability to construct the Wonder after 5000 points are reached. The second section awards the victory (to include playing a movie and ending the game) once the Wonder has been finished. I was able to alter that portion of the code so that now the victory is triggered when a specific building is finished, one that can ONLY be built in the city containing the Wonder.

So how does this play out in game? First of all I changed the Wonder from Gutenberg to "Hagia Sophia", which is a building held sacred by both Christianity and Islam. As was true with the original system, this Wonder is buildable only by civs with 5000+ religious points (see attachment). However, the game does not end when it is finished. The Wonder-owner now has to construct the "Religious Victory" building, which requires 20000 build points, making it by far the most expensive structure of this era. That means it's going to take a while to finish, so the human player now has the option (and the time) to intervene and prevent its completion. Conversely, if the human player is the one who built the Wonder (or captured it from an AI civ), you have the choice of pursuing the Religious Victory or placing it "on-hold" as you pursue other paths to victory. All while knowing that this particular option is now "off the table" for all other civs in the game.

In closing I will just note - for those who have been paying attention - that, yes this new building takes us past the hard code building limit (64) once again, but this time without a corresponding offset. So why is that not a problem? Well, the Religious Victory building never actually appears in a city, since the instant it is finished, the game ends. Also, this victory invariably take place in the Middle Ages or soon thereafter, meaning there are MANY future era structures that haven't been built, so there's effectively no way this solution will ever cause a problem.



145. Nanite Defuser Issue:

Originally posted by *Maquiladora*

The Nanite Defuser wonder apparently not only destroys all the nukes in the world, but also all the nuclear plants, and forbids you from building any in the future. This also has the knock-on effect that you can't build any fusion plants after the nanite defuser is built either, because they require nuclear plants first.

I'm wondering is this really a good idea? A wonder destroying a bunch of buildings, and also banning another building for the rest of the game. It means nuclear plants are almost worthless, since the nanite defuser will always get built anyway.

I came across the above quote the other day, and ran a test with Cradle 5 to see if that's still a problem. And it is - if you build the Nanite Defuser, it not only wipes out "Nuke" missiles, but destroys all Nuclear Plants as well. Even worse, since the Nuclear Plant is a pre-req for building a Fusion Plant, those can never be built from that point forward (although it has no effect on those which already exist). Interestingly, even if the Nanite Defuser is destroyed, you still cannot build Nukes or Nuclear Plants. Worth noting that nuclear subs are not affected (just be aware that in Cradle 5 you need the Uranium Good in order to build Nukes and Nuclear Subs)

The biggest issue in all this is the inability to construct Fusion Plants, so I'm going to remove the Nuclear Plant requirement (deleting "PrerequisiteBuilding IMPROVE_NUCLEAR_PLANT" from the Fusion Plant in "buildings.txt"). That way, even though all things Nuclear are gone from the game, Fusion power is not affected. As to the comment that "Nuclear Plants are almost worthless", the solution is to add a pollution reduction factor, making them a valuable pollution reducer in the end game (radioactivity issues aside, their greenhouse gas emissions are effectively zero), and increasing that value for Fusion Plants to help make up for the loss once all the Nuclear Plants are destroyed.

146. Eight New Improvements: I've been working on a few large projects, but along the way have made a number of fixes and gameplay enhancements. Let's review:

1) War Discontent:

- There is nothing in-game (nor even in the Game Manual) which describes "War Discontent" and how it is calculated. The effects are visible as a reduction in "Happiness", but what causes that? Although you might think (based on other games) that the variables include things like "duration of war" or "battles lost" or even "military strength of enemies", in fact it is NONE of those. Instead there are 8 different variables, most of which involve count and location of your military units, and ALL of which vary from one Government to another. I'll spare you the details here, but it's all now itemized in a new GL "Concepts" entry.

2) Martial Law:

- Another important impact on "Happiness" is the "Martial Law" effect provided by military units garrisoned in your cities. As with "War Discontent", the effects vary by Government Type, and again there was no direct description provided in-game. This too is now discussed in a new GL "Concepts" entry.

3) Great Library updates:

- A number of units and one building require Goods in order to be built (Horse or Uranium), and this information has been added to their GL Entries.
- Another new feature in Cradle 5 is that several TIMPS are immune from pillaging (Nets & Pastures), and this information is now included with their GL Entries.

4) "Expel Unit" Reputation hit:

- The ability to expel civilian units rather than kill them is an important feature in the game, but the player still gets a reputation hit. This is especially problematic in Cradle 5, because the AI is MUCH better at building and deploying civilian units against you. This setting (ExpelUnitsRegardCost) is located in "diplomacy.txt", and there is a different entry for every one of the "Diplomatic Stances", ranging from -10 ("Default") to -20 ("Provoke War"). Oddly enough, these are the same

reputation hits incurred by pirating trade routes, which is just insane. Accordingly I'm going to drop the "Expel" hit down to -1 for "Default" and -5 for "Provoke War".

5) "Lawsuit" Reputation hit:

- Cradle uses the "Lawsuit" as a way to assassinate or "disappear" certain civilian units, the idea being that it's a "less visible" (and thus more diplomatically acceptable) method of removing them as opposed to just killing them outright with a military attack. As with "Expel", this setting (LawsuitRegardCost) is located in "diplomacy.txt", and there is a different entry for each of the "Diplomatic Stances". And once again we see a real disconnect between the reputation hits. For example, in "Default", a secret assassination of civilians costs 30 points whereas a standard "military attack" is only 20 points! The differential in "Provoke War" is similar; -60 for the assassination, -50 for a military kill. Accordingly the "Lawsuit" reputation hit has been reduced to -10 for "Default" and -20 for "Provoke War".

6) Uniticons.txt Error Fixes:

- While adding the new "Religious Victory" building entry to the uniticons.txt file, I saw that "Robotic Plant" had an incorrect link, specifically the building history was pointed toward the Advance instead of the Improvement itself. Looking further, four other IMPROVE categories had the same problem: Arcologies, Oil Refinery, Monument & Arch. Since the correct entries do exist in the GL, only the links had to be fixed.

7) Rivers:

As reported earlier (see **Heading 8**), minor adjustments to the Rivers settings in const.txt caused an incremental improvement, but rivers were still far and few between. After examining the changes suggested by other players, I doubled the previous settings and the result was excellent. The Cradle 5 continents and islands are now well populated with rivers of every length, and even twin river systems (ala Tigris and Euphrates) are not uncommon (see attachment).

8) Plunder Unit attributes:

- While running some tests, I noticed that all four of these units have inappropriate attributes listed in units.txt:

CanExpel
CanPillage
CanPirate
ExertsMartialLaw
OnlyBuildOne

- The first four don't make sense for units that are either animals or captives, while the 5th is only applicable to units that can be constructed. For similar reasons, all have now been given the previously missing "CantCaptureCity" attribute.

- In addition, Plunder IV (the truck) had "MovementType: Mountain" which means that it could traverse mountains in the absence of roads. That obviously doesn't make sense for a wheeled vehicle of this sort, so it has been removed from this unit (but not from the other three).



147. "War Discontent" Revisited: As reported in the previous post, a new Concept entry was added for "War Discontent", but I wasn't entirely happy with the result. Among other things, there are 8 variables associated with this, and they can be modified so as to be different for each of the 18 Government Types. But unlike the multiple values associated with "Martial Law", Cradle makes no distinction when it comes to War Discontent - every value is the same for every government. And - oddly enough - the same is largely true for most other mods and even the AE base game. Aside from "WarDiscontentPerUnit" and "WarDiscontentMaxUnits", 6 of the 8 variables are unchanged from the original CtP2. That led me to perform some detailed testing in order to figure out exactly what is going on. But rather than drag you through the various tests and all their iterations, we'll just look at the findings:

- **WarDiscontentMaxUnits:** This is a value which provides the maximum number of units which can be positioned outside of a city or fortification before unhappiness begins to occur.

- **WarDiscontentPerUnit:** This is another value, and is used in the formula which calculates the "War Discontent" unhappiness.

Thanks to **Peter Triggs** ([who posted the actual formula used in the exe](#)), we know that both of these are factored by the number of cities in order to achieve a "per-city" happiness malus. To see how this plays out in-game, we'll look at "Tyranny" in Cradle 3, which sets "WarDiscontentPerUnit" at .5 and "WarDiscontentMaxUnits" at 25. Let's assume the player has 8 cities and 41 units outside a city or fort: $((41-25)*.5)/8 = 1.0$ Thus a -1 "War Discontent" value is applied to each of the 8 cities. The real kicker is that you get this unhappiness even during peace time - it has NOTHING to do with War! On the plus side, testing shows that it does NOT apply to units which have the "Civilian" attribute, and thus affects military units only.

That still leaves 6 other variables, and we'll start by looking at those which actually do have an effect:

- **AtHomeRadius:** This is a value which refers to the radius of tiles around a city (in AE and all mods it is set to "2" for all gov types). This has no effect on the "WarDiscontent" variables discussed above, and in fact only seems to be used by the next variable:

- **OverseasCoef:** Yet another value, it's a WarDiscontent penalty which is applied (additive) to the WarDiscontentMaxUnits number. The primary mitigating factor is the AtHomeRadius value, but Forts have an effect as well, in which the distance malus from the nearest city is maintained (i.e it does not increase) in the circle of hexes immediately around the fort (but not INSIDE the fort, lol).

Here's an example of how these play out, using an OverseasCoef of "1" and an AtHomeRadius of "2" (and we'll also assume the total unit count is low enough to avoid the WarDiscontentMaxUnits penalty): A unit positioned 2-tiles or less away from any player city will incur no unhappiness. But if it moves one additional tile away (now at 3), the WarDiscontentMaxUnits number from that unit alone is now -1. Another tile and we're at -2. And each additional tile adds -1 to the total, with no upper limit! (**see attachment**) Just as sketchy, this formula makes no distinction between military and civilian units - both incur the malus. In my testing, it didn't take long before the AI started to see revolts, driven solely by the movement of units away from their core set of cities.

That looks pretty bad, but realistically it could be offset by increasing the AtHomeRadius (say from 2 to 8) and reducing the coefficient to a fraction (f/e from "1" to ".1" or even lower). But why bother? It's simply a different way to obtain a WarDiscontent value. On the other hand, what if it has an effect on the remaining four variables? Well, that's definitely worth looking at, so here they are:

- **HomeDefeatCoef:** A happiness penalty caused by units dying in combat near home.

- **HomeDefeatDecay:** The rate at which the Home Defeat penalty decreases each turn.

- **OverseasDefeatCoef:** Happiness penalty caused by units dying in combat away from home.

- **OverseasDefeatDecay:** Amount Oversea Defeat penalty decreases each turn

That certainly looks promising. Especially since previous testing proves that the game is able to distinguish between a unit located within the "home radius" and one that's outside it (i.e. "overseas"). Even more, these variables are talking about units that are being killed, so for once we have a happiness degrader that is actually tied to warfare, not just units positioned outside of cities. But unfortunately, none of these variables have an effect. No matter how many units you lose,

and regardless of where they are located, there is NO EFFECT on "War Discontent". Disappointing to say the least.

So where does that leave us? First of all, the last six variables will stay exactly as they are - unused and unusable. As for the remaining two, I'm going to make some changes so that we do have variation among the gov types. However, the changes have to be incremental, not radical. I simply don't have the time to perform extensive playtesting which involves ALL the different gov's. Anyway, I'll look at how this was handled in AE, AOM, MoT and MedMod and will use those findings as something of a guide.

Lastly, I'm going to change the name of this effect from **"War Discontent"** (which emphatically it is NOT) to **"Military Unit Unhappiness"** and will revise the various GL entries accordingly.



148. Revised Grand Canyon: As discussed in **Heading 18**, Cradle 5 includes the "Natural Wonders" mod, featuring a number of new code enhancements which improve positioning on the map and ensure that all of them appear in game. For the most part the graphics are pretty good, the exception being the "Grand Canyon". It's a single tile improvement, and the graphic quality is, well, poor (see inset on attachment). In addition, there isn't anything particularly "grand" about a single TIMP, so I took another look at the code and was able to modify it in order to generate a string of 3-to-4 "canyon tiles" in a sequence running SE-to-NW. The next step was to modify an existing graphic (found on the web), and line it up so the SE section merges seamlessly with the NW edge. The result, albeit a bit cartoonish, gives the appearance of a very long canyon with a river running through the middle of it (see attachment). In addition, the assigned attributes in "tileimp.txt" prevent the construction of any other improvements on these tiles, so roads and such will have to run around the Grand Canyon, rather than through it (which seems appropriate). **Edit:** Also see **Heading 160**.



149. Six New Improvements: As you can probably gather from the nature of the recent updates, Cradle 5 has been undergoing some rather extensive playtesting, which - unsurprisingly - has revealed a number of issues, most of which are rather small but - when fixed - provide noticeably improved gameplay. Here are some of the recent changes:

1) "Obsoleting Advance" added to Unit GL entries: When selecting new Advances to research and units to build, the player needs to consider whether the new Advance will cause a particular unit to go obsolete (meaning that you can't build more of them). Previously this information was NOT provided in the GL (or anywhere else), but now it is - all units have a new entry which tells you which Advance (if any) will make them obsolete (**see circled text**).

2) Emissary acquires "Hear Gossip" attribute: In Cradle 5, the AI builds a lot more stealth units, and one of the few downsides to that behavior is they are more likely to spot (and expel) foreign diplomats, and in particular those which are parked adjacent to a capital city. As a result, it's difficult to have one sit there long enough in order to "Hear Gossip", so that attribute will now be added to the "Emissary", since he arrives earlier in the game, before the mass of "stealth-spotting" units begin to appear. Plus, it IS one of the attributes of the "early diplomacy" that this unit represents (i.e. acquiring knowledge of foreign lands through various methods). GL entries updated accordingly.

3) Government-Specific Unit Card indicators: As discussed earlier in **Headings 33 and 34**, There are two categories of government-specific units, the "disbanding infantry" and the "specials". To assist the player in quickly determining whether a particular unit belongs to either category, a pair of symbols have been added to the upper left of their unit cards - a "shield" for disbanding infantry and "crossed sword & axe" for the specials (**see attached**)

4) PT Boat becomes Subchaser: The primary function of the "PT Boat" unit (in all versions of CtP2) is to detect submerged submarines, something that PT Boats were not designed to do (they don't have underwater detection devices). Accordingly, the unit has been re-named as the "Subchaser", a similar-sized small naval unit (from the same era) that WAS specifically designed to hunt submarines. Changes made to the GL, gl_str.txt, and the Tech Tree (all the graphics remain the same, however).

5) Leader Selection Screen: When loading a new game, the player has the option to choose a "Male" or "Female" Leader. However, as laid out in item 1 of **Heading 113**, Cradle 5 only features Male leaders so the selection screen has to change. And now it has - the new choices are between "Leader 1" and "Leader 2" (**see bottom of attachment**).

6) Unit Promotion CTD: This is an old bug, regrettably not fixed by the Source Code team. Whenever a unit is promoted to "Veteran" or "Elite", a notification appears in the "Msgs" list. It contains an "eyeball" icon, and if you click that it centers the screen over the promoted unit, and the cursor blinks at that location. However, if you open the message and click the "Eye" AFTER the unit boards a vessel, the game is unable to locate it, and instead you get the "No exception object" error message, after which the game CTDs. I ran a large series of tests, and eventually determined that the only solution was to remove the "EyePoint" code from each of the "promotion" messages.

Having a message which tells you a particular unit was promoted and which then centers on the unit is a very nice feature, but retaining code which causes a CTD - even if it's only in rare cases - just strikes me as a bad idea, especially since most of the message functionality is still retained simply by deleting the "EyePoint" code. As a result, I opened the script.slc file and removed the eyepoints from both the Veteran and Elite promotion messageboxes, and this CTD will never occur again.



150. Floodplains: The "desert river" attachment to **Heading 146** brought back memories, specifically that one of the interesting features in Civ3 was the ability of Rivers to turn sterile "0-food" desert hexes into "3-food" floodplains. This is actually quite realistic since historically a number of "desert river terrain" regions had very high population levels, f/e the Nile, Tigris/Euphrates, & the Indus valley. That had me wondering - could something similar be done for Cradle 5?

Fortunately the "terrain.txt" file includes an "EnvRiver" section for EVERY terrain type, although currently the settings are identical for all of them: +5 to gold, food, and commerce. But it does mean that we CAN have "floodplains" in CtP2! Accordingly the EnvRiver Desert food setting will increase from 5 to 20 (the same level of increase as seen in Civ3) and we'll also increase the "score" (which is how the AI values different terrain types) from 20 to 40 - making it equally desirable to "grassland river" terrain.

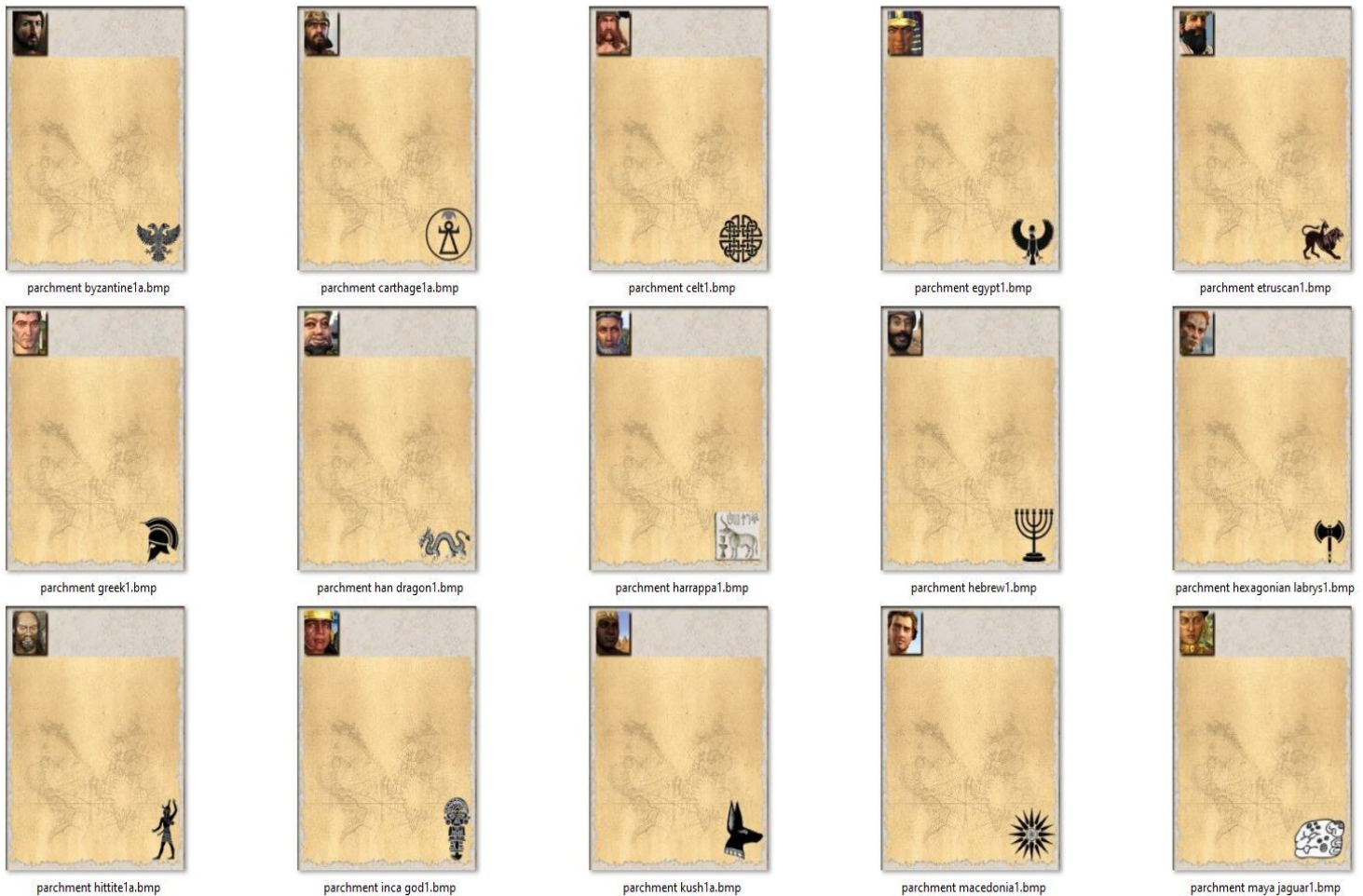
Testing shows that AI settlers are drawn to the new "floodplains", and the Desert entry in the GL has been updated to describe the increased benefits.

151. Parchments (Rev1): This is another one of those projects that's been on my R&D list from the very beginning. Whenever there's a diplomatic interaction between the human player and an AI civ, the "Diplomatic Proposal" window opens, showing tone options on the left and [the leader picture](#) of the recipient at the top. At the bottom of the screen is the "parchment", where offers and replies appear as they are made. In vanilla CTP2 there was a unique parchment for each civ, featuring a faded symbol in the center which represented the civilization of the proposal sender. However, many of those used modern iconography (such as the "Rising Sun" for Japan) and most of the new Cradle civs are not represented in CtP2. Most mods (including Cradle) have modified these parchments in various ways, and the best features are the unique symbols for each civ and the addition of a second picture. I liked the Cradle approach (also featuring sender pictures and cultural icons), but most of the symbols were not unique for every civ, and neither were many of the diplomat photos.

After a great deal of effort, I came up with a new parchment design which contained unique "diplomat" pictures (different from the leader pics) and culture symbols, the latter prominently displayed at the top of each parchment. The new design was so visually appealing that I created all 33 parchments before testing even one. Which turned out to be a mistake. As you can see in the attachment, Carthage has just received a proposal from the Persians, and.....apparently there's a good reason why symbols shouldn't be placed "front and center". Back to the drawing board. Argh.



152. Parchments (Rev2): Shrinking the culture symbols and placing them in the bottom right of each parchment did the trick, as they no longer conflict with the text display. The "fixing" process would have been even faster, if only I'd bothered to save each symbol as a separate file the first time. As opposed to having to create every one of them from scratch (again). Lesson learned.



153. "Sprite Selection" Reticle color: While testing out a new air unit sprite (more on that later), I realized that it's very hard to see the unit motion because of the "sprite selection circle" or "reticle" (a graphic based on the CtP symbol). Not only is it "neon green", but the reticle continues to surround the unit as it moves, thereby obscuring many of the "in-motion parts" as the unit proceeds to a new location. The question is, can it be made smaller or at least less obtrusive?

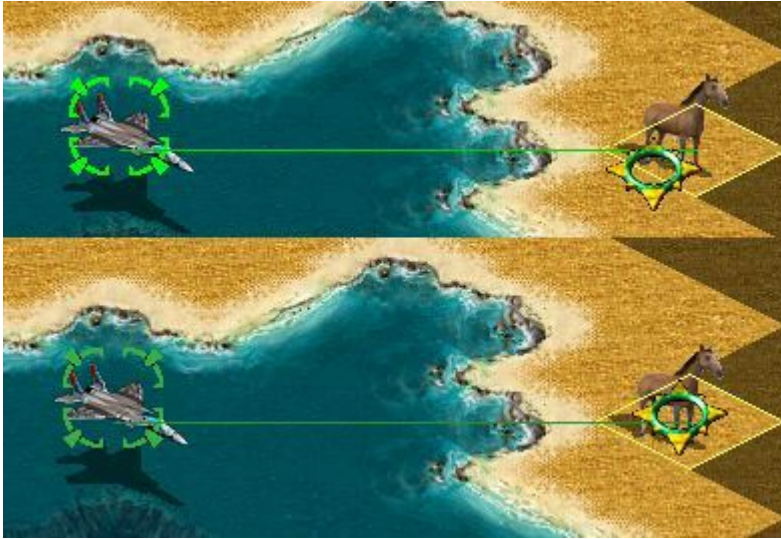
Digging a bit deeper, the reticle comes in several colors, each of which means something:

- 1) **Green:** Unit Sprite has movement points available.
- 2) **Yellow:** Unit Sprite has used up all movement points on this turn
- 3) **Red:** Unit Sprite never has movement points (f/e a "city")
- 4) **Black:** Sprite is a Good (reticle appears and then fades away)

Unfortunately I could not find the reticle graphic in any of the files. It's not included with the compressed .zfs or .til files, nor is it one of the editable cursors. In addition, there is a different look for the settler-type units, as the green reticle also includes a small green outline around the adjacent hexes.

The good news is that I found the file which controls the colors: **Colors00.txt**. Rather than require modders to edit this file, the SC team added a line to userprofile.txt (ColorSet=0). The way it works is, you create an alternate file with a different numeric ending and the game will use that file instead of the default. For example, Cradle5 now uses a file named **Colors06.txt** and the line in userprofile.txt has changed to ColorSet=6. As for the specific color, Line 44 is the culprit, specifying that the reticle is a bright neon green. I played around with this and tested a number of different colors,

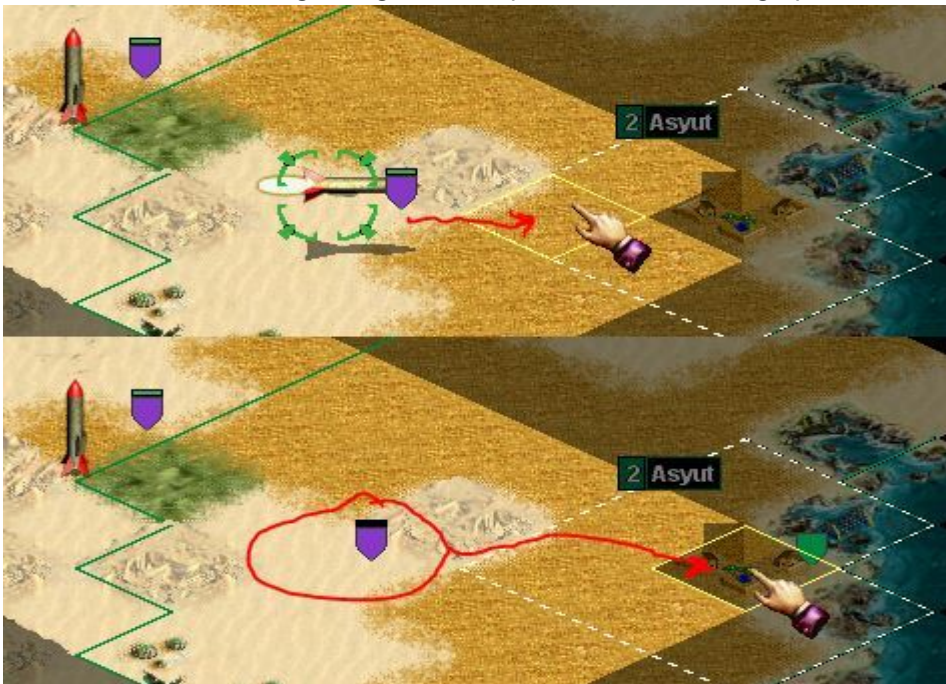
but unfortunately all of them obscure the movement to some degree. The big problem is the reticle graphic itself does not have an alpha channel (nor can one be assigned), so it's impossible to add a transparency effect, which would solve the problem. Anyway I finally settled on a "less bright" shade of green, and the reticle is now somewhat less obtrusive (see attached).



154. "Exploding Unit" sprite graphics: Any unit which has the "SingleUse" AND "Explodes" attributes in **units.txt** is destroyed after it hits the target. Apparently, when it is given a target and is moving toward it, the game has ALREADY taken into account that the unit is dead (even before it is actually destroyed) and so the unit sprite disappears the instant it starts moving toward that final destination. The only solution is to have it move one hex short of the target and then attack from there, which is kind of silly, but at least you don't lose the "flight animation" sequence until - after stopping - it is sent on to the target.

In the attachment, you can see the effect on the Cruise Missile sprite in each case. The top example shows the appearance of the sprite when the unit is told to stop one hex in front of the target. The one below shows that the sprite has disappeared (all that's visible is the unit shield) as it moves directly to the target.

There's no fix for this - and in fact the "Nuke" missile has the same issue - but I wanted to highlight the problem and make it clear that there's nothing wrong with the sprites, but rather the graphics are "working as designed" (unfortunately).



155. Fixing the Interceptor: The CTP2 Interceptor sprite (GU046.spr) does not have an "Idle" animation, and thus displays no movement on the map. There are three animations (Move, Attack & Death), comprising 238 images (including shadows), so I added a 4-image Idle in which the jet rocks side to side a bit. Unfortunately the "movement" portion is so subtle (a slight waggle of the wings) that it's not visible on the map, especially given the obstruction from the reticle graphic (see **Heading 153** above, which includes the modified CtP2 interceptor).

Conversely, the CtP1 Interceptor has a very noticeable "after-burner" effect as it moves, so I decided to give that a closer look. This sprite has only two animations (Move & Attack), comprising 140 images (including shadows). In addition to a new single image "Idle" animation, I copied in the 28 "Death" animation files from the CtP2 unit (altering them slightly to better match the CtP1 unit), and the result was a distinct improvement (see attachment).

Since both Sprites have now been fixed, I'll include the two of them in the download but will renumber the CtP1 sprite (from 46 to 225) and change all the text references accordingly (newsprite.txt & uniticons.txt). Also includes new 2D art which matches the look of the new sprite.



156. New Fighter sprite: The existing fighter sprite (a US P-38) does not have an Idle animation, so there is no "on-map" movement. Rather than rebuild the unit, I decided to use the "Spitfire" sprite (see attached) which was included with the CtP2 "World War 2" scenario. This unit has all 4 animations, including a nice "Idle" in which the plane touches down and bounces. No sprite editing required! In addition it's a 1-engine fighter, and thus more emblematic of the fighter planes of this era.

Unfortunately the existing fighter pilot's voice features an American drawl (files GUV031-034), and is thus not appropriate for a British plane. Luckily there is a British air alternative: the file group GUV105-108, which is currently assigned to the "Bomber". That unit is an American B-52, so reassigning the British pilot voice to the Spitfire opens the door for improving the Bomber voice as well. To that point, while searching through the voice files I spotted another issue. The voice sequence for the "Machinegunner" (GUV101-104) is actually that of an American-accented pilot. He talks about "skies open" and you can hear the "mic click" at the end of each phrase. Definitely NOT correct for a ground unit, and it means these voices can be reassigned to the Bomber.

Of course, that means we now need a "ground unit" voice replacement, and the best option was the GUV076-079 series, previously assigned to the "Leviathan". That's a very late game unit that can easily accommodate a more electronic sound. And fortunately, that is EXACTLY the voice used for the Leviathan in CtP1! Why it was changed, I don't know, but now it's back.

The result of all this is a new sprite for the Fighter and new voices for the Fighter, Bomber, Machine Gunner and Leviathan. All of which required changes to newsprite.txt, sounds.txt, & uniticon.txt along with new 2D art (borrowed from AOM), the Spitfire sprite, and four Leviathan voices copied over from CtP1.

As a side note, take a look at the Road network built by AI Rome. Not a sprawling mess, but rather a coherent connection of one city to another. Very nice.



157. Fixing the Stealth Fighter sprite: The Stealth Fighter sprite has four animations (Move, Attack, Idle & Death), comprising 132 images. However, even though it has all the necessary animations, there are several problems. To begin, the single file Idle animation is of little benefit since the "movement" animation consists of 5 identical files with no motion of any kind. In addition, there were graphical errors associated with 24 of the "Move" and "Attack" animation files, in which turbulence is only shown coming off of one wing, while several of the "Attack" files had a similar problem in which missiles were fired from only one wing. Conversely, the "Death" animation features an interesting 5-file sequence in which the fighter gradually fades away.

That sparked an intriguing idea. Since this is a "stealth" unit, why not use the Death animation for the Idle, but rather than "fade-out", have it "fade-in"! Likewise, why not use the same effect for the Move sequence? As for "Death", the "explosion" effect used by the Spitfire works just as well for any air unit, so that could be inserted here as well. The final result was a completely re-imagined sprite with new animations which look great in-game. As an example, the attachment shows two Stealth fighters, one at rest and the other fading in and out of view as it moves across the map.



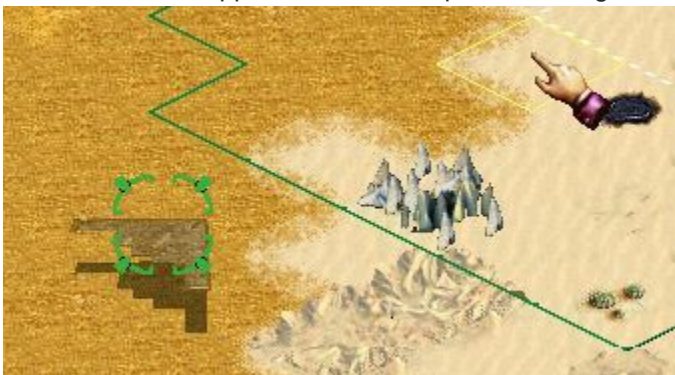
158. Fixing the Spitfire and Stealth Fighter (again): Hoo boy, it never fails, one step forward and two steps back, lol!

One reason for selecting the Spitfire was the opportunity - for once - of using an existing sprite exactly as-is, no modification required. But looking closer at the attachment in Post 207, something clearly was missing - the Idle animation has no shadows! Even worse, opening the sprite confirmed there were no shadow files for ANY of the animations. Fortunately the WW2 scenario includes the German Bf-109 sprite which is exactly the same size as the Spitfire, and it DOES have shadow files. So I deconstructed both sprites, copied the shadow files from Bf-109 to the Spitfire, rebuilt the sprite, and voila! Shadows that match perfectly, for every animation.

While doing that, I also decided to revise the Stealth Fighter's Idle animation. Turbulence coming off the wings of an "Idle" jet doesn't look right (see the attachment above), so the images have been fixed and this sprite rebuilt as well.



159. Fixing the Stealth Bomber sprite: Like many other incomplete sprites, the Stealth Bomber has only three animations (Move, Attack, & Death), comprising 226 images. Fortunately the Attack and Death animations required no editing, and originally I planned to add nothing more than a short Idle. However, the successful "fade in-out" effect used by the Stealth Fighter is obviously a natural fit for this unit as well. Especially since the existing Move animation had only 6 files featuring a barely visible up-and-down rocking motion, along with blinking red lights on the wing tips. The Idle for the rebuilt sprite uses the original 6 Move files along with the Stealth Fighter's "fade-in" effect. And the new Move animation follows the same approach, with a sequential fading and reappearance as it moves through the air (see attached).



160. Fixing the Spy Plane sprite: The CtP2 Spy Plane is actually a modified version of the CtP1 Stealth Bomber. The unit has good Attack & Death animations (no changes necessary), but Move was pretty minimal - a slight rocking motion along with a blinking light. Given the appearance and role, this is another sprite which can benefit from the special effects used by the two stealth units. Accordingly, the sprite was deconstructed (118 images) and a new Idle animation created, while fading effects were added to the Move.

In addition, as you can see in the attachment, the colors of the Grand Canyon have been toned down and a set of rapids added to the central river.



161. Fixing the P-38 Fighter Plane sprite: With the inclusion of the Spitfire there isn't a current need for a second WW2 era fighter plane, but I decided to go ahead and fix the P-38 anyway. After all, it's the only remaining CtP2 sprite that does NOT have in-game motion so this completes the catalogue. It will be included in the download using the original sprite number (GU035.spr) since all of Cradle's in-game links now point to the Spitfire (GU108.spr). The original P-38 voices are good and because they weren't assigned to another unit (for exactly this reason), are still available. It can be utilized in non-Cradle games simply by copying the sprite into the ctp2_data\default\graphics\sprites folder.

There are three good animations (Move, Attack, & Death - no editing required), comprising 238 images and shadow files. All the Move images have a blurry in-motion propeller, so for the missing Idle we'll use the first file from the Death animation (shows a P-38 parked on the ground with a non-moving 3-bladed prop) but will change its location to place it in the air.

This completes the air unit sprite project.



162. Wonder Unit Issues (Part 1): Wonder Units (those which are awarded by the construction of certain Wonders) are a fun feature in Cradle, and definitely add to the atmosphere, particularly in the early game. Having Caesar, Hannibal, or any of 20 others leading your armies into battle is pretty cool, especially since each one of them has unique skills. Among the many "Special Attack" abilities, some can generate plunder, others perform sieges, and many have the "Victory Enslavement" ability (sending slaves to nearby cities).

The issue is that some of these abilities become problematic as the game moves along, in particular:

1) Enslavement: The Emancipation Wonder abolishes slavery worldwide after it's built. That includes turning all slaves into citizens and killing off all slaver units. But it has no effect on Wonder units with the enslavement attribute, and soon your cities will start to fill up with slaves again. Definitely a disconnect.

2) Siege Attacks: I spent a LOT of time analyzing and reviewing the many special attacks (see **Heading 87**) and there is now a mechanism which changes the graphics and unit abilities so that ancient era attacks are converted to modern with the implementation of the "Modern Era Swap file" (see **Heading 110**). However, I was not able to fully convert Siege attacks since they share graphics with the Infector's modern era "Plague" attack, and there's no way to change that. And once again, this is an attack which is performed exclusively by Wonder units.

3) Era Disconnect: The final issue is that while it's really cool to have your ancient and medieval era armies led by historical characters such as Nebuchadnezzar and Attila, that becomes increasingly strange once the game stretches on beyond the Renaissance. By the Modern Era the visual effect is quite ludicrous, with chariot-archers and sword-wielders operating in tandem with tanks! (**see attachment**)

One solution was to simply kill them off as the game proceeds, either through slic coding or by making them government dependent. Which would solve the problem, but was kind of a blunt force approach. So I played around with some other ideas, and one in particular became increasingly attractive....



163. Wonder Unit Issues (Part 2): Among Cradle's many neat features is the slic code which allows the player to upgrade Elite Units (described in **Headings 10 and 63**). For example, after the discovery of "Bronze Working", Elite Spearmen can be upgraded to Elite Hoplites. This is controlled by code in the updater3.slc file, which is quite large - over 1700 lines!

I'll spare you the details, but after a huge amount of editing and testing, I was able to identify the necessary portions of code and developed a 300-line file which automatically upgrades selected units from one type to another, without player intervention, upon the discovery of a particular Advance. The code can distinguish between civs, so it applies individually as each civ discovers the triggering Advance.

Once that became possible, I developed 4 new "Age-specific" leader units, none of which have the Siege or Victory Enslavement attributes:

1) Field Marshall: This is an early Industrial Age Leader unit, which has the sprite and most of the statistics of its near-equivalent, the US Grant Wonder Unit. All of the "Great House" Wonder Units will automatically convert to Field Marshall with the discovery of "Age of Reason". It also has a new unit card which combines features of the Elite (a large letter in a strip on the left side) and Wonder Unit cards (a number of stars indicating relative strength).

2) Brigadier: Another early Industrial Age Leader unit, the Brigadier makes use of the Ctp1 Musketeer sprite, dismantled and rebuilt so it now has Idle and Death animations (and thus full on-map movement). The statistics are "similar-but-less" than those of the "Field Marshall" (hence one star instead of three - **see attached unit card example**). Most of the remaining Wonder Units will upgrade to Brigadier, the exception being those with "Religious Conversion" capability, all of which convert to powerful "Patriarch" units instead.

3) General: With the discovery of Electricity, both leader units upgrade to modern types. The FM becomes a General, and uses the CtP2 Brown General sprite from the WW2 scenario. It has all required animations and features a new unit card, similar to those in the attachment. The stats are a level below those of the Dwight Eisenhower Wonder unit.

4) Colonel: This is the upgraded Brigadier, and uses the fully animated CtP2 US Paratrooper sprite (also from the WW2 scenario) and a new "Leader Unit" card. As with the FM-Brigadier duo, the Colonel's stats are a reduced version of those given to the General.

This new mechanism resolves all of the late game Wonder Unit issues, but that wasn't the end of the process...



164. Wonder Unit Issues (Part 3) - Before moving on to the related changes, here are some additional details:

1) Cradle has three other "ancient era" units that will upgrade using this new system:

- Great King upgrades to Brigadier
- Hero upgrades to Brigadier
- Great General upgrades to Field Marshall

2) Besides "better" stats, there are additional differences between FM-General and Brigadier-Colonel:

- FM-General exert ZOC and are Ranged units
- Brigadier-Colonel do not exert ZOC, are Flanker units, and can Beach Assault

3) To compensate for the loss of Victory Enslavement and Siege Attack attributes, all four of the new Leader Units can now generate Plunder.

4) There are three remaining Wonder Units, and they are treated differently from the others:

- US Grant is an Industrial era unit who arrives after the "Age of Reason", and will upgrade to General (see attached) with the discovery of "Electricity"
- Eisenhower is a Modern Era unit and never upgrades
- Schwartzkopf is also a Modern Era unit and never upgrades



165. New Renaissance Era Advance (Age of Discovery) & Wonder (Magellan's Voyage): While researching the existing Wonder Units and their capabilities as part of the Wonder Unit Upgrade project described above, I came across an [old post](#) in which somebody made a good point about using the "East India Company" as the Wonder which delivers "Hernan Cortes". The time frame is wrong for Cortes (by over a century), plus having a British Wonder deliver a Spanish Arch Enemy is, well, weird:

Initially I thought about adding a replacement Wonder Unit that uses a "ship sprite", but the reality is that we don't NEED a wonder unit associated with "East India Company", but rather a better link for Cortes. That reminded me of a much earlier version of Cradle which contained a victory option involving Magellan, and - as the title of this post clearly indicates - that led to the solution.

Cradle 5 now has a new Advance, "Age of Discovery", which appears in the Tech Tree just prior to "Chronometer" (the pre-req for the "East India Company"). This new Advance allows construction of the Galleon unit (moved up from Chronometer) and features the "Magellan's Voyage" wonder (**see attached**) which must be built in a coastal city, provides extra gold from overseas trade routes and eliminates the "distance from capital city penalty". And of course, provides the "Hernan Cortes" wonder unit!

There is new 2D art for the Advance and the Wonder, a new Spanish-accent voice for Cortes, and a new movie as well.



166. Revised Norman Schwarzkopf Wonder Unit: While working on the Wonder Unit Upgrade project, I took another look at this unit. In Cradle 3 & 4, it's an "Interceptor" air unit, but Norman Schwarzkopf was a US Army General, most famous for planning the armored assault in the Desert Storm campaign. Yes, air power was a huge component of that operation, but an air unit is not a proper representation of his military branch. Additionally, all the other Wonder Units are Land units, so this is likewise an oddity in that regard. Lastly, this era in Cradle 5 now features the "Heavy Tank" which uses an M1 Abrams-like sprite, the armored ground unit most emblematic of Schwarzkopf's famous campaign.

Changing this in-game required a new 2D Unit Card, new stats in Units.txt (obtained by increasing those assigned to Eisenhower), a revised link in Newsprite.txt (from 46 to 38), and changing the 2D art linkages in uniticon.txt (from UPGP212* to UPGP209*). The result is visible in the attachment below.



167. Revised Unit Voices: There was a fairly extensive project in which unit voices were re-worked and re-activated ([see post # 70](#)), but the addition of the 4 new "General-type" units caused me to take another look.

Many of the original CtP2 unit voices were shared between different types and some of them weren't very accurate. For example, the Diplomat and Slinger used the same voice files. By contrast, many of the CtP1 voices were very specific-to-the-unit and used phrases like "Shields Up!" (now assigned to the Cradle Hoplite), "Aim your arrows (Archer), "Fix Bayonets" (Brigadier), and "Let 'em Burn (Dromon). There were also opportunities to use better accents - f/e Cortes now has a Spanish accent while the Knights & Charlemagne use a French voice from CtP1.

Even within the existing CtP2 voice files, there was an opportunity for additional differentiation. As noted in the earlier post, the game uses the "Acknowledge" voice while "Select1" and "Select2" are never heard. However, most of those work well as Acknowledge replacements. For example, Alexander, Caesar, and the Legion all shared the Legion "Acknowledge" ("form up") but now all three are unique: Alexander ("For the Empire"), Caesar ("form up"), and Legion ("centurion here")

All told, this sub project assigned 35+ unused voice files (most from CtP1) to many of the units which previously had to share.

168. Fifteen Fixes: Given all the many changes implemented in association with the new "Wonder Unit Upgrade" system, it was clearly time for a long playtest to make sure everything was working properly. And needless to say, that turned up quite a few issues:

1) Inadvertent loading of units aboard ships: The "sentinel" command is a great way to park units in locations where they won't activate unless a foreign unit appears in their vision radius. Unfortunately, that is a problem in Port Cities since units set to "Sentinel" are automatically loaded aboard any Transport-capable ship that passes through, whether intended or not. The only other way to "park" a unit in a city is to fortify it, but 10 of the civilian units did not have the "Entrench" attribute. Fixed.

2) Capturing foreign settlers automatically results in war: This used to be hard-coded, but the SC team altered the code so it only effects Regard. Even so, it was still causing a declaration of war with every capture, so I dropped the regard cost in diplomacy.txt from -60 (Cradle 3) to -40 (AE Default), but to no effect. In fact, it had to go all way down to -10 before the desired result was achieved - war is no longer automatic! This doesn't eliminate the chance for war, since if Regard levels are already low the AI will respond. And likewise, repeated enslavements will not be tolerated for long. But it is nice to have a level of uncertainty.

3) Unit issues in Mountain terrain: Some chariot-borne units were able to move into un-roaded mountains (Great King, Sargon, Hammurabi, Khufu, Nebuchadnezzar & Ramesses) and the same was true for the Teutonic Knight. Also, while the Composite Archer can move in mountains, it could not attack there. All fixed.

4) Dromon can carry units: Historically incorrect. In addition, it upgrades to and from naval units that cannot carry troops, so that ability is clearly a disconnect. Fixed.

5) Longship tweak: The GL Entry says it only carries ONE unit but the actual value in units.txt was TWO. Changed back to one. In addition it has very weak Attack & Defense values (10, same as the Ancient Era Coracle), so to give it a better chance of surviving in battle, I changed the ZBRangeAttack from 0 to 10 and gave it the "IsFlanker" attribute.

6) Mounted Archer bombardment: This unit only had half of the "bombard attributes" (so it didn't work) but it really shouldn't have any. Fixed.

7) Raider is Stealthy and can "see Stealth": Stealthy is fine, but there's no historical analogy by which a unit such as this could spot Stealthy civilians. Fixed (removed the latter attribute).

8) Legal units can't be expelled: Which means the only way to remove them from your territory is to kill them. And if you do it with military units, that incurs a heavy "Regard" malus. Fixed (added "CanBeExpelled" to all legal units)

9) Commercial units can't be expelled: Similar issue, so I added "CanBeExpelled" to the Corporate Branch. However, the SubNeural Ad is not a person and so killing it shouldn't produce the same global outrage effect (think "Chinese Spy Balloon"). The solution in this case was to remove its "Civilian" attribute.

10) All 4 Plunder Units have "CanAttack" attributes: Not appropriate for units which represent "captives" of various types, so those have been removed.

11) Missing "Wooden Ship" attribute: Affects Bireme, Galleon, & Ship-of-the-Line. This is necessary to identify whether a defending vessel is subject to the "AttackWoodenShipBonus" factor. The only ship which had that bonus was the Dromon, but I've now given it to the Ironclad unit as well, since historically that ship was VERY effective against wooden ships, and basically made them obsolete (as war vessels anyway). The Ship-of-the-Line has also been given a small bonus against wooden vessels so it's not underpowered when facing the Dromon.

12) Cities on Mountains: One of my long standing "pet peeves" is that when you are building out the early empire, sometimes there are large areas dominated by mountain terrain, and it's definitely NOT a good place to create a city. However, if you don't settle it or post guard units, the AI will persist in sending Nomads and creating worthless cities there. Annoyances aside, historically there weren't large cities built on top of Mountains, especially in the early eras. Villages and

Forts, yes, but not Cities. Anyway, the "Settle: Mountain" attribute has been removed from Nomads but is still included with Settlers (who arrive late in the ancient Era) and Urban Planners. The effect is to keep Mountain cities out of the early game, but allows them to appear later in the game. In **the attached screenshot**, the "Settle" button is being pressed, yet nothing is happening

13) Colosseum attribute: This Wonder has the "IncreaseFoodAllCities" attribute which doesn't really make sense. It's clearly intended to replicate the "free Bread" aspect of the Roman "Bread & Circuses" system, but the Colosseum itself was just the entertainment aspect of that system. And giving food to ALL cities seems wrong, since it was a feature provided just to the citizens of Rome, not those in every city in the Empire.

14) Lighthouse of Alexandria attribute: This Wonder grants an international trade route bonus AND one for every water trade route. I'm removing the "international" bonus, partly because it's duplicative with "Magellan's Voyage", but even more because a "Lighthouse" is certainly beneficial to water trade, but not necessarily "international" (since that can involve purely land routes).

15) Duplicate "CityWalls" attributes: The Castle and City Walls improvements both have the "CityWalls" attribute. Since the player (and AI) will always build BOTH structures, it adds questionable value and might even have an unseen doubling effect on Defense. Removed from the Castle.



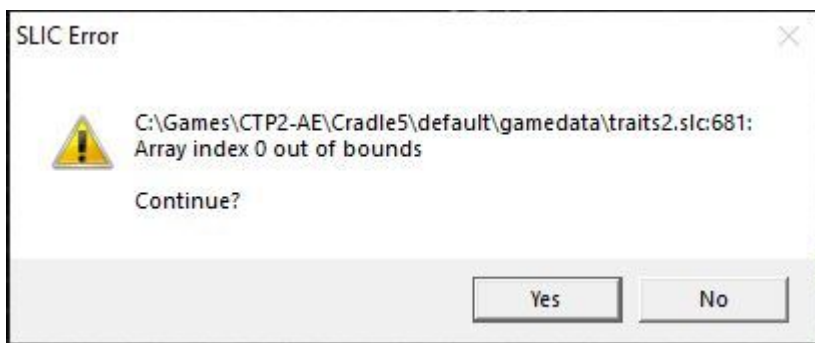
169. "Array index out of bounds" Errors (see attached): When playing any CtP2 mods (and even the base game), it is always recommended that players change the settings in userprofile.txt from "DebugSlic=Yes" to "No". That's partially to cover up poor modder SLIC coding but (at least prior to the Apolyton Edition fixes) there were even disconnects between the hard code and otherwise functional SLIC. Most of these errors aren't fatal, so the general feeling was, "if they aren't causing CTDs, just hide them from view"

Anyway, being something of a perfectionist I've been working behind the scenes to track down and eliminate ANY errors that pop-up, even the supposedly harmless ones. That's been pretty successful, but I kept getting persistent "Array index out of bounds" messages associated with two lines in the traits2.slic file, each of which contained this text: "tmpPlayer = city[0].owner;"

That seemed odd, especially since the same code does not kick out errors when used in other files. Long story short, I finally worked out a solution and - at least for now - there are **ZERO SLIC errors in Cradle5!** Of course that's only from playtests down to 1500 BC, so we'll have to see if others are still hiding out there. **Edit:** This has proven to be more complicated than I expected, and additional testing shows that that these errors can still appear. Fortunately it's not really a problem, as discussed above.

For those who are interested in this sort of thing, the process of tracking and fixing went roughly like this (omitting all the incorrect guesses and useless fishing expeditions):

The traits2.slic file had code which specified first that "int_t tmpPlayer" and secondly that "tmpPlayer = city[0].owner". The latter is in two places (lines 681 and 709) and those are the lines kicking out the errors. Looking at other slic files, I saw a few cases where tmpPlayer wasn't used, but rather the code specified "city[0].owner" directly. I made that change in four locations, specifically changing "(PlayerCivilization(tmpPlayer))" to "(PlayerCivilization(city[0].owner))" (in rows 684, 688, 712, and 716). Additionally, I commented out the now unnecessary "int_t tmpPlayer" and "tmpPlayer = city[0].owner" lines (rows 678, 681, 705 and 709). After that, I ran a few quick test games which proved the "extra population" code was working as intended, but now without the errors.



170. Too many Wonders and Buildings: So much for the Good News. Back in Post #191, [I quoted Martin Guhmann](#) as evidence that there was a workaround for the Hard Code limitation of 64 Wonders and 64 Buildings:

*"Actually there is no database limit for buildings or wonders, it looks like the problem is that **there is a limit of buildings a city can own**, you can build the additional buildings but the city won't get them."*

I interpreted that to mean "individual cities can't hold more than 64 buildings and wonders" and thus the solution is to restrict the number which each city can build. However, that is **INCORRECT**. Here's how it really works:

The 64 buildings and 64 wonders limit is NOT based on how many can fit in a particular city, but rather on the COUNT and SEQUENCE of items in buildings.txt and Wonder.txt. Any structure which comes sequentially after #64 on either list (regardless of when it is chronologically available) can be selected and added to the build queue, but after completion it does not appear in the list of city assets and is thus buildable again by the same city (and any other). In the **attachment** you can see evidence of the problem. The "Wonders" screen shows that "Torah" (#65 on the list after Magellan was added) has been constructed 4 times (albeit no "owning cities" since it isn't present in any of them) and yet is still under construction in the city at the top of the screen.

This is a BIG PROBLEM in Cradle 5, because the count of Wonders is now at 69, while for Buildings it is 67. Since there are no workarounds, the only solution is to remove structures from buildings.txt and Wonder.txt. I've been working the problem for almost a month now, and will soon discuss a path forward. Don't despair (as I did at first), since the solutions make a lot of sense and should have minimal impact on game-play.



The screenshot shows the game interface with a city view at the top and a 'STATISTICS' window below. The city view shows a yellow flower and a red building. The 'STATISTICS' window has tabs for 'Score', 'Wonders', and 'Ranking'. The 'Wonders' tab is active, showing a list of 'Torah' wonders constructed by Rome, Japan, Carthage, and Japan.

Wonder	Year	City	Player
Torah	2140BC	---	Rome
Torah	2140BC	---	Japan
Torah	2090BC	---	Carthage
Torah	2070BC	---	Japan

Close

171. Removing Excess Wonders (Part 1): As noted above, there are currently 69 Wonders and we need to remove 5 of them. The first two are quite easy:

1) National Shield: This is a very late game wonder which provides Forcefield buildings in every city. Since it does nothing more than repeat a benefit which is already available from the Force Field building, it's an easy choice for deletion. Game Impact? **None**.

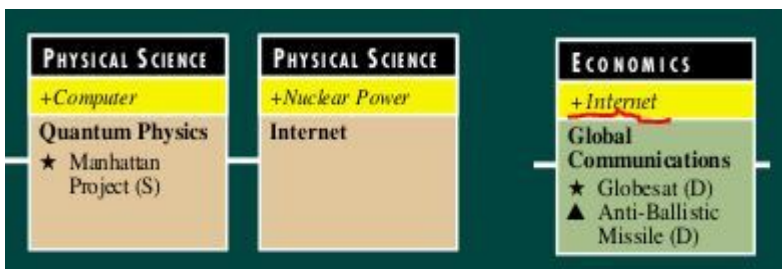
2) Central Matter Decompiler: Another late game wonder which puts Matter Decompliers in all cities. As with National Shield, it doesn't provide anything new, but rather repeats what is already available as a Building. Game Impact? **None**.

172. Removing Excess Wonders (Part 2):

3) Internet: Another late game wonder, this puts Computer Centers in all cities. As with National Shield, it doesn't provide anything new, but rather repeats what is already available as a Building. The main difference of course is the "Internet" is a real thing - one of the most important developments of all time - and completely removing it from the game is just wrong.

More to the point, the way in which CtP2 portrays the Internet is completely incorrect. The main fallacy behind an Internet Wonder is the fact that only ONE CIV would get it. In addition, the benefit of the Internet Wonder - placing computer centers in each city - is a poor representation of the true Internet reality. The solution to all this is to remove the Wonder and replace it with an ADVANCE called "Internet" and associate that with a FEAT which increases Science. Game Impact? **Improvement**.

The new Advance follows "Quantum Mechanics" and is a pre-req for "Global Communications" and "Robotics" (see attached). Implementing this requires changes to a LOT of files: Advance.txt, feat.txt, feats.slc, feat_str.txt, uniticons.txt, Wonder.txt, gl_str.txt, Great Library.txt, WonderBuildLists.txt, advancelists.txt, and the Tech Tree.



173. Removing Excess Wonders (Part 3):

4) Resurrection: Most of the "Religion" Advances (Judaism, Buddhism, Islam, etc) are associated with a "Book Wonder" (Torah, Pali Canon, Koran) but Christianity instead provides the "Resurrection" Wonder. Although truly the seminal act which served as the foundation of the religion, it must be admitted that this was not seen as a world changing event AT THE TIME IT HAPPENED, but only became so as the word spread. This points instead to the Christian Book ("Holy Scriptures") which already is a Wonder, but one which becomes available much later with the "Theology" Advance.

Ignoring the religious aspect for a moment, the "Resurrection" Wonder provides a 1-point Happiness Bonus which never expires. However, the Christianity Advance already provides an additional 1-point Happiness Bonus (the same as all the other Religion Advances), so in that sense the associated Wonder is a bit overpowered. Accordingly, the change will be to remove "Resurrection" and shift the "Holy Scriptures" from Theology to Christianity. Game Impact? **Minimal**.



174. Too many Wonders and Buildings (revisited):

By now, veteran thread viewers will know that I've been poking at every aspect of this game, right from the beginning. There certainly are hard-coded game limitations, and even a few instances of Source Code team induced bugs that broke previous functionality (more than compensated for by the multitude of improvements, of course). But frequently, things which had long seemed impossible, turned out not to be.

Anyway, this particular issue - the hard-code limit of 64 Wonders and 64 Buildings - has been eating away at me for almost a month now, and consequently I've been dragging my feet at implementing the required changes. Removing functionality, no matter how you spin it, isn't a lot of fun. Accordingly, most of this time has actually been spent on various ideas for workarounds, all of which failed. So last week I finally "bit the bullet" and started to make all the necessary changes (many of which haven't been previewed yet), to include heavy testing to make sure all the new changes work properly.

During that process - in particular the efforts aimed at future Techs and Structures - I couldn't help but notice that some unbuilt Wonders were not appearing in my city build queues. And without exception, all of them had Expiration Advances. So a little itch started up in the back of my brain, and it wouldn't go away.... *"what if?"*

175. Too many Wonders (the issue):

Let's start by reviewing the issue as it specifically pertains to Wonders. Like every other Wonder, those which are # 65 and higher in the "Wonder.txt" file are buildable by each civ from the moment it discovers the Enabling Advance. The problem arises upon completion, because the finished Wonder does NOT appear in the city which built it, and thus continues to be buildable everywhere. Exacerbating the problem, the AI continues to see the Wonder as a high priority structure, and will continue building it in perpetuity. *In short, the "too many Wonders problem" will cripple the AI and is effectively a game-breaker.*

That said, "Wonders" in CtP2 operate according to a number of fixed rules, and those rules apply regardless of where a Wonder might be positioned on the Wonder.txt list:

- 1) All have an Enabling Advance (the scientific discovery which allows them to be built)
- 2) All *can* have an "Obsoleting Advance", although many do not (the scientific discovery which cancels their powers and makes them unbuildable).
- 3) By definition, you can never have more than ONE Wonder. The "bug" masks this fact, but only because the game code does not see the structure in a City Inventory and thus cannot recognize that it was completed.

Now we can't do anything about the hard code limit and how it presents in-game, but it turns out that we CAN use items 2 and 3 to offset the worst part of the problem: A Wonder which is buildable forever.

176. Too many Wonders (the solution):

In Cradle5 there are 8 "Great House" Wonders, each of which provides a historical Great Leader in the form of a Wonder Unit - and not much more. They offer some historical background and enhance the atmosphere, but primarily they are delivery mechanisms for Wonder Units. The slic code which does this (contained in the wonderunits.slc file) is remarkably simple; an Event Handler with nine lines of code which place a Wonder Unit in the city which completes that particular Wonder.

Next, a brief segue into a related area. Unlike the hard code limits which apply to Buildings and Wonders, CtP2 effectively has no limit on the number of Advances, i.e the scientific discoveries laid out in the Tech Tree. The rules are also pretty loose, so you can even have Advances which link to nothing else - true dead ends which can't be researched and don't lead to any others. Point being that the options in this area are essentially unlimited.

For testing purposes I created a new Wonder called "Sargon2" (a copy of the existing Sargon Great House) and placed it in the # 65 position. The enabling Advance was set for "Toolmaking" (granted to every civ at game start) while it also received an obsoleting advance - a newly created dead-end Advance imaginatively named Z_LAST. The slic file was then edited to include some "Great Leader" unit creation code, but also an additional section - also only 9 lines - in which "Z_LAST" was gifted to the civ which first built the new Wonder.

A new test game was launched and early on we can see that every civ began building the Sargon2 Wonder in multiple cities (**see image #1**). By 2340 BC the race was almost over, with Egypt on the verge of completing the "House of Sargon2" in Memphis (**see image #2**). As you know from the attachment to **Heading 170**, that normally wouldn't matter much because the instant the Wonder was built, other cities such as Tanis and Abydos would continue to work on it - as would every other AI civ in the game.

But that's not what happened. Instead, on the very next turn (2330 BC) Sargon2 has been built (**see image #3**) and both Tanis and Abydos have switched production to Nomads (and given the mass of shields built up in the process of working on Sargon2, those units will be constructed immediately). And - tellingly - no other Egyptian cities are working on Sargon2. In fact, EVERY Civ has switched production to something else. As additional confirmation (**see image #4**), a full 12 turns later we see that only Egypt has built Sargon2, something that is seemingly impossible given the parameters of the "Hard Code Limit".

So how can this be? Well, it's surprisingly simple. Once Egypt built Sargon2, the SLIC code gave them the Obsoleting Advance, and that makes it IMPOSSIBLE for any other civ to build this Wonder. To put the discovery in perspective, it means this: ***Rather than a hard-code limit of 64 Wonders, the real number is UNLIMITED.***

Kind of stunning when you think about it.





177. Unlimited Wonders (what's next?):

Definitely a very exciting discovery, but what does it really mean? We'll start by dampening expectations - an "unlimited number of Wonders" does NOT mean "Wonders with a full set of Wonder attributes". The traditional CtP2 Wonders were noteworthy because they provide a variety of built-in attributes that were easy to activate without any need for coding - increases to science, food, commerce, regard, hitpoints, etc. But all those require the Wonder to be physically located in a City Inventory, which is NOT the case with the "beyond 64" structures.

That said, they can still do a lot of things:

- Trigger a number of existing SLIC events such as Feats and Unit & TIMP creation
- Trigger a nearly unlimited number of other SLIC events
- Have Great Library entries
- Other stuff we haven't even thought about

That may seem rather generic, but let's consider those abilities in the context of the existing Wonders already present in Cradle5:

1) As noted earlier, there are 8 "Great House" Wonders, and all of them deliver units (check), provide Historical background in the GL (check), and provide 1 Gold every turn (check)

2) In addition there are 6 "Religion" Wonders, and all of them deliver units (check), provide Historical background in the GL (check), and deliver a 5% increase in Science every turn (check)

That's a total of 14 Wonders in those two categories alone, ALL of which could be shifted into a "beyond 64" position in the file, without any reduction in their ability to provide EXISTING functionality. So instead of "5 too many" it's more like "9 too few", lol.

That doesn't mean it's time to make wholesale changes to the existing Wonders, but certainly some of those which were eliminated can now return. In addition, this entire exercise required that I take a long hard look at the existing Wonder system, so a number of changes will be made regardless, simply because they make more sense (such as shifting "Internet" from a Wonder to an Advance).

Bottom line, there's a lot to do here, but at least it's going to be fun. Adding is much more pleasant than subtracting!

178. Too many Buildings (revisited):

On the other hand, what about "Too many Buildings"? Can the same discovery help in that area as well? Ummm, no. By design, buildings can be constructed in multiple cities for multiple civs. So the same solution - give an obsolescing Advance to the first Civ which builds one - would NOT work here, unless you greatly altered the code to give that same Advance to ALL civs. But even then, "why bother"? A building of this sort could only exist in one city of one civ, and it still wouldn't be found in City Inventory, and thus would have IDENTICAL properties to all the "beyond 64" Wonders. And since those are unlimited in number anyway.....and far, far easier to code? Well, you get the idea. All of which means that Cradle5 still has an excess of 3 structures in Buildings.txt, but fortunately there are some good solutions available for those.

179. Removing Excess Buildings (Part 1):

1) Religious Victory: As you may recall from in **Heading 143**, the "Religious Victory" building was added as the final structure necessary to achieve the Religion Victory option, following completion of the Hagia Sophia Wonder. As I noted at the time, the building itself can only be constructed once and it never appears in the City Inventory since the game ends the instant it is completed.

When the modified Religious Victory test was successfully performed, this building was located at the #67 position in buildings.txt, so inadvertently we already ran the test which proves the "too many buildings" limit is not a problem for this particular structure, and thus it will remain in the game exactly as-is. Game Impact? **None**.

180. Removing Excess Buildings (Part 2):

2) Orbital Lab: This is a really strange implementation for a building. You can build one in every city - and see it in the Inventory - yet it represents an orbiting space lab. Even if this were a "Far Future Era" structure (which it isn't), it's hard to visualize a scenario where every city on the planet would maintain their own private space laboratories.

In fact, this works MUCH better as a "Wonder" - a single orbiting **Space Station**. The associated Advance is "Space Flight", and as such the very first Space Station would (and historically did) qualify as an amazing technological spectacle, the very personification of a "World Wonder".

The current building gives a 30% Science increase in each city that builds it, but as a Wonder we'll reduce that to 10%, since it immediately benefits the entire Empire. In addition - since this will be a "normal" Wonder using the "built-in" attributes - the host city will gain a Science Specialist. And we'll toss in a free "Space Plane" unit, just for fun! The CtP2 "Solarius" Wonder movie plays when it's built (previously unused in Cradle), and we'll use a screenshot from that for the 2D art (see attached)

Transforming this Building into a Wonder resolves the 2nd of 3 "problem" slots in the buildings.txt file. Game Impact? **Improvement**.



181. Removing Excess Buildings (Part 3):

3) VR Amusement Park: A late-game building, but current technology trends indicate this to be an unlikely version of the future. Virtual Reality is happening at home, not in a large facility you have to physically visit. By contrast, something that is within the realm of "far future" possibility would be the **CtP1 Dinosaur Park Wonder**. For which there is also a TIMP (so it will be a Visible Wonder!) As with the Space Lab, we'll substitute an interesting Wonder in place of an unlikely "building". The movie already exists, but for Cradle 5 it's been edited to remove the CtP1 "bonus description text" appended at the end. The 2D art is a straight copy (**see attached**).

The existing structure provides +3 Happiness in every city which builds it, but that's a bit too much for a Wonder. So we'll drop the bonus to +1 and will also add 2 Scientists to the Specialists in its home city. Since this will be a "normal" Wonder, it can use existing "built-in" Wonder attributes.

To make up for some of the Happiness Loss, we'll add +1 Happiness to the "Incubation Center" which is a nearby structure on the Tech Tree that currently provides only a single benefit - raising the overcrowding level.

In addition, although the VR Amusement Park is enabled by "Neural Interface", the new Wonder will instead be associated with "Genetic Tailoring". Transforming this Building into a Wonder resolves the final "problem" slot in the buildings.txt file. Game Impact? **Improvement**.

With this, the "excess building" problem has been completely resolved.



182. Buildings and Wonders - Current Status: With the changes discussed above, we now have 67 Wonders and 65 Buildings. Looking first at the Wonders, a number of changes were implemented to reach this final total:

1) Although it would have been easy enough to restore **Central Matter Decompiler** and **National Shield**, I chose not to do so. Wonders which exist only to grant free Buildings tend to be overpowered. Especially in the late game period, the most advanced civ will build these two, and that's usually a civ with an already substantial lead.

2) **Resurrection** has likewise been omitted. It really was a "two-fer" Wonder for Christianity (along with Holy Scriptures), plus - as I noted earlier - it was backward looking in assigning great importance to an event which historically wasn't recognized as significant until long after the occurrence.

3) **Internet** remains an Advance, not a Wonder.

4) **Space Station** and **Dinosaur Park** have replaced the Space Lab and VR Amusement Park Buildings.

5) The last three on the list (i.e. the non-City Inventory Wonders numbered 65-67) are the **Great Houses of Sargon, Alexander, and Hannibal**. Those were selected entirely because they are the first to appear, and thus were the easiest to test. Once each is completed, that civ is given the appropriate obsoleting Advance (Z_SARGON, Z_ALEXANDER, or Z_HANNIBAL) and thus no more can be built. Extensive playtesting has shown that this works exactly as intended - the civ which first builds each Wonder is granted the correct Wonder unit (and his retinue), while all other civs shift production to something else. Worth noting that the playtesting also confirmed that the AI civs are happy to steal (or perhaps trade) those Advances, but that is not a problem since they don't do anything other than inhibit construction of something that no civ should be building anyway!

As to the Buildings:

1) **Space Lab** and **VR Amusement Park** have been replaced by the Space Station and Dinosaur Park Wonders.

2) The earlier restoration of **Micro Defense** and **Matter Decompiler** has not been rolled back, especially in light of the removal of the Central Matter Decompiler Wonder. In addition, both buildings provide the sort of building-specific attributes which cannot be duplicated by Wonders or Feats, unlike those granted by the Space Lab (Science) and VR Amusement Park (Happiness).

3) The last Building on the list (i.e. the non-City Inventory Building at number 65) is the **Religious Victory** structure. This was tougher to test realistically since the Religious Victory option is a mid-game event, only available after enough culture points have been accumulated AND it's only available to the builder of the Hagia Sophia Wonder. Nevertheless, I was able to extend two playtests into the 1700 AD and beyond time frame, and in each case the AI civ which built the Wonder is the only civ which can construct this building and win the game. So it's been tested and it works (**see attached**), albeit that identified a grammar problem, lol.

That concludes the extensive effort invested in researching and identifying workarounds for the 64 Wonder and Building Hard Code limit. Time for something else!



183. Wonders - Related Changes:

But before we do that, a few follow-ons to the Wonder-related changes:

1) Using a major religious figure as a Wonder Unit always struck me as something of a disconnect, since all the others are primarily secular in character. Accordingly, the **Muhammad** unit has been replaced by the major Islamic General of that early period, **Khalid ibn al-Walid** (see attached). He appears with the building of Mecca.

2) The **Great House of Alexander** originally was linked to the discovery of Republic, but historically that is too late (among other things, it meant that Hannibal was arriving before Alexander). That has changed, and Alexander's House is now available with the discovery of City State.



184. Playtesting - Issues & Findings:

After resolving the "too many Wonders & Buildings" issue, Cradle 5 is now approaching a "final state", so it was time for a new series of extended playtests. This identified a number of problems, and I'll briefly review them, roughly in the order in which they presented and were resolved:

- 1) Full Civ Revolt CTD:** Initially, all games failed to progress beyond 1200 BC before an unrecoverable CTD brought them to an end. Eventually I traced that back to instances of "full civ revolts" in which EVERY city switches over to a new civ, and apparently that is not something the code can handle. Digging deeper, the unhappiness levels causing these revolts were directly tied to a pair of issues:
 - First, there were improperly high "War Discontent" values in "govern.txt" (see **Heading 147** for a discussion of this mechanism). In particular I foolishly set the threshold to "zero" for Anarchy, which meant that every time a civ switched governments - especially if there were a lot of units in the field - the unhappiness levels spiked beyond the civ's ability to offset it with sliders.
 - The second factor involved the original (as yet unmodified) Cradle 3 settings in DiffDB.txt, specifically those which reduced the cost of everything for the AI - in particular at the higher difficulty settings. The in-game effect was something like MAD (mutually assured destruction) since AI civs could see that their opponents were fielding huge armies, so all sides kept building more and more units until eventually the "War Discontent" values caused a civ-wide revolt and brought everything crashing to the ground.
 - The solution involved fixes to the War Discontent values in govern.txt and replacing the Cradle 3 entries with most of the AE cost, research, and production values in DiffDB. With those two changes, games can now play through to 2025 AD (**see attached**) and beyond.
- 2) Single-City Civ Revolt CTD:** Even after the fixes noted above, it is quite common for single cities to revolt and become a new civ. This is fine, and the game has no problem with it. However, if one of these single-city-civs revolts into a new civ (f/e Nubia revolts and becomes the Inca), that can result in a CTD as well. I couldn't find a fix for that, but you can simply reload the game from the last auto-save and it will continue without a problem. Disconcerting, but not an issue.
- 3) Dynastic House Issue & Great King improvement:** As described way back in **Heading 3**, the Dynasty Advance allows all players to construct the Dynastic House building and receive the "Great King" unit. However, if a civ loses their capital, they can build a new Dynastic House and receive another Great King. Not really a problem in the early game, but potentially this could happen long after the era of Great Kings was over. So now this structure has been given the "ObsoleteAdvance ADVANCE_CITY_STATE" attribute, so it can longer be constructed after the discovery of City State. In a related change, the Great King now has the same movement (from 2 to 3) and vision (1 to 2) attributes as Sargon, and building the Dynastic House also grants the player a free chariot unit.
- 4) Quinquireme Sprite:** Unlike every other unit, the rebuilt Quinquireme sprite had the shield in the center of the ship as it moved around. Not sure how I missed that, but the sprite has now been fixed.
- 5) Wonder Unit Upgrades:** As each civ gained the "Age of Reason" Advance, their Wonder Units upgraded to the Field Marshall/Brigadier replacements, so the new system is working properly (see **Heading 163** for details).
- 6) Emancipation Proclamation:** Although this Wonder eliminated all Slavers and freed all slaves in all cities, it did not stop civs from building new Slavers. Fortunately the SC team added a new Wonder attribute (ProhibitSlavers) and once that was applied to the Emancipation Proclamation Wonder, no further slaver-type units (or abolitionists) could be constructed.
- 7) Pollution:** Several of the test games used unmodded AE, primarily to gauge differences with Cradle in terms of speed and AI aggressiveness. One notable finding is that pollution was a serious problem in all AE games, including numerous Dead Tiles appearing in the Middle Ages and even a Global Warming event prior to 2000 AD. By contrast, in Cradle the effect of pollution is gradual and even by 2000 AD there were no dead tiles (although the "pollution meter" was rising steadily - **see attached**). That's good, because it means no changes are needed to the Cradle pollution settings and buildings.

8) "CanBeExpelled" Attribute: The AI does not understand the true use for Plunder units (disbanding them in cities to gain shields or population), so it uses them to explore. At least that's something, but it's annoying to have them clogging up space inside your territory. A similar but more dangerous problem is when otherwise peaceful civs send Hired Thugs or Assassins to perform their nefarious acts against you, and they too aren't easily removed. All six units now have the "CanBeExpelled" Attribute", which allows them to be evicted at low diplomatic cost.

9) War Elephant size: Elephants are the only "Large" land unit (besides the late-game "Leviathon"), and that means they can't be loaded onto ANY troop carrying vessels. Even tanks are "Medium"! War Elephants now changed to Medium.

10) Wonder TIMP fixes: Several issues cropped up during these playtests.

- The Wonder TIMP code only allowed them to be built on Grassland, Plains or Desert, but frequently those are not available or have been used by other Wonder TIMPs. When that happens, the new Wonder destroys the old by being built on top of it. The solution was to expand the number of acceptable terrain types to Forest, Jungle and Hills.

- Once the AI is able to Terraform, it does not factor in whether a Wonder TIMP is sitting on a terrain type that it wants to transform, destroying the Wonder TIMP in the process. The solution was to add code from the Natural Wonders slic file, so the AI can't do ANYTHING to a tile which contains a Wonder TIMP.

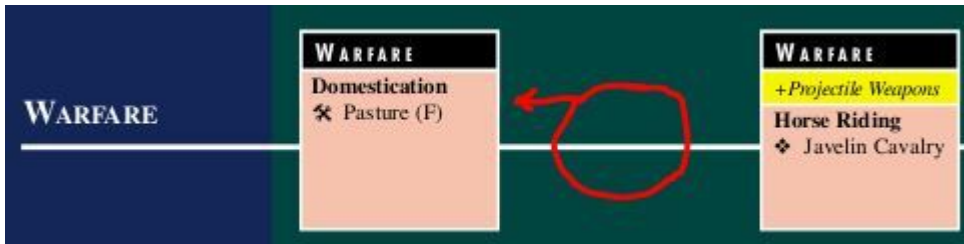
- A few times, one AI civ would gain technological ascendancy over the others, and start building all the Wonders before any other civ could get them, and would usually do so in the best production city. So a single city would begin to acquire ALL the visible wonders, and usually wouldn't have enough room to place them, so all the older wonders would be wiped off the map. The solution was to add a limit of 5 Wonders per city (in Const.txt, MAX_CITY_WONDERS setting changed from 1000 to 5), so it keeps the AI (and the human) from building up a powerful production city and assigning all the Wonders to that one location.



185. As the season turns from Winter '23 to Spring '24, my "modding time" has been greatly reduced as outdoor requirements multiply at the Ranch. That doesn't mean we're at a standstill - rather a lot has been done, just not written up. Anyway, excuses aside there are quite a few interesting developments to report and I'll begin with one that in hindsight seems pretty obvious:

Advances - Move "Domestication" to Level 1:

Historically, the Domestication of plants and animals occurred long before the development of Agriculture, yet in Cradle we find that Agriculture is actually a pre-requisite for Domestication! That doesn't make sense, so in Cradle 5 the Domestication Advance is moved from Level 2 to Level 1 (see attachment), the Agriculture pre-req has been removed, and the research cost reduced from 320 to 180 (same as "Exploration"). Files changed: Advance.txt, GL.txt, Tech Tree



186. The various "problem solving" changes reported back at the end of February (see **Heading 184** above) all involved "Barbarian-Human" playtesting. The primary goal of that activity is for turns to fly by as quickly as possible while searching for CTDs and evaluating AI performance. Once it was clear that all the dangerous CTDs had been eliminated (those which can't be resolved by restarting from the last auto-save, i.e. the type of problem caused by the "system resource" deficiencies which afflict older games), and that the AI was at least moderately competent at defending itself, it was time for a "Normal Civ Human" playtest. That takes a LOT longer, but is absolutely essential in order to identify the multitude of things which can make a game "un-fun". Things like the working of the "Domestication" Advance as reported above. Anyway, there is a LOT of stuff that's been done in that vein, and it's the sort of thing you'll see in the next series of reports. Some of it REALLY simple, others.....well.....complicated. For example here's one annoyance that was fairly easy to alter, but has a surprisingly nice effect in-game:

Elephant Walk sound:

When the "War Elephant" unit moved across the map, it made a "footstep" sound that didn't fit with an animal of this size. Turns out that it was sharing the same sound file as the Infantryman. Accordingly I borrowed the elephant_footstep_02.wav file from my previous mod work in support of Europa Barbarorum 2, modified the number of "footfalls per second" to make it work better in CtP2, renamed it to "Ele_walk.wav", then added a new entry in sounds.txt which references that file (SOUND_MOVE_ELEPHANT) and then assigned it to both Hannibal and the War Elephant. The result is a sound which is exactly what you'd expect to hear when seeing an elephant walking across your screen in Cradle 5. Files changed: sounds.txt & units.txt

187. Militia Unit Systems:

Cradle has a system which uses SLIC code to create "militia" units in newly founded cities. The code is extensive and complex, because the units upgrade over time (from Spearman to Hoplite to Legion, etc) AND they are immobile (and forced to remain so). The code is complex primarily because these are unbuildable units which have statistics that are different from their "Standard" unit equivalents. For example, the Militia Spearman has much better defense than the regular Spearman, and the same is true for the other six Militia types. That kind of functionality comes at a price, however, as the files which control it contain over 1500 lines of slic code dedicated purely to this purpose, and it runs in the background, every turn.

By contrast, AE has a new feature which places a cheap unit in every newly constructed city, and it does not use ANY slic code. It becomes active simply by changing "AIMilitiaUnit=No" to "Yes" in **userprofile.txt**. Implementing this in Cradle 5 resulted in two immediate improvements: First, the number of city captures by the AI increased noticeably (albeit entirely in the early game) and secondly it reduced turn-processing time by a full third. Unfortunately, this new Militia code was apparently never tested thoroughly, because it makes no distinction between "cheap" land & naval units. So pretty soon, Coracles and Biremes started to show up as garrison units for inland cities!

There was no obvious way to fix that (other than by inflating naval unit prices to an excessive degree), so instead I replaced the AE Militia system with a simple 9-line slic script which gives a standard Spearman unit to every newly founded city (human and AI) for the first 300 turns (until 1 AD). That was tested and works perfectly (although the units can move, the AI does not leave cities without garrison units), and personally I like the reduced complexity. That said, the release version of Cradle 5 will still feature the Cradle 3/4 Militia unit system. However, I will include the simpler 9-line system as an alternate which the player can opt to utilize instead.

To do so, simply open the **"Script.slic"** file (in the Cradle5/gamedata folder) and remove the "// " in front of "Updater4.slic" and ADD "// " in front of the "Updater3.slic" and "Homeguard.slic" lines (see **attachment**, which shows the "as-delivered" lines)

```
3085 #include "updater3.slic" → // Modified for Cradle 5 Advances and Units (provides multiple opportunities for older units to upgrade)
3086
3087 // #include "updater4.slic" → // Same as updater3, but without the original Cradle Militia Upgrades
3088
3089 #include "homeguard.slic" → // Implements the original Cradle 3 & 4 Militia Unit system
```

188. Infantry Unit Gap:

When a Civ transitions from Oligarchy to Republic, there are ZERO buildable infantry units available to carry the player through during this transition. **Spearmen** become unbuildable with "Barracks" (the immediate pre-req for Oligarchy) while both **Hoplites** and **Hypaspists** disband at Republic. Meanwhile the next disbanding Infantry unit (**Legion**) isn't available until "Iron Working", so the player has to rely entirely on "Specials" (see **Heading 34**), and there's only one of those (**War Elephant**).

A related problem involves the "plunder" script which grants free units after battle (as discussed in **Heading 37**). Much of this file was altered earlier, but playtesting has uncovered a problem with the unmodified section. From "Barracks" until "Iron Working" the script provides **Hoplites**, but at that point in the game they are only one Advance away from disbanding!

Looking closer at the five Disbanding Infantry units, it seems that two of them (Legion and Man-at-Arms) can exist during THREE gov's, while for Swordsman, Hoplite and Hypaspist it is only TWO. It turns out that if we are consistent and extend availability of the latter three to a THIRD Gov, that solves all the problems:

- * **Swordsman** is still obsolete (unbuildable) with City State but does not disband until Oligarchy
- * **Hoplite** is still obsolete with Republic but does not disband until Dictatorship
- * **Hypaspist** is still obsolete with Republic but does not disband until Dictatorship

Files changed: Units.txt and GL.txt (unit and concept entries)

189. "Food Imports" replace the "Silo" Building:

The **Silo** is a problem for several reasons, in particular since it appears to be shoehorned into the Tech Tree as some sort of intermediate **Granary** (using almost identical 2D graphics), while the text refers to its benefits as being available after the "Agricultural Revolution", which actually is a different building, the **Food Silo**.

In addition, it has benefits which are very similar to those granted by the **Aqueduct**, a building which can be constructed at almost exactly the same time. The attributes of each structure are:

- **Silo**: 1700 Cost, 4 Gold Upkeep, 15% Food, 5 turn Starvation protection
- **Aqueduct**: 1200 Cost, 3 Gold Upkeep, 5% Food, 5 turn Starvation prevention

Clearly there's a high level of redundancy there, all of which contributes to easy City Size growth, which is not something we want to be fostering anyway. Looking at this historical era (late Roman Republic, early Empire), the Romans had developed a food import system without which the people of Rome would starve. And in fact, Greek City States used similar methods throughout their history.

Breaking that down, it's a system which provides food for coastal cities since it's only economical to transport large amounts of food by sea. So that suggests a "building" which can only be constructed in port cities, provides a regular supply of food, no starvation protection (the people eat what comes in, it isn't stored) and lastly it should be expensive to build and maintain, since we are replicating the entire system, not just a single structure. Those parameters suggest a revised building with the following attributes:

- **Food Imports** (new building name - **see attached**): Coastal cities only, 2000 Cost, 5 Gold Upkeep, 10% Food, 0 turn Starvation protection. And given the total reliance on the Sea, and the current position on the Tech Tree, the granting Advance will be "Hullmaking". Another option would be to create a new "Sea" Advance located between Map Making (L5) and Hullmaking (L7), but at least for now that's an unnecessary complication.

Lastly, since this isn't really a building it will not have (or be) a PrerequisiteBuilding for any other structures. For example, **Granary** is currently a pre-req for **Silo** which in turn is a pre-req for **Food Silo**. With this change, there won't be a PrerequisiteBuilding for **Food Imports**, while **Granary** becomes the pre-req for **Food Silo**. Files changed: uniticon.txt, buildings.txt, BuildingBuildLists.txt, gl_str.txt, GL.txt & Tech Tree plus new 2D art



190. The path from Oligarchy to Republic to Dictatorship to Tribunal Empire:

The extended human playtest identified some issues involving all the mid-to-late Ancient-era Govs. Linkages between the Ancient-era gov's were identified as a problem back in **Heading 35**, and while that solution was beneficial, the issue wasn't fully resolved.

1) The first problem is there's **no Advance between Oligarchy & Republic**:

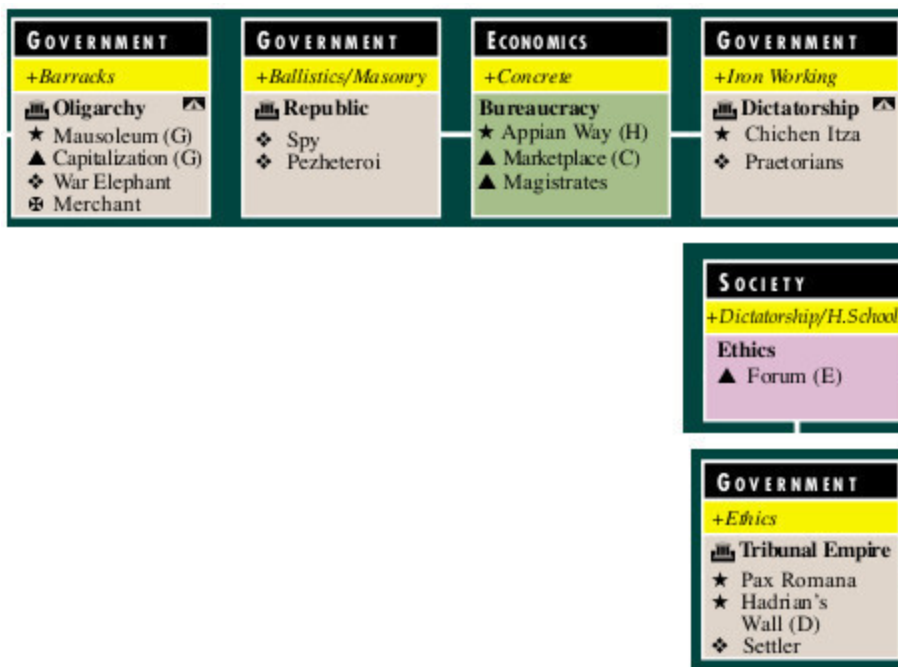
Which means that immediately after discovering Oligarchy, the player has the option to skip it altogether and simply wait a few more turns to research and choose Republic. The least intrusive solution involves changing the "Compound Bow" pre-req from "Barracks" to Oligarchy (which already has the "Barracks" pre-req). The "Ballistics" Advance requires "Compound Bow" and currently leads to "Ballista Towers" (which is fine). But now we'll make "Ballistics" the pre-req for Republic instead of Oligarchy and that creates linkage and space between the two gov-types.

2) The second problem is there's **no Advance between Republic & Dictatorship**:

Fortunately there's an easy fix for this. Simply change the "Bureaucracy" pre-req from Oligarchy to Republic and then make "Bureaucracy" the pre-req for Dictatorship instead of Tribunal Empire.

3) The third problem is there's **no link between Dictatorship & Tribunal Empire**, and in fact you can get either one before the other: The Great Library tells us that Dictatorship is the period between the Roman Republic and the Empire, so it's clear that we need to establish a path which leads from Republic to Dictatorship to Tribunal Empire. Here again there's a simple solution. "Ethics" is already a pre-req for Tribunal Empire, but now we change the "Ethics" pre-req from Republic to Dictatorship and that provides both the link from Dictatorship to Tribunal Empire and puts an Advance in between.

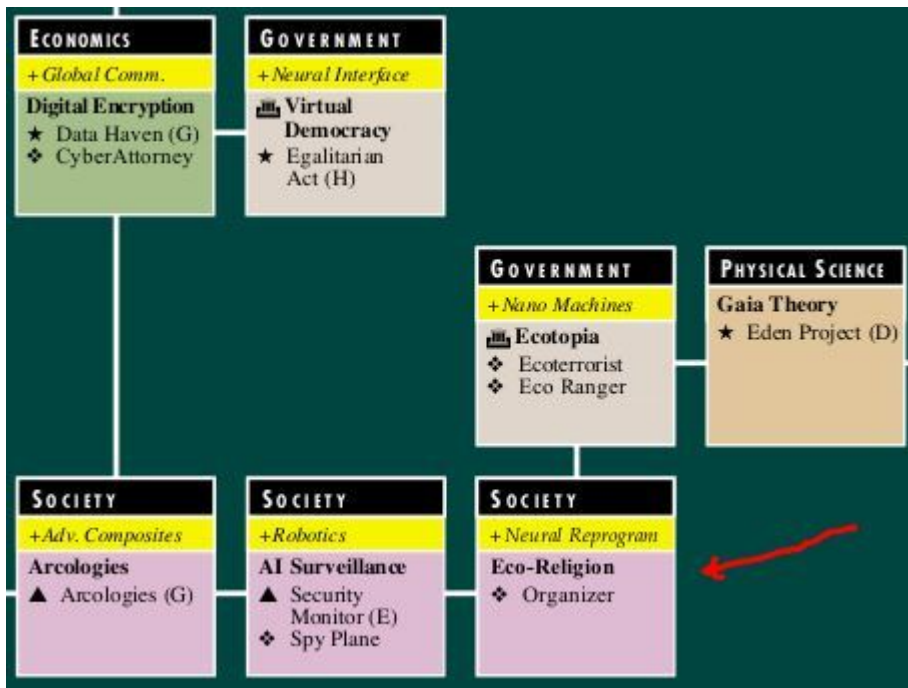
Files changed: Advance.txt, GL.txt & Tech Tree (**see attached**)



191. Eco-Religion Advance:

Inevitably, my work on the chain of Advances leading from Oligarchy to Tribunal Empire (see above) suggested that it would be a good idea to look for similar issues affecting the rest of the governments. Fortunately, in most cases there are no direct links leading from one to another, but there is one exception - **Virtual Democracy** is the pre-req for **Ecotopia**. Both are late-game CtP2 govs, and this linkage has always been part of the base game. However, reading through the descriptions and history, there's really no connection whatsoever between the two, and in fact they are polar opposites in almost every way. Accordingly, I've added a new Advance in the "Social" series called **Eco-Religion**, and it describes the process by which the Environmental movement becomes radicalized, ultimately leading to the extremist Ecotopian Government. This new Advance has the AI Surveillance and Neural Reprogramming pre-reqs, and replaces Virtual Democracy as the pre-req for Ecotopia.

Files changed: uniticon.txt, Advance.txt, advancelists.txt, gl_str.txt, GL.txt & Tech Tree plus new 2D art



192. New "Organizer" Unit:

As some of you may have noticed, the **Eco-Religion** Advance block in the Tech Tree attachment (above) includes a new unit, the **Organizer**. The rationale is that we have a new quasi-religious Advance which talks about using conversions to gain adherents, so the idea is to add a unit which "paves the way" for the **Ecotopia** by converting enemy cities to the "new religion".

The Ctp1 Forever Future mod has already provided two new female sprites for Cradle5 (Assassin and the Plunder II "captive"), and in this case we'll use one more (**see attached**). The sprite had a slight issue with the Idle animation (only worked in one direction) so it was deconstructed and rebuilt (130 images) and now serves as the new Organizer.

This unit will be fairly cheap for the late-game era, and has the ability to "Convert Cities" (low probability of success and death) and "Raise Money" (Sale of Indulgences). As with some other civilian units, the Organizer has Stealth but cannot see other Stealth units and has limited vision range (in other words, you can't use her as a "spy"). She is also gov-specific, and can only exist under the final three gov-types (Technocracy, Virtual Democracy and Ecotopia).

Files changed: newsprite.txt, uniticon.txt, sounds.txt (plus 4 new sound files), Units.txt, UnitBuildLists.txt, gl_str.txt, GL.txt, Tech Tree, new Sprite and 2D art.



193. "Birth of an Empire" victory (Part 1):

As noted earlier, Cradle has replaced the late-game CtP2 "Science Victory" with the ancient-era "Birth of an Empire", which essentially means a player has been able to duplicate the Roman Empire at its height. All of the pieces required for the Science Victory have been renamed to better fit this new incarnation, and that includes the enabling Advances, various Costs, and everything else. This turned out to be a much more complicated system than I first realized, plus several changes have been made for Cradle 5. Accordingly, let's review all the main features:

1) Once a player discovers the "Tribunal Empire" Advance, they can build the **Pax Romana** Wonder (the CtP2 **Solaris Project**). That Wonder is the first element in the Birth of an Empire Victory option, and it must be completed before any of the other requirements can be constructed. What I did NOT realize is that "Wonder completion" allows EVERY PLAYER - not just the Wonder owner - to pursue this victory! Very important to remember that.

2) The second required element is that a player has to construct an **Arch** building in 25 cities (the CtP2 **Gaia Computer**). The building can only be constructed following completion of Pax Romana AND if the player has discovered the "Concrete" Advance (changed from "Bureaucracy" in Cradle 3/4). In addition, a city can only build an Arch if it already has a Shrine, a Granary, a Bazaar, a Ziggurat and a Work Camp in the City Inventory. Arches are very expensive to build (Production Cost = 2000) and maintain (Upkeep = 15)

3) The third required element is for the player to construct a minimum of 25 **Magistrates** (see attached). This was called the **Power Satellite** in CtP2, and the **Monument** in Cradle 3/4. These have the "Bureaucracy" Advance pre-req, and again, can only be built after a Civ has completed Pax Romana. Technically these are buildings, but they do NOT appear in the City Inventory, meaning they operate in every way just like a building that is listed after #64 in buildings.txt ([see description of that particular problem in Post # 223](#)). It would have been nice if this "building" could have moved to the end of that list (thus freeing a slot for something else), but alas it didn't work, despite tons of tweaking and testing. Importantly, there is NO LIMIT to the number which can be built by any single city, so long as that city already has Conscripted Labor, an Arena, a Forum and a Physician in the City Inventory. Unlike the Arch, there is also a "maximum" value associated with Magistrates: If the player constructs 50 or more, that doubles the "cultural coverage" provided by each Colony (more on that next).

4) The fourth requirement is for the player to construct at least 10 **Colonies** (the CtP2 **Processing Tower**). These are Tile Improvements, have the "Civic Engineering" Advance pre-req, and as with the others, can only be built after somebody has completed Pax Romana ([also see post # 156 for a different way to create Colonies](#)). Each Colony projects a 10-hex "cultural radius", and this can double to 20 hexes if a player constructs 50 or more Magistrates. In addition to the count of colonies, this victory element requires that 50% of the map be covered by the cultural radius.

That's all well and good, but since Magistrates are not listed in the City Inventory, how can you keep track of how many were built? Even worse, the "cultural radius" does not appear on the game map! How then is it possible to monitor progress toward this victory, much less attain it? Fortunately that's not a problem, as we'll see in the next post.



194. "Birth of an Empire" victory (Part 2):

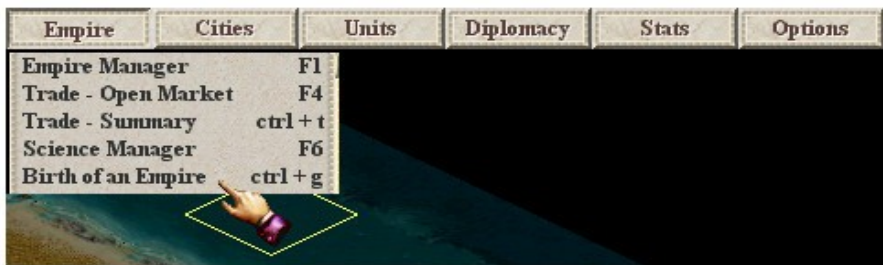
The player can easily track the progress of this Victory by clicking the "Empire" button on the top left of the screen (**see top image** on the attachment) and then clicking the "Birth of an Empire" selection (or use the ctrl+g hotkeys).

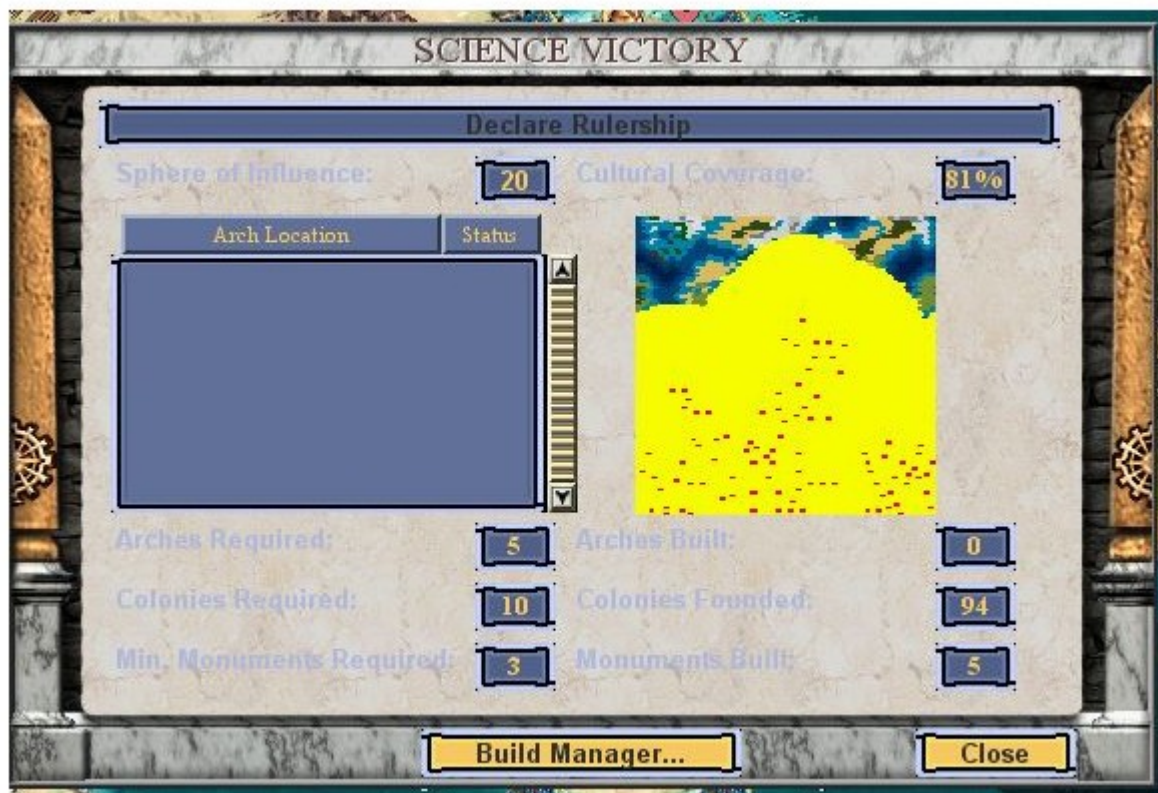
The original screen (**see 2nd image**) was very "techy" in appearance (as befits a late game Science Victory) and Hexagonian modified it for Cradle 3 (**see 3rd image**). That was better, but it's been improved even further for Cradle 5 (**see 4th image**). We now have a better mix of colors and thinner frames which keep the text from bleeding into them.

Looking closer at the last image, you'll see a large yellow circle in the bottom right of the game map window. This is the 10-hex "cultural radius" surrounding the one colony, and covers 6% of the map (see the "Cultural Coverage" value in the box just above the top right corner of the map). As additional colonies are built, new areas of yellow appear on the map. For example, the third image shows a map in which 94 colonies were built, and the "Cultural Coverage" comprises 81% of the map. Please note that "coverage" is the total amount of "yellow" on the map (not a sum of individual radii), so that two adjacent colonies will project a nearly identical radius. Separating your colonies will provide coverage to a much greater area.

When all elements of the Victory have been satisfied, the color of the "Declare Empire" button at the top of the tracking screen will change to Gold (same color as the "Build Manager" button on the bottom). Clicking the button will start a countdown and so long as all elements of the Victory remain intact, you will win the game in 5 turns.

Lastly, a new "Victory Movie" has been created for "Birth of an Empire". This was made by editing the opening sequence of the CtP1 intro movie, which features a trireme approaching an unknown shore and culminates with a centurion planting a staff bearing the CTP symbol.



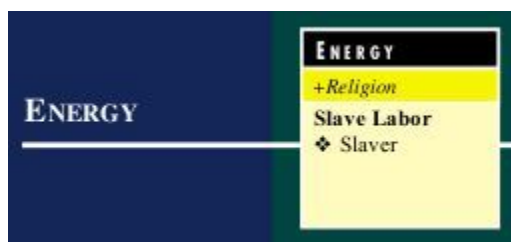


195. Adjustments to three Advances: Shifting **Domestication** from L2 to L1 and moving the Alexander Wonder from **Republic** to **City State** made a lot of sense but the extended playtest caused me to look closer at the Tech Tree positioning of several other Advances and Wonders (and thus their location in the historical timeline). Several stood out as an issue, and we'll start with a few of the Advances:

1) Slave Labor Advance: It seems odd that this would be a "Society" Advance, especially since historically the first instances on record are associated with Warfare. Instead we'll shift it over to the poorly populated "Energy" series (**see attached**), since that's what Slave Labor was really all about - "free" energy. Also, we'll remove the **Stoneworking** pre-req but keep **Religion** (a Level 1 Advance should not have two pre-reqs).

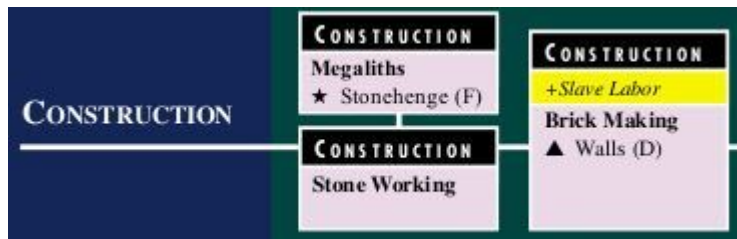
2) Jurisprudence Advance pre-req: In the earlier versions of Cradle the pre-req was changed from Monotheism to **Judaism**, but it's not clear why. Realistically, primitive Judaism is sort of assumed as the original form of Monotheism (hence the Temple of Solomon Wonder), but not the formalized version which appears after the Babylonian Captivity (as represented by the Torah). Will revert the pre-req back to **Monotheism**.

3) Christianity Advance pre-req: One of two pre-reqs is **Monotheism**, but that is already part of the sequence which leads to the other pre-req, **Ethics**. However, with its removal from **Jurisprudence**, Judaism is now a "dead-end" Advance, although historically it was the true precursor to Christianity. **Judaism** is now the pre-req.



196. Stonehenge Wonder: Historically this is the oldest Wonder, yet it's associated with the Level 2 **Astronomy** Advance alongside the "Ziggurat", a building from a later period. The solution required the creation of a new Advance called **Megaliths** (**see attached**) placed at L1 in the "Construction" group alongside its immediate pre-req (**Stone Working**). Megaliths is a low cost Advance, but also a "dead end", so the player has to balance the desire for acquiring an early game Wonder versus potentially falling behind in the Tech Race.

As for Stone Working, that will become the pre-req for **Religion** (previously there wasn't one) which links the "Construction" series into the path leading to most of the early building-granting Advances. The 2D art for Megaliths was taken from the Astronomy Advance (which gets new art featuring a Babylonian Star Disk).



197. Pyramids Wonder: This Wonder is associated with the L2 **Brick Making** Advance, yet the Pyramids were constructed from stone. By contrast, **Ceremonial Burial** is another L2 Advance and offers no direct benefits (buildings, Wonders, etc). This is odd, because you'd be hard pressed to find a more exemplary structure to accompany this Advance than the Pyramids! Done (**see attached**).

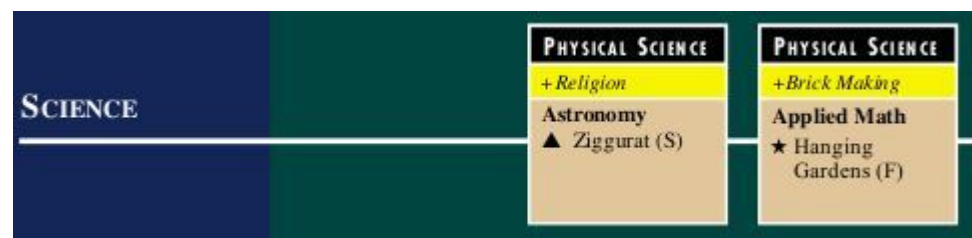


198. Code of Hammurabi Wonder: This was originally associated with the L4 **Jurisprudence** Advance, but that means it appears long after its true historical era. Moving this to L2 **Writing** is a good fit because that Advance doesn't have any associated units or buildings. Obviously, one of the noteworthy things about the "Code" is that it was written down, so it's a logical link.



199. Hanging Gardens Wonder: This Wonder is associated with the Level 6 **Aqueducts** Advance, and thus can't be built until long after it historically appeared. Even worse, it grants a free Aqueduct in every city, which is pretty overpowered and realistically there's no connection between that benefit and this Wonder, since the historical structure was not a "Garden" but rather a Ziggurat.

Thus the logical shift is to the L3 **Applied Math** Advance which has no associated benefits and immediately follows **Astronomy**. That also suggests a more appropriate benefit: A 5% Science boost and a free scientist to the city which builds it, since this aligns with the benefits granted by the Ziggurat building in the prior Advance. In addition, we'll add **Brick Making** as a pre-req for Applied Math since you definitely need bricks for the Hanging Gardens! This will also ensure that the associated Nebuchadnezzar Wonder Unit does not appear until after his historical predecessors, Hammurabi (Code) and Khufu (Pyramids).



200. Scripto becomes Spartacus:

One of the more unusual Wonder Units is the Gladiator named **Scripto** who appears after a player builds the Colosseum. A curious choice, especially since research has failed to identify any reference to a gladiator with that name. Possibly it's something very obscure, like a name written on a wall next to a portrayal of a gladiator (such as seen in the ancient graffiti in Pompeii), but even so it's a real contrast to the other Wonder Units, all of whom portray well-known historical figures. At one time I considered changing the name to **Spartacus**, but that was a lot of work just for a name change. However, while reviewing the existing Wonder Unit attributes and considering new ones (a project to be reviewed in an upcoming post) an interesting option was to give this unit the "UndergroundRailway" attribute, and thus the ability to "free slaves".

That changes things completely, because the most famous slave revolt of ancient times was the rebellion led by Spartacus. It's obviously an imperfect analogy since this Wonder Unit frees slaves owned by OTHER civs, and thus isn't a threat to his owners. Even so it's an interesting ability, especially since this unit had no other special attributes and simply functioned as a powerful infantry unit (which wasn't historically true, anyway). Only two other units have this ability (Patriarch and the Abolitionist), and while the cost of this Special Attack is very low (50 gold per attempt), that is offset by relatively high "DeathChance" attributes for both units. For Spartacus however, we'll alter things by significantly reducing the chance of success to 15% and setting DeathChance to just 5%. So it becomes an interesting, low risk option for the player.

Worth noting that this is NOT the "SlaveUprising" special attack. Unfortunately (as described in Item 4 of **Heading 100**) that attack is almost certain to fail and has other nasty side effects. Which is too bad, as otherwise it would be a perfect fit! The "ExertsMartialLaw" attribute will also be removed since historically rebellious gladiators weren't a reliable source of law and order in ancient cities. Lastly, there is also a button conflict between "Free Slaves" and "Reform City" (both at location 2-4), so the latter attribute will have to be removed from Spartacus.

Files changed: newsprite.txt, uniticon.txt, wonderunits.slc, wonderunits2.slc, Units.txt, gl_str.txt & GL.txt



201. Zone of Control Concept Entry:

Curiously, **Zone of Control** (or ZOC) is completely undefined in the CtP2 Manual, and is referred to only once in the Great Library (under the CONCEPT_ALLIANCE entry). Nevertheless, it's an important concept because ZOC is the "diamond" of 8 hexes which surround all units and cities (the latter are considered "units" by the CtP2 code). The default coding assumes that all units have an active ZOC, which means that units belonging to a different civ cannot move from one ZOC hex directly into another (**see attached example**). However, this default behavior can be altered in three ways:

1) Units with the **IgnoreZOC** attribute do exactly that - they can march from one ZOC hex into another with no restrictions. Most of the civilian units in Cradle have this attribute.

2) Units with the **NoZoc** attribute do NOT project a ZOC and units from any other civ can move through their 8 hex "diamond" without any restrictions. Most of the military units in Cradle have this attribute, since it improves AI pathfinding ability. The exceptions are Cities (all of which project an active ZOC), two of the largest naval units (Battleship and Dreadnaught) and 11 of the 30 Wonder Units.

3) ZOC restrictions also do not apply between units of civs bound by an **Alliance**.

Files changed: concept.txt, uniticon.txt, gl_str.txt, GL.txt & new 2D art



202. Modified Attributes for most Wonder units:

While re-arranging the early game Wonders (as described in several of the posts above), I also examined the associated Wonder Units and their attributes. The initial focus was on same-era units that had different attributes, such as Sargon's ability to enslave while his cultural contemporary Nebuchadnezzar could not. This led to a wider look at ALL the Wonder units, which identified additional issues:

- Too many ancient-era units could project a **Zone of Control**
- Many units had the **Bombard** ability prior to the existence of onager-type weapons
- A large number of units were given the semi-functional **Siege** attribute (only works for the AI)

In addition, the SC Team added a number of new attributes to the Units Database, none of which were being utilized in Cradle. Several in particular seemed quite useful:

- **CanHarvest** adds terrain gold to the treasury when entrenched. Basically a form of non-destructive pillaging.
- **AlwaysHeal** allows units to heal in the field even after moving. Not a complete "return to Health", but the same level of healing granted to a unit that didn't move at all.
- **Sneakbombard** supposedly allows units to bombard without war being declared, but unfortunately I could not get it to function. Would have been a nice addition for units like Sun Tzu and Genghis, but alas, no.

As you can see from the attachment, this was a comprehensive review in which the attributes of almost every Wonder Unit were adjusted to some degree.

Files changed: Units.txt & GL.txt

			11	15	13	14	9	7	5	14	5	1	4
Count	Wonder Unit	Era	ZOC	Bombard	Enslavement	Siege	Beach Assault	BonusAgainst	Convert	Plunder	CanHarvest	Free Slaves	AlwaysHeal
1	Great General	Ancient		X									
1	Hero	Ancient					X						
2	Great King	Ancient			X	X							
6	Alexander	Ancient	X	Remove	X	X	X	X		X			
6	Genghis	Medieval	X	Remove	X	X		X		X			X
3	Sargon	Ancient	Remove		X	X				X			
5	Hannibal	Ancient	X	X	X	X				X			
6	Caesar	Ancient	X	X	X	X	X	Remove		X			
4	Atilla	Medieval	Remove	Remove		X		X		X	X		
6	Saladin	Medieval	X	X	X	X		X		X			
4	Charlemagne	Medieval	X			Remove		X	X	X			
5	Hernan Cortes	Renaissance	Remove	X			X		X	X	X		
4	Ulysses Grant	Industrial	X	X			X			X			
3	Dwight Eisenhower	Modern	X	X			X						
3	Norman Schwarzkopf	Modern	X	X			X						
2	David	Ancient				Remove			X		X		
2	Hammurabi	Ancient	Remove		X	X							
2	Khufu	Ancient			X	X							
3	Leonidas	Ancient				Remove		X			X		X
4	Marius	Ancient		X	X	X		X					
3	Khalid ibn al-Walid	Medieval		X		X			X				
2	Nebuchadnezzar	Ancient	Remove	Remove	X	X					X		
3	Pacal	Medieval			X	Remove			X				
2	Ramesses	Ancient	Remove		X	X							
2	Spartacus	Ancient										X	X
2	Sun Tzu	Ancient		X		Remove							X
3	Field Marshall	Industrial	X	X						X			
3	Brigadier	Industrial		X			X	Remove		X			
3	General	Modern	X	X						X			
3	Colonel	Modern		X			X			X			

203. Various changes and new features:

- 1) New Religious Victory Movie:** As noted above, a new victory movie was created for "Birth of an Empire", and the same process (editing the CtP1 Intro movie) was used to create a new Movie for the Religious Victory. Tested and works fine.
- 2) New Science Feat:** An additional Feat has been added for the builder of the first 5 Ziggurats, since there should be an early game Science Feat.
- 3) Advance Discovery Feats:** The first civ to discover each of 13 Advances (f/e Concrete, Internet, Robotics, etc) get a Feat Bonus, but that information was not included in the Great Library. It is now.
- 4) Dark Age Duration:** The Minoans and Mayans have "Dark Age" Feats which last for 100 turns. By contrast, there are only 6 other Civs with Dark Ages, and their duration is either 20 or 30 turns. I've experienced the longer ones, and they seem to last forever (1000 years!) Accordingly we'll drop them from 100 to 50 turns.
- 5) Advance Links:** Changed the flow of Advances so that "Tank Warfare" is no longer a dead end but is part of the chain leading to "Combined Arms" (which includes the "Heavy Tank").
- 6) Advance Links (con):** Likewise, "Naval Aviation" now flows into the "Flight" series of Advances as a pre-req for "Jet Propulsion" replacing the redundant "Modern Metallurgy (already part of that chain).
- 7) Convert City:** Success and Death Rates for the dedicated Religious Units were inconsistent. As just one example, the Cleric's death rate was very high (.5) while the earlier Prophet was quite a bit lower (.3), but all needed tweaking. Several of the Wonder units also have this ability but their chance of success is very low (.4 or less), which is offset by no chance of dying.
- 8) Advance Cost adjustments:** Reviewed all L1 thru L4 Advances and revised some of the research costs (some higher, some lower), mostly to account for moving several of the Wonders to Advances that previously had no benefits. The main change was to L4, which had a big disconnect in research costs: Half of them averaged 800 (roughly the same as L3) while the rest were around 1500. Now all are 1000 or more. The average increase was kept to 80 by instituting a huge reduction in the "Chariots" Advance (from 1700 to 1000).
- 9) "NoZOC" attribute for Destroyer unit:** Only three "non-Wonder" military units have ZOC; Battleship, Destroyer, & Dreadnaught. Of those I can see the rationale (sort of) for Battleship given its size and "over-the-horizon" gun range (and Dreadnaught if only because that is the upgrade from Battleship), but Destroyer doesn't make sense, especially since it has short range guns and upgrades to Plasma Destroyer (which does not have ZOC).

10) Changed "Injoined" to "Disrupted": When a city is "sabotaged", the text in the Infobar (bottom of the screen) said "injoined". Unfortunately this is controlled by the `Idl_str.txt` file (one of those which can't be swapped), so we'll need a generic term that applies to BOTH "sabotage" (the ancient era attack) and "injoin" (the modern version). "Production Halted" worked for both, but is much longer (18 characters) than any other messages in this location. Eventually I settled on "Disrupted", which applies regardless of era. As an aside, I ran a test to see how the Infobar handled multiple results, specifically an enemy city that was Converted, Franchised, Disrupted, and Watchful. In this case the city name was short enough so the "Infobar" could display all of that text (**see attached**), but otherwise the screen fits as many characters as possible and then ends the line with a series of periods (...)



204. Mod Status Report after 2 years: Exactly 2 years ago, this thread kicked off, and I'd have to say it's been an interesting journey. Learned much along the way, but what about the initial goal? A version of Hexagonian's Cradle that is fully compatible with the Apolyton Edition? As veteran thread viewers might well agree, the answer is yes. For the past week+ I've been running a long "human game", and it's been.....fun. So while there's a lot which could be done to tweak and improve further, maybe it's just time to send this out there and see what others think.

Technically that means putting a halt to further changes, solidify the "Era Swap"and then hosting. But it is kind of cool to see the end most definitely in sight.

205. IncreaseScientists Attribute for Wonders:

The promised release is going to be delayed for a while because the current playtest has revealed the actual workings of a number of game mechanisms that I previously assumed were bugged. The first of these is the "IncreaseScientists" attribute used by several Wonders. The GL variously reports this capability as either "Increasing Science in the Host City" or "Increasing Science Specialists in the Host City". As it turns out, NEITHER of these is strictly true.

As you can see in the attachment below, the Science Points in Ashur are "11" both before and after completion of the new Great Library Wonder. Nor were there any additional Science Specialists. So what's going on?

CITY MANAGER
Ashur* Mayor

Optimize Specialists

Specialist	Count	Efficiency	Buttons	Value
Workers	2			
Citizens	2			
Slaves	0			
Entertainers	0			+0
Farmers	0			+0
Laborers	0			+0
Merchants	0			+0
Scientists	0			+0

Population
20000
20 7 45 11
Growth +750
Happiness: 82

Buildings
Capitol 0
Forge 2
Great Library 119
Bazaar 17
Courthouse 19

Buttons
Sell 400 Activate Disband Rush Buy 58455

Bottom Bar
Advice Natl Manager Build Close

CITY MANAGER
Ashur* Mayor

Optimize Specialists

Specialist	Count	Efficiency	Buttons	Value
Workers	2			
Citizens	2			
Slaves	0			
Entertainers	0			+0
Farmers	0			+0
Laborers	0			+0
Merchants	0			+0
Scientists	0			+0

Population
20750
20 7 45 11
Growth +750
Happiness: 82

Buildings
Capitol 0
Forge 2
Great Library 19
Bazaar 19
Courthouse 21

Buttons
Sell 400 Activate Disband Rush Buy 4422

Bottom Bar
Advice Natl Manager Build Close

206. IncreaseScientists Attribute for Wonders (con):

Here's the key - as the next attachment shows, **the increase in Science only occurs when Science Specialists are assigned**. Before the arrival of the Great Library, Specialists increased the Science Points from 11 to 22, but AFTER the Wonder is built, the Specialists increase the number to 26. Keep in mind that Science Points are affected by a large number of things, including Gov types, Feats, Improvements, and other Wonders, so the quantity of "point increase" is variable and will constantly change as your game progresses.

CITY MANAGER

Optimize Specialists | Ashur* | Mayor

Specialist	Count	Efficiency	Science Points
Workers	2		
Citizens	1		
Slaves	0		
Entertainers	0		
Farmers	0		
Laborers	0		
Merchants	0		
Scientists	1		22

Population: 20000
Growth: +375
Happiness: 82

Capitol: 0
Forge: 2

Great Library: 153
Bazaar: 22
Courthouse: 24

Sell: 400 | Activate | Disband | Rush Buy: 58455

Advice | Natl Manager | Build | Close

CITY MANAGER

Optimize Specialists | Ashur* | Mayor

Specialist	Count	Efficiency	Science Points
Workers	2		
Citizens	1		
Slaves	0		
Entertainers	0		
Farmers	0		
Laborers	0		
Merchants	0		
Scientists	1		26

Population: 20750
Growth: +375
Happiness: 82

Capitol: 0
Forge: 2
Great Library: 24

Bazaar: 24
Courthouse: 28

Sell: 400 | Activate | Disband | Rush Buy: 4422

Advice | Natl Manager | Build | Close

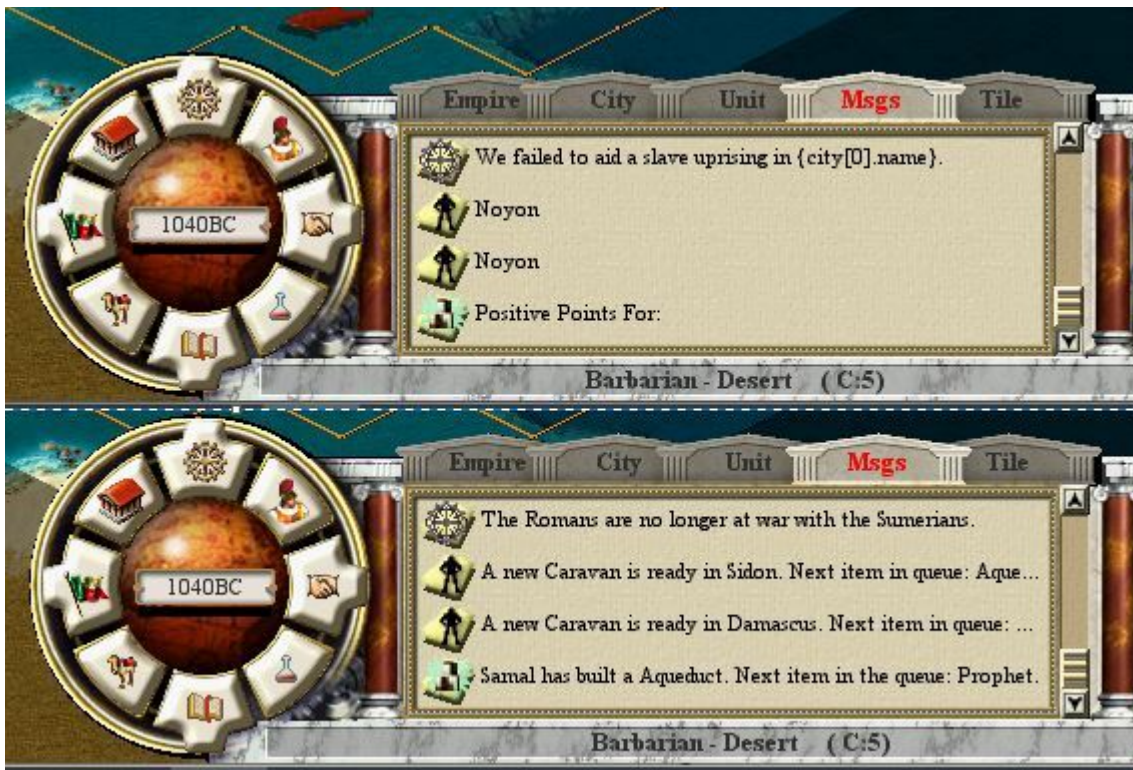
207. String File edits and Message Corruption:

While discussing the "Swap File Solution" earlier (see **Heading 110** above), I commented that "you can swap almost any file and see the changes immediately simply by loading your Save game", but that string files were an exception because "even a ONE WORD change to a SINGLE MESSAGE results in the corruption of EVERY MESSAGE!" However, despite the capitalizations, that is not true.

During the ongoing playtest I made a number of message changes (planning to implement them later), but accidentally left a few in place and soon realized there was no message corruption whatsoever. Further testing showed that you can make any number of changes to EXISTING messages, but that message corruption only occurs if you add NEW ones.

The attachment shows an example of each - the upper screenshot shows the Messages you get when adding a single line to **info_str.txt**, while the one below shows the messages after editing an existing line. You'll notice that the "messageicons" are identical in each example, and that's because they are reporting the SAME events, except - obviously - the text on top is corrupt.

Looking back, I was editing AND adding, and thus didn't realize there was a difference. Anyway, this means that "Message Editing" is back on the menu as part of the Swap File changes. As just one example, the Infobar text was recently changed to "Disrupted", that being a generic message which could apply to cities that were "Sabotaged" (Ancient Era) or "Injoined" (Modern Era) (see item 10 in **Heading 203** above). But now we can have both, simply by including different versions of **Idl_str.txt** in each Swap File.



208. City "Area of Influence":

Neither the Great Library nor the Manual talk about the difference between population growth limits (controlled by buildings) and the population levels needed to expand a city's **Area of Influence** (the hexes within the dotted white line perimeter which are available to be "worked" by the city residents - **see attached example**). For example city populations are locked at 12 until you can build an Apothecary, but the area of influence expands when the population goes from 8 to 9.

Accordingly, there's going to be a new concept entry for "City Influence" so the player realizes that Level 1 (8 hexes surrounding the city) is for pop sizes 1-8, Level 2 (an additional 12 hexes) is for pop sizes 9-20, Level 3 (an additional 24 hexes) is for pop sizes 21-32, Level 4 (an additional 12 hexes) is for pop sizes 33-46, and Level 5 (an additional 12 hexes) is for all population levels in excess of 47.

That of course is helpful information, but there's a lot more to this than meets the eye, as we'll discuss in a subsequent post. But first we'll have to clarify some associated language.



209. City Population: Workers-Citizens-Slaves:

The Great Library entries are somewhat confusing when it comes to defining the difference between Slaves, Workers, and Citizens. Even the "City Manager" screen incorrectly implies (or at least it did - now fixed - **see attached**) that Slaves are Citizens by showing "Citizens" as the sum of Slaves + Workers. While the GL does have entries for Workers and Slaves, it says nothing directly about "Citizens", and thus a new concept entry has been created to fill that gap.

The game clearly intends that Citizens and Slaves be handled as a single "Worker" entity when you look at the sliders on the "Domestic Policy" tab since it does not differentiate between the two in the context of global work hours, wages, and food (although the Slave entry in the GL says they only eat half the food allowance)

However, they are definitely NOT the same thing, since Citizens have a number of abilities which Slaves do not, thus making them much more valuable:

- Only Citizens can be assigned as Specialists.
- Building a Unit with the "Settle" ability (such as the Nomad) requires (and expends) one Citizen from the city's Population.
- Once a City expands its Area of Influence, a certain number of non-Specialist Citizens are required in order for a city to access Trade Goods located within the expanded area.

The third point is not intuitive (nor explained in the manual), but it's critically important that the player understand exactly what that means. We'll discuss it next.



210. The Case of the Missing Trade Goods:

For as long as I can remember, one aspect of CtP2 gameplay defied explanation - invariably some Goods located within the City Area of Influence were simply not available for trade. There didn't seem to be any rhyme or reason since oftentimes the same Good could be traded from a different city, and individual cities themselves could trade some Goods but not others.

More an annoyance than anything, it wasn't something I pursued until the current playtest when the chickens really came home to roost. In Cradle 5 you need access to a **Horse Good** in order to build the more advanced Cavalry Units, and that need was met because Rome was trading Horses with my civ (Phoenicians). The rude awakening came when Rome canceled the Trade Route and suddenly Cav units were (literally) no longer on the menu.

But the truly frustrating part was that my city of Enkomi had a Horse Good within its Area of Influence, yet that Good was NOT available for Trade (**see attached**), nor - apparently - able to meet the Horse Requirement for the building of Cav Units. What in the name of all that's holy could possibly cause this???



211. The Case of the Missing Trade Goods (con):

I'll spare you the torturous testing and all the dead-end theories and take you right to the heart of things: **Non-Specialist Citizens (see attached)**. Enkomi had a total population of 16, including 9 Citizens and 7 Slaves. Two of the Citizens were assigned as Labor Specialists in order to speed up Production. But what happens if we re-assign just one of those Citizens back to the non-Specialist Worker pool?

CITY MANAGER

Optimize Specialists | **Enkomi** | Mayor ☐

Workers	16	Growth Turns	999	Conversion Loss	0
Citizens	7	Crime	5%	Franchise Loss	0
Slaves	7	Happiness:			
Population	164950	Military Units -2			
Efficiency	<div><div></div></div>	Pollution -1			
Entertainers	0	Empire size -1			
Farmers	0	Capitol Distance -1			
Laborers	2	Pollution: 54			
Merchants	0	Pollution from Population 67			
Scientists	0	Aqueduct -6			
		Apothecary -6			

Academy 4 | **Prophet** 1

Agora 0 | City Wall 7

Apothecary 2 | Theater 4

Aqueduct 3

Bazaar 0

Courthouse 1

Forge 2

Granary 2

Shrine 1

Sell 750 | **Activate** | **Disband** | **Rush Buy** 1125

Advice | **Natl Manager** | **Build** | **Close**

212. The Case of the Missing Trade Goods - Solved:

That's right, Enkomi's **Horses** have not only appeared in the Trade Manager (**attached**), but it's now possible to build the Horseman unit (see Abdera at bottom right).

So here's the key. Goods in the Level 1 "City Influence" perimeter (the 8 hexes immediately surrounding every city) are always available for Trade. However, once the Area of Influence expands to Level 2 (the additional 12 hexes gained at population levels 9 thru 20), the rules change. **Trade Goods in the expanded area are only available if EIGHT citizens are available as Non-Specialists.** And something similar is true when the perimeter expands again at Level 3 (20 non-specialist Citizens for pop sizes 21-32), Level 4 (32 non-specialist Citizens at pop sizes 33-46), and finally Level 5 (46 non-specialist Citizens for all population levels in excess of 47).

Once I realized what was happening, the mechanism suddenly made sense and actually improves overall game play because it means there's a real penalty in place for players who go "all-in" on enslavement as a population expansion strategy. Sure, your cities will grow faster, but there's a catch. If you don't ensure that there are enough Citizens present, those large perimeters are not going to help when it comes to expanding your Trade Networks, which is THE primary method for building up your Gold Reserves.

And it makes sense in a real-world way as well. Slaves might be good for mining and farming, but Trade Networks are the realm of Entrepreneurs (as historical records prove, even in the most ancient of societies), and for those you need true Citizens, not a populace in which most are held in bondage.

The screenshot displays the game's interface, focusing on the City Manager and Trade Manager windows.

CITY MANAGER

Optimize Specialists: Enkomi

Workers: 16
Citizens: 8 (highlighted with a red circle)
Slaves: 7

Population: 164950
Growth: +375
Happiness: 80

Efficiency: [Progress Bar]

Entertainers: 0
Farmers: 0
Laborers: 1
Merchants: 0
Scientists: 0

Growth Turns: 14
Crime: 5%
Happiness: [List of factors: Military Units -2, Pollution -1, Empire size -1, Capitol Distance -1]
Pollution: 54
Pollution from Population: 67
Aqueduct: -6
Apothecary: -6

TRADE MANAGER

Market: Trade - Summary

Show Cities: Own, Friendly, All. Cities Per Good: 1

Our City	G	Has This Good	This City Will Buy It	Nation	For	Caravans
Arvad		Fish	Ninus		71	4
Ashdod		Cotton	Palmyra		86	6
Berytus		Sugar	Ninus		150	6
Byblos		Spices	Ninus		50	4
Byblos		Wheat	Arvad		45	4
Ekron		Bananas	Sidon		165	8
Enkomi		Spices	Ninus		50	5
Enkomi		Horse	Ugarit		91	6
Gaza		Hardwood	Ninus		131	4
Mari		Deer	Ninus		107	6

Caravans Available: 7
Caravans in use: 50
Total Trade Profit: 797
Total Trade Routes: 9

Abdera: Horseman 2

213. Citizen Concept entry in the GL:

The Great Library has concept entries for Population, Workers and Slaves, but nothing for **Citizens**. However - as noted above - they are a VERY important component of the game, and accordingly a new Citizen Concept Entry has been added to the GL. (Edit: see **Heading 238** below for new citizen graphic).



214. "MaxWorkers" data element in "citysize*.txt" files:

Heading 5 talked about how the six citysize*.txt files set the population limits which extend the City Influence perimeter. Interestingly, even though AE, Cradle, and other mods make changes to the original CtP2 files, one correlation always remains the same: The "Population" number is always the same value as the one for "MaxWorkers". At every level.

But what was really interesting is the "MaxWorker" values are also identical to those which control access to Trade Goods within the city perimeter (as discussed in **Heading 212** above). Which led to the question - can this value be reduced so that Trade Good access doesn't require quite as many non-specialist citizens? And the answer is...Yes! As a test, the "MaxWorkers" value for Level 3 cities (those with populations between 21 and 32) was reduced from 20 to 15 and sure enough, the Trade Goods in the extended perimeter were now available with 15 citizens instead of 20. However...

The HUGE downside was that 15 or more non-specialist citizens IMMEDIATELY caused a gigantic increase in Production Pollution. In my test city, that number rose from Zero to 376, resulting in -9 to city happiness! But if you assigned just one of those 15 citizens to a Specialist task, the pollution completely disappeared. Looking through the many CtP2 text files, I

could not find any variable that correlates non-specialist citizen counts with production pollution, so what's causing this is a complete mystery. Possibly a bug of some sort.

Accordingly, this idea will be filed away as "unworkable", and the 1-for-1 correlation between "Population" and "MaxWorkers" has been restored in Cradle 5.

CITY MANAGER

Optimize Specialists | Berytus | Mayor

Workers	26	Growth Turns	1	Conversion Loss	0
Citizens	15	Crime	5%	Franchise Loss	0
Slaves	11	Happiness:			

Population: 269664
750 163
864 442
Growth: +918
Happiness: 69

Efficiency: [Bar]

Entertainers: [0] +0
Farmers: [0] +0
Laborers: [0] +0
Merchants: [0] +0
Scientists: [0] +0

Pollution: 518

Pollution from Production: 376
Pollution from Population: 202
Aqueduct: -20
Apothecary: -20

Academy: 4
Agora: 0
Apothecary: 2
Aqueduct: 3
Bazaar: 0
Courthouse: 1
Forge: 2
Granary: 2
Physician: 5

City Wall: 2
Colosseum: 13
Caravan: 2
Theater: 2
Food Imports: 4
Marketplace: 3

Sell 750 Activate Disband Rush Buy 5377

Advice Natl Manager Build Close

CITY MANAGER

Optimize Specialists | Berytus | Mayor

Workers	26	Growth Turns	1	Conversion Loss	0
Citizens	14	Crime	3%	Franchise Loss	0
Slaves	11	Happiness:			

Population: 269664
430 121
406 215
Growth: +525
Happiness: 78

Efficiency: [Bar]

Entertainers: [0] +0
Farmers: [0] +0
Laborers: [0] +0
Merchants: [0] +0
Scientists: [1] +15

Pollution: 142

Pollution from Population: 202
Physician: -20
Aqueduct: -20
Apothecary: -20

Academy: 4
Agora: 0
Apothecary: 2
Aqueduct: 3
Bazaar: 0
Courthouse: 1
Forge: 2
Granary: 2
Physician: 5

City Wall: 3
Colosseum: 26
Caravan: 3
Theater: 3
Food Imports: 8
Marketplace: 6

Sell 750 Activate Disband Rush Buy 5377

Advice Natl Manager Build Close

215. Slave & Citizen Distribution code:

The Source Code team rewrote the "Slave Distribution" code and added two features. Rather than piling up in the city nearest to the Enslavement location, Slaves are now distributed across nearby cities. In addition, once a city reaches the building-imposed population limit (f/e population is capped at 12 until the Apothecary is built) the code won't send any more Slaves there. There is an exception however. If ALL your cities are at the population limit, then any new Slaves will ALWAYS go to the NEAREST city. In essence, the code reverts back to the old "Slave Distribution" system (i.e. there is no attempt at dispersion when all cities are at the limit). Worth noting that when a city's population increases beyond the building-imposed limit, it will immediately begin to starve. Farming Specialists and Food-providing buildings cannot alleviate the problem and the only solution is to construct the building which sets the new limit....or wait until starvation brings the population back down.

The **Free Slaves** attack (available to Abolitionists, Patriarchs and the Spartacus Wonder Unit) is similar to Enslavement, except it creates a Citizen in one of your cities. However, this code was NOT modified, and they too will always go to the nearest city. There is no distribution and the code ignores building-imposed population limits. Basically, it's the Citizen version of the old "Slave Distribution" code.

Cradle can't alter any of this as it's part of the executable, but the information is presented here since there are obvious gameplay ramifications.

216. Troop Unload issue: When unit-carrying Naval units are grouped with Naval attack units (no cargo capacity), the TF will not disembark units unless the warships are removed from the group. In the attached example, the top image shows a group of 3 ships led by a Trireme. The "cargo box" tells you that some of the ships are carrying units, and you can even drag the cursor onto a land hex (where the "green asterisk" implies that troops will be unloaded). However, nothing actually happens - all the units remain aboard their ships.

Instead, you have to click on the Task Force and then remove all the warships from the group and only THEN is it possible for the remaining vessels to unload their cargo. A very tedious exercise indeed, especially as the game progresses and you have large numbers of escorted task forces to deal with.

The solution is to add four lines of "Cargo Data" code to every surface warship in Units.txt (see 2nd image) AND to change the "MaxCargo" setting to Zero. You can see the result in the 3rd Image. It's the same Task Force led by the same Trireme, but now it has an "Unload" button. Clicking that will unload all units in the Task Force without having to go through all the gyrations required by the previous system. To be clear, this does NOT allow warships to carry units, it simply gives them an Unload button. Files changed: Units.txt



```

2742 ...CargoData {
2743 ...MaxCargo 0
2744 ...Load SOUND_ID TRIREME_LOAD
2745 ...Unload SOUND_ID TRIREME_UNLOAD
2746 ...}

```



217. Praetorians:

During the ongoing playtest, I realized that you could build Praetorians even when the gov-type is Republic. That's a problem, but associating them exclusively with the Dictatorship Gov leaves a very narrow window of time before the Tribunal Empire Gov is enacted, and then this unit can't be built at all.

Even so, it seems very weird to have them available to Republics, so the best solution is to remove "GovernmentType GOVERNMENT_REPUBLIC" and change the "ObsoleteAdvance" from "Tribunal Empire" to "Dark Ages". That extends the "buildability" throughout the Empire period (which is at least partly historical), but keeps the unit from appearing too early in the historical timeline.

Files changed: Units.txt & GL.txt

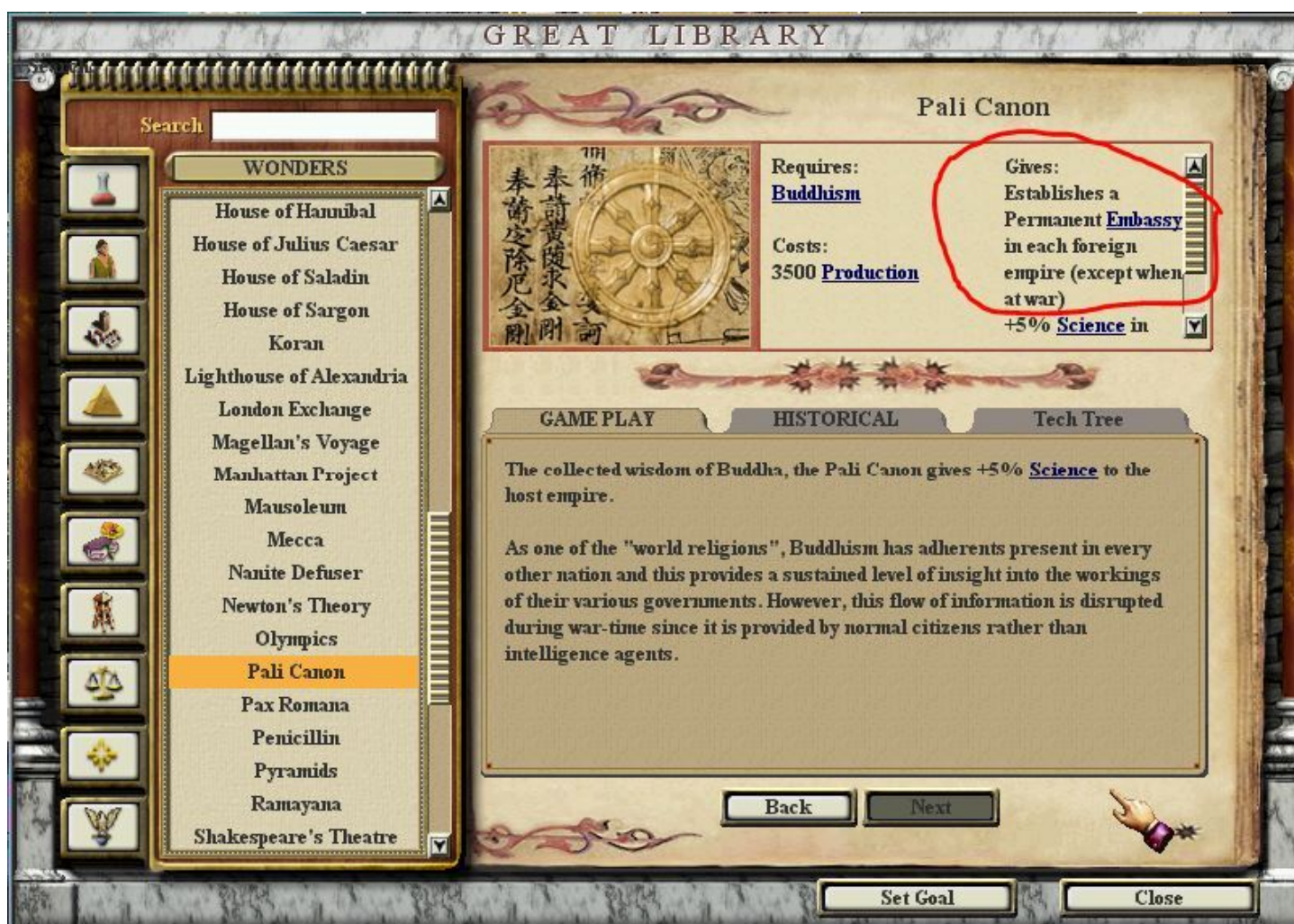
218. "Embassies Everywhere" Gap in availability:

After the Cyrus Cylinder expires with Age of Reason, there is a gap in the benefit provided by this Wonder, since the only other **EmbassiesEverywhereEvenAtWar** Wonder is the late game "World Peace Center".

Rather than add this ability to a mid-game wonder (the Eiffel Tower was a tempting option), a different idea was to add the lesser powered (and completely unused) **EmbassiesEverywhere** attribute to the "Book" Wonders associated with the three "world religions" (Christianity, Islam & Buddhism) on the basis that these religions have so many adherents worldwide that some of them are present in every nation (**UPDATE**: Added Judaism). This provides the religion's "Home Country" a sustained level of insight into the workings of the various foreign governments. However, this access would be disrupted during war-time since the information isn't being provided by intelligence agents or traitors but rather by normal citizens.

To clarify, the information thus obtained is identical to that visible through an Embassy, but it saves the player (or AI) from going through the trouble of dispatching Diplomats around the world. In particular, it avoids the time-consuming process of sending another Diplomat to re-open an Embassy that was closed during time of War.

Files changed: Wonders.txt & GL.txt



219. Feats Concept:

One of the important features in CtP2 is the presence of **Feats**, which essentially facilitate the use of SLIC events to reward the Player for performing a variety of different actions. Examples include being the first civ to circumnavigate the globe, discover a particular Advance, or build a certain number of City Improvements. Cradle takes this even further by using the **Feat System** to award a set of unique traits to every Civilization, thus ensuring that each one offers the player a different gameplay experience.

Although the Manual talks about Feats to some degree, there was nothing in the Great Library. But now there is - a new Concept entry for "Feats of Wonder" has been added to the Cradle 5 GL (the 2D art seen in the attachment was borrowed from AOM)

Files changed: uniticon.txt, concept.txt, gl_str.txt, & GL.txt



220. New City Sprites: After creating a full set of 19 Mesopotamian City sprites (see **Heading 30** above) I noted that for any future city sprites it would make more sense to create partial sets, primarily for civs to use in the Ancient and Classical era, and then to merge those into an existing path. In addition to the complexity associated with making a complete set of all-era sprites, the biggest issue is the hard code limit of 255 sprites. Adding the Mesopotamian and African City sprites (the latter courtesy of BureauBert) brought the total number of sprites in Cradle 5 to 219, leaving only 36 open slots.

As I commented then, it's enormously time consuming to create new city sprites from scratch, especially since I'm not an artist. Fortunately [the modding community inundated Civ3 with city sets for almost every conceivable civilization](#). Many of those are absolutely beautiful - true pieces of art - but unfortunately most of them are too large to use as-is, so all required editing. Even so, without those baseline graphics this project would have been impossible. Let's take a look at all the new additions:

Greek style (6 graphics): Begins with 3 Mycenaean-style cities available in the Ancient Era, applicable to Greece & Macedonia. See attached example (shows 2 of 3 graphics)



221. Greek Style (con): In the next era the "Greek Style" shifts to the traditional Classical style (see attached example - shows 2 of 3 graphics) and then follows the Roman style beginning with the Medieval era. Greece and Macedonia previously used the Roman style from beginning to end, so this is a completely new look for both civs.



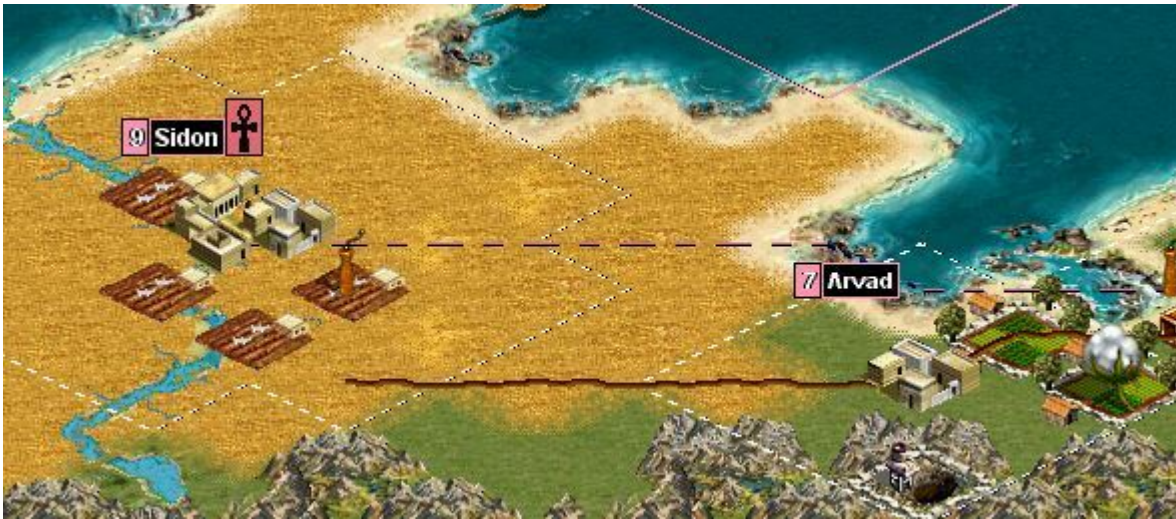
222. Minoan style (3): Three graphics used by the Minoan civ in the Ancient Era (attached example shows 2 of 3 graphics). They shift to Greek in the Classical Era and then to CtP2 Roman in the Medieval era.



223. Japan style (6): Yamato will use 3 graphics for the Ancient Era, apply a different #3 for the Classical Era, and then add a new #4 for the Medieval and a different #4 for the Renaissance. Then shifts to the CtP2 Asian style in the Industrial Era. See attached example (shows 3 of 6 graphics)



224. Levant style (4): Three graphics for the Carthaginians, Hittites, and Phoenicians (see attached example with 2 of 4 graphics) with a 4th for the Hebrews. **Edit:** Revised, see Section 225 below.



225. Since the last post, I've taken another look at the new cities and decided to expand the list. At that point there were still 7 open slots, but making some changes to a couple of the CtP2 styles increased that to 11, all of which are now utilized. We'll start by reconsidering the "Levant" style:

Levant style redux (4): Under the new system, the Turks have moved into this group (from the Arab style), and both the Hebrews and Carthage now have their own styles. The additional change is that a second #3 has been added, which appears in the Classical Era (so the top level cities using this style will change when moving from Ancient-to-Classical). As before, all Levant styles will shift to the CtP2 Arab series starting with the Medieval Era.

Hebrew style (1): This civ will continue to use most of the Levant-style graphics in the Ancient & Classical eras but the city style featuring the Temple of Solomon will move to the #3 position in the Classical era. As before, the Hebrews will use the Levant style in the Medieval era, but the final two cities will now be Ancient Levant #3 while the new Classical #3 moves to the #4 slot. They will begin using the CtP2 Arab series starting with the Renaissance.

Carthage style (1): Similar to the Hebrews, Carthage will use most of the Levant-style graphics in the Ancient era, but in the Classical they will feature a new "Carthaginian" city in the #3 slot (see attached). Carthage shifts to the CtP2 Rome series at the Medieval Era.



226. Indus style (6): Harappa will use 3 graphics for the Ancient Era, apply a different #3 for the Classical Era, and then add a new #4 for the Medieval and a different #4 for the Renaissance. Then shift to CtP2 Asian in the Industrial Era. See attached example (shows 2 of 6 graphics)



227. Revised Arab Style (-3): Arabs, Persia, and Turks used the "Arab" style which starts off with a Persian-style dome as the central building and then grows larger from one era to the next. It's definitely not accurate in the early parts of the game, so under the new system the Turks will follow the Levant-style (which does return to "Arab" in the Middle Ages) while Persia & the Arabs will now use the Indus-style cities in the Ancient & Classical eras. Unlike Harappa however, Arab-style will keep using the Ancient Era # 3 in the Classical period. **The attachment shows the difference** - Indus3a is the top level Arab city while Indus3b is the one used by the Harappans.

The existing Arab sprites for Ancient/Classical (31-33) will not be used (making those 3 slots available), while the four used for Medieval/Renaissance (41-44) will stay the same. The "style name" will remain "Arab" and we aren't creating new art, so it's just a matter of changing linkages in the agecitystyle.txt file.

Revised Palace Style (-1): As noted earlier I needed 4 additional slots, three of which came from the Arabs while the 4th comes from the largely unused Palace-style. The last Palace Style graphic in the Modern era (20) was removed, and the final slot for this style will be a repeat of the one before (19). Again, this only required a change to the linkages in

agecitystyle.txt.



Indus3a.tif



Indus3b.tif

228. Revised Castle Style (4): Barbarians, Celts and Vikings use the CtP2 "Castle" style which features a small Medieval castle right from the beginning. As with the "Persian Dome", it's definitely not accurate in the Ancient and Classical eras. The updated style is more appropriate for Ancient Europe (attached example shows 2 of 4) with 3 graphics for the Ancient Era and a different #3 for the Classical.

Once the Medieval era arrives, the original Castle sprites for the Ancient/Classical periods now appear while the Middle Ages sprites move out to the Renaissance (previously these were used for both Middle Ages eras). That means this style uses ALL the original Castle-style sprites, thus providing more differentiation in each time period.



229. Cahokia style (4): Has 3 graphics for the Ancient and Classical Eras and then adds a new #4 for the Medieval Era (see attached example with 2 of 4 graphics), shifting to CtP2 Mesoamerican in the Renaissance Era. This new style is used solely by the North American Tribes. Originally I planned for the Inca to share these, but they now have a unique style of their own.



230. Inca style (5): The Inca will use 3 graphics for the Ancient and Classical Eras and then add a new #4 for the Medieval Era and a different #4 for the Renaissance. Then they shift to the CtP2 Mesoamerican style in the Industrial Era. See attached example (shows 2 of 5 graphics).



231. Japan Style (0): The original pair of #4 graphics for Japan in the Medieval/Renaissance contained only the central Castle structures, with no outlying buildings. In retrospect that was kind of a strange look - where would the citizens live? Anyway, I found some additional Civ3 graphics which use the castles as centerpieces for true cities, and those have now been edited and added as replacements (see attached). These occupy existing slots, so there's no change to the count of Japan-style cities (still at 6).

As a result of all this, the eleven new or revised styles use all 40 of the remaining slots, so barring the elimination of an existing style (looking at you, "Palace") all 255 slots are occupied and there's no room for more.

Files changed: agecitystyle.txt, civilisation.txt, citystyle.txt, gl_str.txt



232. New population limits for City Graphics:

In the original game (and it's no different in AE or Cradle 3/4), the Ancient & Classical Eras share the same 3 City Sprite graphics, each appearing at population levels 1, 6, and 11. Things aren't much different in the Medieval, Renaissance, and Industrial Eras, since there's only one additional graphic and that appears at population level 16.

By contrast, the Player doesn't need any improvements in order to reach Size-12 cities, and the Ancient-Era Apothecary allows them to grow up to Size-20. There are two more buildings available in the Classical Era (Physician & Bath House), and these allow cities to reach Size-40. Which means that for half the game, most of the City Sprites will be stuck at graphic #3 or #4, and of course they'll reach those levels quickly.

Accordingly, it makes sense to revisit the population-to-sprite linkages, and under the new approach they are now associated with expansions in the City Influence area (see **Heading 208** above). Thus the 2nd City Sprite will appear at Size-9, the 3rd at Size-21, and the 4th at Size-33.

Although the Modern, Computer, Genetic, Diamond, and Future Eras each have EIGHT city sprites, the defaults for those are also comparatively low, as the final four appear at Population levels 21, 26, 31, and finally 36. Even though Cradle 5 allows cities to reach Size-80!

So we'll modify these as well, but since there's only one remaining Influence Expansion, now the graphics will tie to City Improvement population expanders. Thus the 5th Sprite will appear at Size-41 (ties to Drugstore), the 6th Sprite at Size 51 (Hospital), the 7th Sprite at 64 (Arcologies) and the last will arbitrarily appear at Size-70, since there aren't any remaining population-related improvements.

File changed: agecitystyle.txt

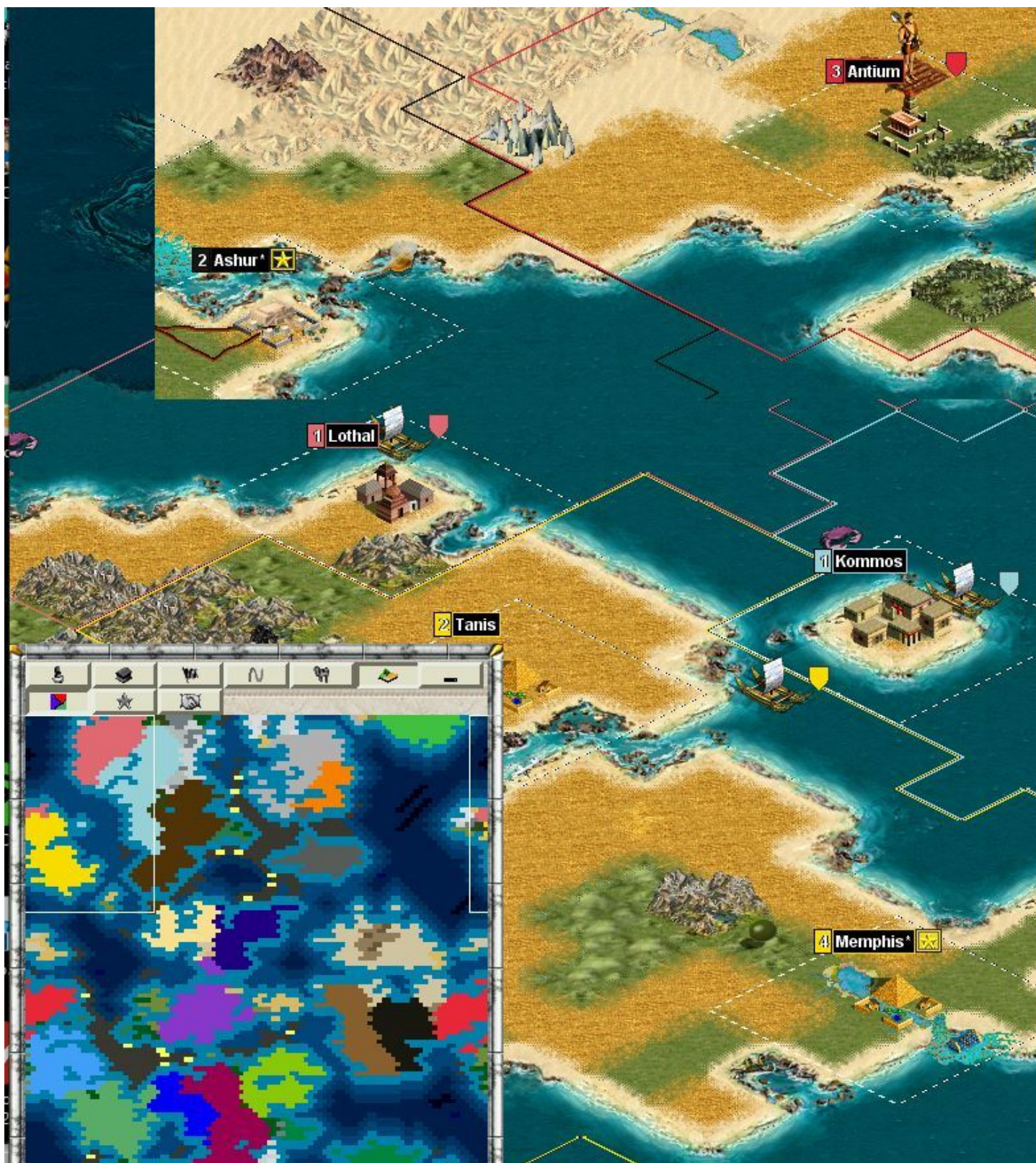
233. Civ Colors: Quite a few of the standard AE colors are more appropriate for other Civs, several new colors have just been introduced for Cradle 5, and some of the old shades were dropped altogether:

- * Rome: From Cornflower Blue to Imperial Red (a different shade from "Barbarian Red")
- * Minoan: From Salmon to Baby Blue (the color frequently seen in Minoan wall frescoes)
- * Egypt: From Forest Green to Golden Yellow (a color usually associated with Ancient Egypt)

- * Assyria: From Light Grey to Black (the first truly "bad-ass" Empire)
- * Greeks: From Blue to Light Grey (like architectural Marble)
- * Babylonia: From Cyan to Blue (same shade as the tiles on the Ishtar Gate)
- * Celts: From Dark Brown to Forest Green
- * Mongolia: From a modern Yellow-Green to Cornflower Blue (as used in many of their textiles)
- * Harappa: From Purple to Salmon
- * Phoenicia: From Pink to Purple (represents the expensive Dye made from Murex snails)
- * Han: From Hot Pink to Dark Brown
- * Hexagonian: From Beige to Hot Pink

The attachment shows some of the new colors: Assyria & Rome (inset at top) and then Harappa, Minoans & Egypt

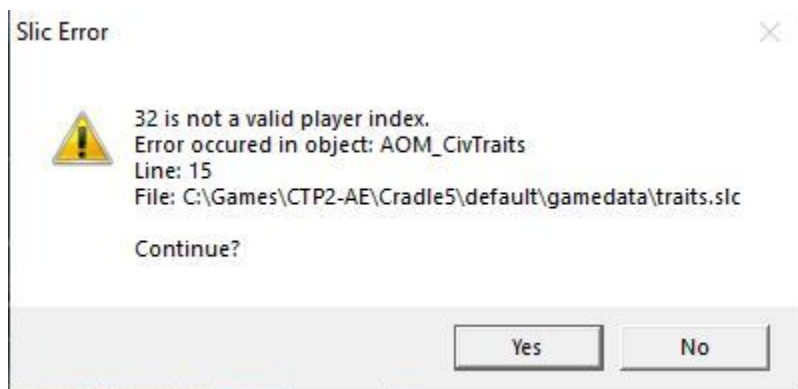
File changed: Colors06.txt



234. 32-Civs Hard Code limit:

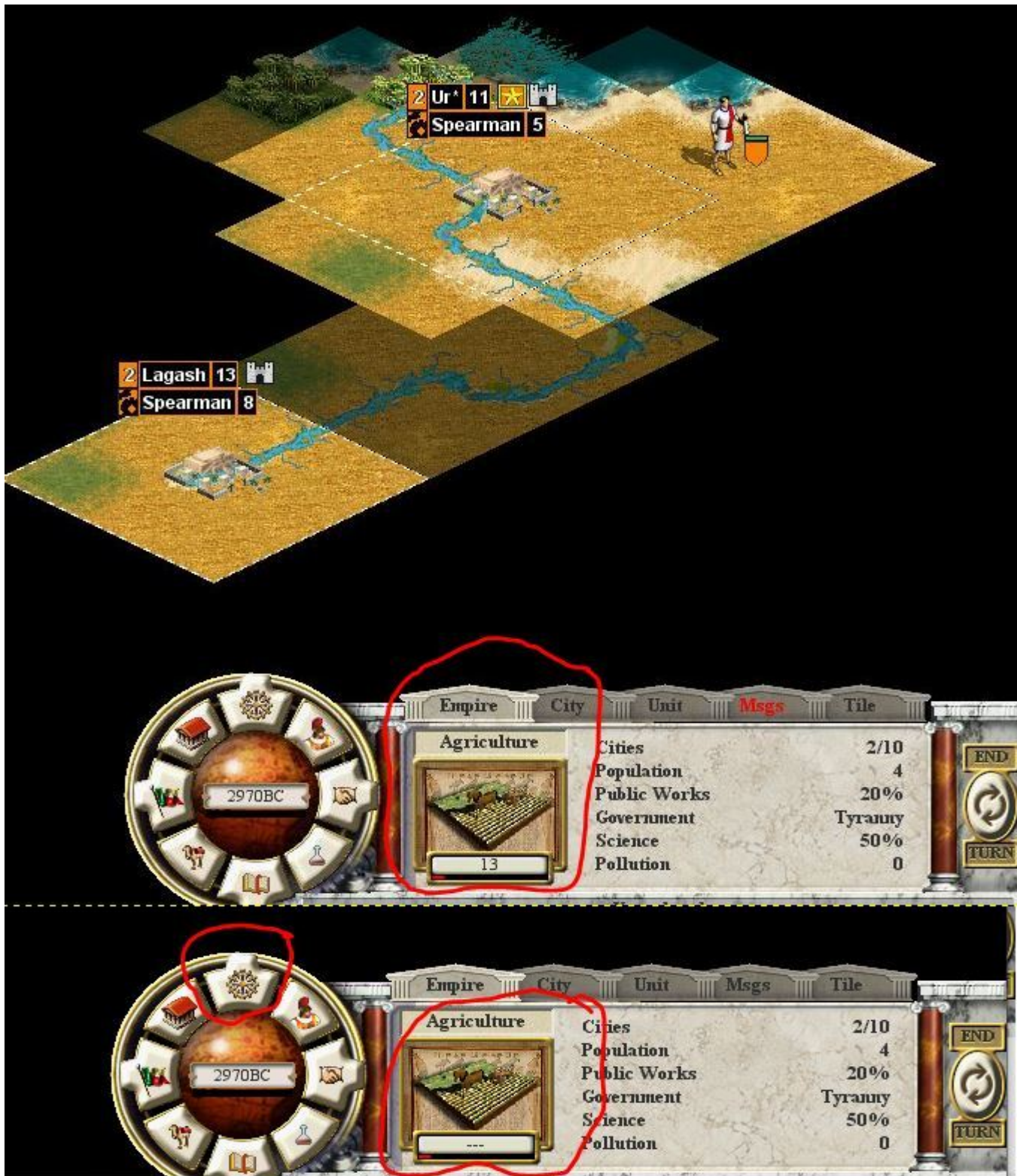
Although AE has 70 civs and Cradle 5 has 32, neither version allows you to select more than 31 at the start of each new game. One reason for this is the Barbarians aren't selectable, but they ARE a civ, and thus selecting 31 really means there are 32 in the game. I could not find anything in writing which states that 32 civs is a CtP2 hard code limit, but there is a file which suggests it. The AE **Colors00.txt** file (Colors06.txt in Cradle5) has only 32 civ colors so that seems to confirm that 32 is the limit. In addition, **Martin Guhmann** added a note at the bottom of Colors04.txt (an optional file not used in either version), which talks about "removing surplus civ colors" which were added at some point by **Nordicus** for a count of civs 33 and higher.

That said, there is an added wrinkle in Cradle. Selecting 31 civs causes a Slic File error to appear at turn 5 (the end of the 2960 BC turn), consisting of a couple messages which point to the code in the **traits.slc** file (see attached). I did examine the code and could not see anything obviously wrong with it, and regardless you can click "Yes" on each message and the game will then continue normally (and the error will not occur again). Although it's unlikely to have a negative long term impact on your game, I would suggest that players avoid the issue altogether by never selecting more than 30 civs at the start of any new game (the error only appears when 31 are chosen). However, it's my experience that extremely high numbers of civs make the game a lot less interesting, and thus rarely select more than 15, even on a "Gigantic" size map.



235. Research completion "bug":

When loading a saved game, the "years to complete" on technology research are always incorrect. As you can see in the attachment, the Sumerians are 13 turns away from completing research on "Agriculture" when the game is saved. After quitting and reloading, the research time has been replaced by a set of dashed lines (meaning "infinite"). This will reset after hitting end turn and has no impact on the true count of remaining turns (i.e. it's effectively a graphics glitch). However, if you click the "Empire Manager" button (circled in red), that is usually enough to reset the true value (sometimes you also have to click the "Government" tab in the next window and hit the "Close" button).



236. Units which arrive with the "Great House" Wonder Units: Some of the "Great House" Wonders have been moved to new advances, and there's also been a number of changes made to units themselves, especially those tied to gov-types. Accordingly I reviewed all of them to see whether the "army" which arrives with each Wonder Unit is still government and/or era-appropriate. And in several cases, it was not:

1) House of Sargon (L3 Dynasty) gives Sargon plus an Archer (from the L5 Archery Advance) and a Spearman (from L1 Toolmaking). This is a problem. A better mix would be a Slinger (from L2 Projectile Weapons) and a Swordsman (from L1 Agriculture). **See attached.**

2) House of Atilla (L9 Dark Ages) provides Atilla plus a Man-at-Arms (from L10 Feudalism) and a Raider (from L8 Stirrup). The problem here is that Raiders are now gov-type units and are not supported by Monarchy or Theology, the most likely govs to be enacted after this Wonder is built. By design, this unit is not supposed to be available to those gov-types, so the only solution is to replace it with another. Cataphract (from L8 Stirrup) seems best because the Hunnic units were a type of heavy cav.

3) House of Genghis (L11 Monarchy) provides Genghis plus a Cataphract (from L8 Stirrup) and a Raider (from L8 Stirrup). Similar to the issue with the House of Atilla, Raiders are gov-type units which are not supported by Monarchy or Theology, the most likely govs to be enacted after this Wonder is built. And again, the only solution is to replace it with another unit. In this case the Mounted Archer (from L5 Mobile Tactics), best replicates the Raider's combination of movement and stealth.

Files changed: wonderunits.slc, GL.txt



237. Freight Flag: [Per the quote below from Martin Guhmann](#), there has to be a "freight flag" activated in tileimp.txt in order for trade routes to follow roads:

"Some of the tileimp records contain an additional flag the Freight flag. Just copy it to the according entries in the Cradle versions, so that new trade routes follow the roads"

Accordingly, I've added Freight flags to all the road types in Cradle 5 (see attached example), using the values from AE in all cases, except making some alterations to account for the lower movement rate on Cradle roads vs. AE roads (2 tiles-per-turn vs 3)

File changed: tileimp.txt

```
## 25 #####

TILEIMP_ROAD {
...Icon·ICON_TILEIMP_ROAD
...Tooltip·TOOLTIP_TILEIMP_SELECT_ROAD1_BUTTON
...Statusbar·STATUSBAR_TILEIMP_SELECT_ROAD1_BUTTON
...Sound·SOUND_ID_ROAD_1
...Level·1
...Class·Road

...ConstructionTiles·1
...ConstructionTiles·12
...ConstructionTiles·12

...CantBuildOn·TERRAIN_WATER_BEACH
...CantBuildOn·TERRAIN_WATER_DEEP
...CantBuildOn·TERRAIN_WATER_RIFT
...CantBuildOn·TERRAIN_WATER_SHALLOW
...CantBuildOn·TERRAIN_WATER_SHELF
...CantBuildOn·TERRAIN_WATER_TRENCH
...CantBuildOn·TERRAIN_WATER_VOLCANO
...CanBuildWasteland

...Excludes·Road
...Excludes·OceanRoad

...TerrainEffect·{
.....Terrain·TERRAIN_DESERT
.....Terrain·TERRAIN_GRASSLAND
.....Terrain·TERRAIN_PLAINS
.....Terrain·TERRAIN_SPECIAL1
.....Terrain·TERRAIN_SPECIAL2

.....MoveCost·50
.....Freight·80
.....BonusGold·1
.....EnableAdvance·ADVANCE_WHEEL
.....ProductionCost·60
.....ProductionTime·2
.....TilesetIndex·200
...}
```


238. New "Citizen" graphic:

The image which accompanied the new "Citizen Concept" entry in the Great Library uses the CtP2 "pick-axe guy" who also appears in the "Worker" and "Specialist" concept images (see **Heading 213** above). There's nothing terribly wrong with that, but it definitely doesn't fit the mental image of a "Citizen". Accordingly, I've created three new images which use the CtP1 Farmer as the centerpiece (see attached)

New files: upcp050I (Specialist), upcp070L (Citizen) & UPCP085L (Worker)



239. Elite Unit Upgrade Info:

Upgrading of Elite Units is controlled by SLIC, and is driven by the discovery of a limited number of Advances (Bronze Working, Barracks, Iron Working, Dark Ages, Gunpowder, Flintlock, Mass Production, Advanced Infantry Tactics, Chaos Theory, Feudalism (Militia Only) & Railroad (Militia Only)). In addition, the upgradeable units have to be in a City, Fort, or Airbase otherwise the code won't "see" them. Unfortunately this information is not specified anywhere, and without advance warning the player will miss out on the opportunity to upgrade many of his Elite Units.

Accordingly, a "notification" comment has been added to the GL Entries of every Advance which drives an Upgrade (see attached).

File Changed: GL.txt



240. Chariots appear late in the historical timeline:

Currently the player can get the City State and Oligarchy gov-types before Chariots are available, which is far later than their true historical appearance. This also means it's rarely worth building any.

Although not directly related, this problem was obscured because the "Barracks" Advance is graphically out of place on the Tech Tree (part of the "Engineering" series instead of "Warfare"). Moving it however is problematic since it doesn't have any direct "Warfare" pre-reqs.

Accordingly, Chariots are now a pre-req for Bronze Working (**see the Heading 239 attachment above**), which is close to the true historical sequence. In addition, since Bronze Working is a pre-req for Barracks, this also gives Barracks a firmer place in the Warfare sequence.

Files Changed: Advance.txt, GL.txt, Tech Tree.

241. Plunder unit types:

When participating in battle, some of the Wonder units generate "Plunder" (controlled by SLIC), but the type of plunder unit changes after the discovery of certain Advances. And - similar to the situation with Elite Unit upgrades - that information wasn't provided anywhere.

Fortunately the solution is the same. Each Advance which alters the type of Plunder unit now has an entry in the Great Library which describes the change (from unit "x" to unit "y"). The second paragraph in the Bronze Working GL entry (**see the attachment to Heading 239 above**) has an example of the new text.

Files Changed: plunder.slc & GL.txt

242. "Unwelcome invaders" regard hit:

It's fairly common to see the following message in the Intelligence Report window: *"This nation is outraged that we continue to move our troops within their borders. To them, we are unwelcome invaders."* This is the visible manifestation of a particular type of "Regard Hit", so it's helpful to understand what causes it.

- After a fair amount of testing, I can say that invisible civilian units (such as Diplomats) don't trigger the message, even if they are seen by other stealth units and remain in foreign territory over multiple turns.
- Military units can travel within another nation's borders without negative effect IF they are not spotted.
- Military units DO trigger the message if they enter the other nation's territory and ARE seen (even if they leave on the same turn).

243. The "North American Tribes":

The "Native American" civilization has been renamed "North American Tribes". One reason is that every city is named after a North American tribe, but equally important is that Cradle includes 3 other civilizations who are also "Native Americans" (in the larger context of "the aboriginal peoples of the Americas"), specifically the Aztecs, Maya, and Inca. Rather than change the underlying code name (which remains "native_americans"), only the translation files have been altered.

Files Changed: civ_str.txt, feat_str.txt, and the GL

244. AI Intelligence Factor:

[According to Protra3211](#), he changed the AI_INTELLIGENCE_FACTOR in DiffDB.txt to "25" (normally "1") since "All the mods have this changed to 25 and some post it helps the AI." To see how others have handled this, I looked at the AE Mod scenario and they keep it at 1 in the earlier difficulty settings, but then raise it to 25 with "Hard" and "Very Hard" and increase it again to 35 for "Impossible". MoT doesn't change it at all, while AOM uses 25 only for "Impossible".

For Cradle 5, we'll alter the settings to 10 for Medium, 25 for Hard and Very Hard, and 35 for Impossible
File Changed: DiffDB.txt

NOTE: Per Martin, this has no effect

245. TurnsAcceptedForOnePop:

This is a new setting in Const.txt (not previously available in Cradle or even AE) which tells the AI to add Farmer specialists if city growth requires more than the specified number of turns. This flag can also be referenced in the strategies.txt file. The format is: TurnsAcceptedForOnePop ** (choose any number to replace **)

The chief benefit is to reduce the AI's single-minded focus on production (which I've been unable to achieve with other game file settings). Now in Cradle 5 with a value of 40.

File Changed: Const.txt

246. TIMP Project:

After completing the City Graphics project back in September, I've been running an extended playtest that's uncovered a few issues along with some under-the-hood improvement opportunities (most have been reported along the way), but otherwise the game has been quite stable and is working largely as intended. Behind the scenes however, work is proceeding on the last big project - **Tile Improvements**. It's been a multi-faceted and challenging exercise, and there's still a long way to go, but it's time to start pulling back the curtain to give you a look at some of what's been going on.

247. Terraform Ocean Button:

Tile improvements are an important facet in the game, and Cradle 5 already features a number of new options in this area. Examples include the new "Trawlers" level (see **Heading 71**) and a 4th level for roads (see **Heading 54**). Although the number of SLIC-created tile improvements is essentially unlimited (for example the Natural Wonders feature - see **Heading 18**), those which can be placed by the players (AI and human) are limited by the number of slots in the Tile tab on the Control Panel (bottom right of the game screen).

In the base game the Tile Tab has 3 buttons for the placement of TIMPs, each with 12 slots, and currently most of those are used (34 of 36). The 4th button is fully assigned to Terraforming, and has no open slots. However, the Source code team added a 5th Button ("Terraform Ocean") along with the following message in the Apolyton Edition Readme file: *"Added: TerraformOcean button in tile bank. This allows modders to use up to 60 of the 64 available tileimp slots".*

Based on that information, I kicked off a large sub-project which aimed to re-name and restructure the TIMP buttons (see before and after button names on the attachment), while also finding ways to expand the number of tileimps in Cradle5.



248. Terraform Ocean Button (con.):

Unfortunately, this particular sub-project came to naught because there's a fundamental difference between "standard" TIMPs and the "terraforming type". When you look at the controlling file (**tileimp.txt**), a standard TIMP has TWO button location identifiers: "**Level**" (the row number of the TIMP) and "**Class**" (one of 12 column names for each of the 3 TIMP placement groups). For example, the "Port" icon (see top of the attachment) is on "Level 1" (first row) in the "Class:OceanATM" group (the 3rd column of the "Ocean" button group).

By contrast, the Terraform group has THREE button location identifiers: "**Level**" (the row number of the TIMP), "**Column**" (the column number of the TIMP), and "**Class**" (the name of the button group). An example of this system is "Terraform Desert" (see bottom of the attachment), the icon for which can be found at "Level 3" (third row) of "Column 0" (first column) in the "Class:Terraform" group (the Terraform Land Button).

The problem is that "standard" TIMP icons will not appear in the Button Bank if they have three location identifiers, and the new "Terraform Ocean" button will not accept any TIMPs that have only two. So the new button only works if you are creating additional terraforming-types, and the only remaining candidates for that sort of activity are the various ocean-type terrains, none of which are being modified in Cradle.

Apologies for the long dissertation, but hopefully this clarifies the limitations associated with the new "Terraform Ocean" button. More to the immediate point, it means my grand project for adding new TIMPs is restricted entirely to the last two remaining "standard" TIMP slots. Disappointing, but there was a silver lining - the research expended in trying to make this work provided a much deeper insight into the workings of the Tile Improvement control files. That will pay big dividends as we proceed.

```
##.21.#####
```

```
TILEIMP_PORT.{  
...Icon.ICON_TILEIMP_PORT  
...Tooltip.TOOLTIP_TILEIMP_SELECT_PIER1_BUTTON  
...Statusbar.STATUSBAR_TILEIMP_SELECT_PIER1_BUTTON  
...Sound.SOUND_ID_PORT  
...Level.1  
...Class:OceanATM
```

```
##.30.#####
```

```
TILEIMP_TERRAFORM_DESERT.{  
...Icon.ICON_TERRAIN_DESERTS  
...Tooltip.TOOLTIP_TILEIMP_SELECT_DESERT_BUTTON  
...Statusbar.STATUSBAR_TILEIMP_SELECT_DESERT_BUTTON  
...TerraformTerrain.TERRAIN_DESERT  
...Sound.SOUND_ID_ROAD_1  
...Level.3  
...Column.0  
...Class:Terraform
```

249. TIMP Control files:

"Big Dividends" eh? Such as? Well, one of the earliest Cradle5 game improvements was focused on revising the Advances associated with Terraforming (see **Heading 45**). As just one example, the ability to remove Dead tiles was now associated with the **Tribunal Empire** Advance instead of the late-game **Conservation**:

```
TERRAIN_DEAD {  
  TilesetIndex 17  
  Icon ICON_TERRAIN_DEAD  
  InternalType: Dead  
  
  RemoveAdvance ADVANCE_TRIBUNAL_EMPIRE  
  TransformRemove {  
    Time 3  
    Materials 1000  
  }  
}
```

Seems pretty clear. In fact, all the changes mentioned in that post were made to the terrain.txt file, after which I moved on to other things, confident that all was well. But it wasn't. [According to Martin Guhmann](#), changes to CtP2 tiles require the adjustment of TWO files, *"tileimp.txt and terrain.txt, if I remember correctly you have to modify both files."*

Uh Oh. And sure enough, the tileimp.txt entry for TILEIMP_TERRAFORM_GRASSLAND still included this segment of code:

```
TerrainEffect {  
  Terrain TERRAIN_DEAD  
  BonusFood 300  
  EnableAdvance ADVANCE_CONSERVATION  
  TilesetIndex 1  
}
```

While you could now transform a Dead Tile into "something else" after Tribunal Empire was discovered, the only option was terraforming it into Grasslands and that would not be possible until Conservation. In other words, nothing had changed. Ugh.

OK, why are there two files, and how do they work? The **terrain.txt** file identifies a type of tile and provides the basic values (food, gold, movement points, etc) and also lists the Advances which allow this terrain-type to be added and/or removed via terraforming. However, in order to know what it can be transformed into, you need the **tileimp.txt** file. And THAT had not been modified to match the new changes implemented in Cradle5.

So yes, a big problem, now identified and fixed.

EDIT: Or.....not. Gah. After running a series of tests to conclusively establish the role of each file, it turns out that part of the above is incorrect.

The tileimp.txt file assigns a "TerrainEffect" to every entry in that file, which includes a line for "EnableAdvance". That code is necessary for non-terraforming TIMPs (such as Farms or Mines), but it has no effect on terraforming - all those Advances are assigned by the terrain.txt file. Which means the Terraforming Advances listed in tileimp.txt are confusing and meaningless. For that reason, I'm going to change them all to the late-game "ADVANCE_HEXTAPUL" (which exists simply as something to research when all other Advances have been discovered)

250. "Excludes" tag in tileimp.txt:

This next bit literally made my head hurt, so I'll describe the issue using examples and try to keep it as simple as possible (The good news is that Cradle players can ignore the whole post, since it's primarily of interest to modders). As noted earlier, there are two open slots remaining on the Tile Improvement "button bank", one of which sits between the "Sea Tunnel" and "Maglev" (see top of attachment). Should be easy enough to just create a new tile improvement and plug it right in, yes? Well, no. But to "keep it simple", let's notionally move an existing TIMP (Sonar Buoy) into that spot and walk through the ramifications. But first, we'll look at the Excludes tags in the Maglev entry, to help you understand what they do.

As you can see at the bottom of the attachment, there are two "Excludes" settings, **Road** and **OceanRoad**. This refers to a pair of "Class" columns on the Land and Ocean buttons. Looking just at "Road", that column contains 3 slots for building a Road, a Stone Road or a Railroad. When Maglevs assign the "Excludes" tag to the Road column, it means *"if you build a Maglev in a tile containing a Road, Stone Road or Railroad, the Maglev will replace that tile improvement"*. Conversely, if you build a Maglev on any tile containing a TIMP that is NOT excluded, the two will coexist. Which, for example, is why you see Roads in the same tile as Farms and Mines.

Returning to the Sonar Buoy, if that is placed in the "OceanRoad" column, it will need the same "Excludes" values as the Sea Tunnel, meaning it will coexist with all the other ocean-type improvements, instead of replacing them as it does now. In addition, the Sea Tunnel will now REPLACE the Sonar Buoy (and vice versa) instead of co-existing with it.

All of which means that it's going to be a little tricky to utilize the open slot in the OceanRoad column.



```
TILEIMP_MAGLEV {
... Icon ICON_TILEIMP_MAGLEV
... Tooltip TOOLTIP_TILEIMP_SELECT_ROAD3_BUTTON
... Statusbar STATUSBAR_TILEIMP_SELECT_ROAD3_BUTTON
... Sound SOUND_ID_ROAD_3
... Level 3
... Class:OceanRoad

... ConstructionTiles 1
... ConstructionTiles 1
... ConstructionTiles 1

... CantBuildOn TERRAIN_WATER_BEACH
... CantBuildOn TERRAIN_WATER_DEEP
... CantBuildOn TERRAIN_WATER_RIFT
... CantBuildOn TERRAIN_WATER_SHALLOW
... CantBuildOn TERRAIN_WATER_SHELF
... CantBuildOn TERRAIN_WATER_TRENCH
... CantBuildOn TERRAIN_WATER_VOLCANO

... Excludes:Road
... Excludes:OceanRoad
```


251. TIMPs that can't be pillaged:

One of the new features in AE is the **CantPillage** flag for TIMPs, and Cradle 5 assigned that to **Pastures** and **Nets** (see **Heading 145**). Unfortunately the AI does not "know" what that means, and extensive playtesting has shown that un-pillageable TIMPs cause AI units to sit on them for multiple turns, constantly trying to pillage without success. That means they operate like flytraps, holding AI units in place instead of allowing them to attack or explore.

Anything which adversely affects the AI is a problem, so the flag will be removed from both TIMPs, but the PW costs will also be reduced so it's cheaper to replace them.

The downside of that removal is particularly applicable to **Nets**, because they are extremely hard to protect. AI naval vessels spend a lot of time in your waters, especially during the initial Exploration phase. The new flag prevented a lot of unnecessary early-game warfare, since the AI tries to pillage any Ocean TIMP they find, even when you have good diplomatic relations. Accordingly, we'll mitigate the issue by removing the **CanPillage** and **CanPirate** flags from Coracles, which also means the AI will use them as they should - purely for unit transport and exploration.

Files Changed: Units.txt, tileimp.txt and the GL

252. Risks.txt:

This is the file which controls the appearance of Barbarians and also has the "percent chance" for everything that comes from Goody Huts. The AE team uses a completely new style of code for everything in this file (f/e **HutChanceGold 0.3** in AE is the same as **GOLD_HUT_CHANCE 0.30** in the original CtP2). Even though Martin Guhmann notes that the game can still parse the old language, I'm going to switch in the new AE file to replace the one from Cradle, retaining some of the Cradle settings, but mostly using those from AE. The biggest issue was that some of the Cradle values for the various Barbarian difficulty levels didn't increase from one setting to the next, so that has been fixed.

File Changed: risks.txt

253. Polar Terraforming:

As often happens, something that seemed unusable does offer at least some utility on closer examination. In this case, while there are 12 slots on the buttonbank for Terraforming Land, there are actually 14 land terrain-types with "Add" Advances. Which means that while the game technically allows all of them to be terraformed, both **Tundra** and **Glacier** do not have the button-bank slots which would make it possible.

Admittedly there aren't many reasons for terraforming a tile into Tundra or Glacier, but since you can do that with Polar Hills and Polar Mountains, it does suggest that all four could be made available with their own button. Accordingly, the **Terraform Ocean** button has been changed to **Terraform Polar**, and all four terrain types are grouped under it (see bottom of attachment).

These are all activated by the new "Polar Terraforming" Advance (see top of attachment), which also unlocks a new TIMP, the **Carbon Sink**. More on that next.

Files Changed: tileimp.txt, terrain.txt, Advance.txt, advancelists.txt, uniticon.txt, gl_str.txt, Great Library, and the Tech Tree.



254. Carbon Sink:

Interestingly, there is not a new Tile Improvement called the **Carbon Sink**, but rather it's an alternate form of the **Mega Mine** (see attached). When you select that from the button-bank and hover the cursor over a section of Mountain Terrain (bottom right of the attachment), you see a green representation of the Mega Mine graphic along with the cost and changes (mostly Production increase) that go with it.

However, if the same cursor hovers over **Tundra** or **Glacier** terrain, you see an alternate green TIMP and the cost and Production values are significantly different. That is the effect of a Carbon Sink. Not only does it feature a different graphic on the map, it operates to reduce the total Production value of the owning city, thus providing a diminished contribution to Global Production Pollution.

Realistically that's not going to be a major impact on the Global Pollution numbers, so think of this primarily as a "proof of concept" which shows that it's possible to get radically different uses from the same TIMP.

The screenshot shows the 'GREAT LIBRARY' interface with a search bar and a list of tile improvements. The 'Mega Mine' is selected, showing its requirements and effects. Below the details, there are tabs for 'GAME PLAY', 'HISTORICAL', and 'Tech Tree'. The 'GAME PLAY' tab is active, showing a description of Mega Mines and their use as Carbon Sinks. At the bottom, a map shows the application of the Mega Mine on different terrain types, with a red circle highlighting the 'Carbon Sink' effect on Tundra and Glacier terrain.

GREAT LIBRARY

Search:

TILE IMPROVEMENTS

- Advanced Farm
- Advanced Mine
- Advanced Undersea Mine
- Air Base
- Aquaculture
- Colony
- Drilling Platform
- Farm
- Fishery
- Fortification
- Hydroponic Farm
- Latifundia
- Listening Post
- Maglev
- Mega Farm
- Mega Mine**
- Mega Undersea Mine
- Mine
- Mine Shaft
- Modern Trawlers

Mega Mine

Requires: Global Economics +20-45 Production
+5 Commerce
1800-3300 PW
4-5 Turns

GAME PLAY **HISTORICAL** **Tech Tree**

Mega Mines utilize the most advanced mining technology to extract greater mineral yields and increase Production by 20 to 45 (depending on terrain type). They also increase Commerce by 5.

After the discovery of Polar Terraforming, Mega Mines constructed on Glaciers and Tundra operate as Carbon Sinks, reducing Production in that tile by -60 (and providing a small +5 increase in Food), thus helping to offset the rise in greenhouse gases.

Back Next

Set Goal Close

Map Data:

Terrain	Time	Cost	Food	Production	Commerce
Mountain	5	3000	5	-55	0
Tundra	4	2400	-5	35	10

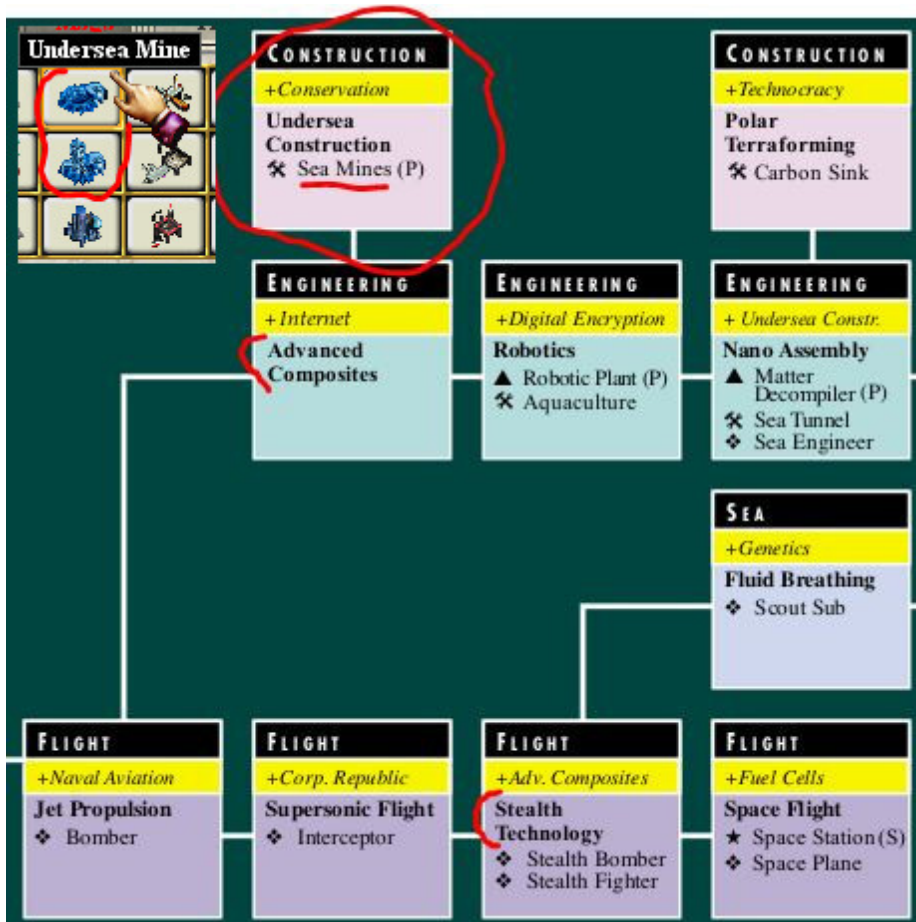
255. Undersea Mines:

Undersea Mines and **Advanced Undersea Mines** (see inset, top left of attachment) are both available from a Level-25 Advance, and it's actually possible to research the Advanced version before the basic. Part of the problem is that Undersea cities first become available at L24 (with **Nano Assembly**), so this portion of the game is compressed into the last 4 levels.

In order to solve the issue, the first level of UnderSea mines is now available much earlier, and is only buildable on a single terrain-type (the ocean shelf). That means they can provide production benefits to land cities, and will serve as the technology pre-cursor for "Sea Cities". This makes sense, since you would expect the Technology needed for underwater cities would first be deployed on a smaller scale (in this case by an ocean mining facility) in order to demonstrate its feasibility.

Shaking up the Tech Tree helps make this possible. For example, **Advanced Composites** will now be a new L22 Engineering sequence tech while the previous Advance with that name remains in the Flight sequence and is renamed **Stealth Technology** (see attached). Going one step further, another new Advance (L22 **Undersea Construction**) will be the pre-req for Undersea Mines.

Files Changed: tileimp.txt, Advance.txt, advancelists.txt, uniticon.txt, gl_str.txt, Great Library, and the Tech Tree.



256. "Fixed" Polar Climate Zones:

As every CtP2 veteran knows, it can be a little disconcerting to find grassland or forest tiles on the top tier of tiles (i.e. the "North Pole"), and likewise to discover that your "Temperate Zone" start location includes some Tundra and a few Glaciers. It's not common, but that sort of thing can happen due to the hidden workings of the map creation algorithm. While researching this, it turns out that the **Const.txt** file allows the player to delineate climate zones (for example, the "MERIDIANA 5" setting means that the northern 5% of the map is polar terrain), but the mapping program uses that more as a guide than a rule. So even though polar regions in Cradle are currently set at 5% north and south, it's normal to find arctic terrain outside those limits.

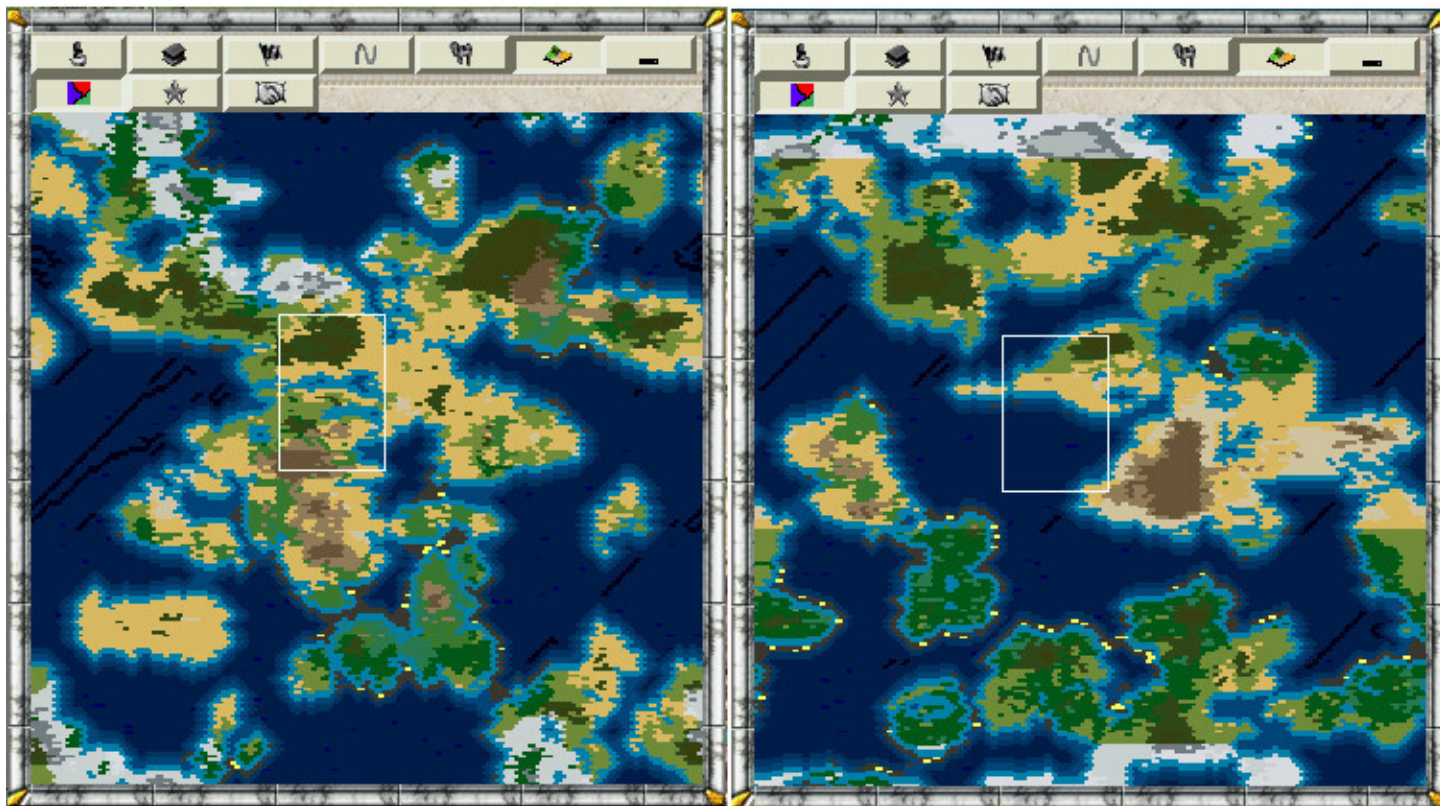
However it IS possible have "non-deviating" polar climate zones, [as explained by Martin Guhmann in the CtP2 Faq](#).

- To set this in your game, open the **userprofile.txt** file and change MapPlugin3=dll\\map\\plasma2.dll to

MapPlugin3=dll\\map\\fault.dll

- The result can be seen in the minimap files below. The one on the left has the normal setting while on the right you see what happens when climate zones are "fixed".

The problem is that "fixed" zones mean there's absolutely no deviation above or below the line, and the result looks very artificial - a firm line in which terrain to the north is tundra or glaciers while one row below it's temperate or even tropical (same is true of the Antarctic zone). Personally I prefer the look of maps created with the standard settings and that will be the Cradle 5 default, but - as you can see - it's very easy to implement fixed zones in your own game.



257. Cradle 5 Status Report: As most of you know, the Source Code Team released [a new version of the Apolyton Edition](#) in late January 2025, with a host of fixes and changes. While that's great news for the CtP2 franchise, it proved to be something of a conundrum for the Cradle 5 mod, since unfortunately it isn't "plug and play" compatible with the new AE-2025. On the plus side, it means that several of the Cradle 5 workarounds or GL warnings (such as the one for the "Liberate City" bug) are no longer necessary since the problems have been fixed - but that's only the ones I know about. Accordingly, I'll have to perform a detailed review of ALL the Cradle 5 changes to ensure the mod hasn't removed functionality that works in AE-2025. On the down side, the AI now has a major happiness problem that causes a lot of early game revolts. I'm sure that's fixable, but it's a warning indicator that quite a few other things may also fail, at least with the current mod settings.

In some ways, the biggest issue of all is that I was right in the middle of a major update to the Tile Improvement system. Reversing those changes is not something I was looking forward to, so after a great deal of thought I decided to finish the mod so as to be fully compatible with the 2011 version of the Apolyton Edition, which was the original plan anyway. Once that is done, it can be released and folks can take it for a spin to see all the new features, and hopefully will be able to report on the inevitable bugs. Following the release, I can focus on developing a revised version of the mod (probably called Cradle 6) which is fully compatible with the new Source Code release (and presumably the subsequent versions thereof)

With that said..... 😊

258. TIMP Project Status Report: I'm happy to report that this sub-project is largely complete, and is now undergoing an extended series of tests. The alterations were extensive, and it's necessary to confirm that everything actually works, including whether the AI is able to utilize all the new features.

I'll be revealing the individual facets in an upcoming series of posts, but first let's talk about the goals for the TIMP project.

1) Utilize all the Button Bank slots: To place a tile improvement on the map, the player has to select it from the Tile "Button Bank" at the bottom right of the screen. As we discussed earlier, there are 5 Buttons with 12 slots each, only 3 of which can be used for TIMP placement. Of those, 34 of 36 slots were already taken, so the first goal was to activate the remaining two. This proved to be a LOT more difficult than previously imagined, because it turns out that both the "Road" and "OceanRoad" columns have a special property - any TIMP placed in one of these columns will automatically be treated as a road, graphically speaking. That means the referenced TIMP graphic is the first of 18, and the game will assume that the next 17 graphics (sequentially by TI ID number) will link together exactly the same way as all "other" road graphics. That required a number of workarounds, all to be discussed later.

2) New TIMPs: With all slots now available, Cradle 5 has added "**Mega Farms**", a new Land Food TIMP at level 4 ("Hydroponics" now shifts to L5) and "**Advanced Trawlers**", a new Ocean Food TIMP also at level 4 (with "Aquaculture" moving to L5).

3) Reorganize the Slots: As noted in several of the earlier posts, there's a limit to how much can be done, but as of now there are only land TIMPs on the "Land" button, sea TIMPs on the "Ocean" Button (with a single "road-type" exception), and a mixture of both on the "Special" button (**see attached**). Additionally the TIMPs are listed in descending order with the earliest ones of each type at the top of each column.

4) Expanding the number of graphics per TIMP: The base game used only a single graphic for each type of Tile Improvement. For example there was a single image for "Nets", another for "Fisheries" and a third for "Advanced Fisheries". This was discussed at great length in [the "Revising Ocean Farms" series of posts](#), (**Heading 67-71**) but the key takeaway is that it's possible to assign a different image for each of the terraintypes upon which a TIMP is placed. Thus "Fisheries" and "Trawlers" were given 6 images instead of 2, which greatly improves the "look" of the game. To put that in perspective, land terrain in AE has three levels of Farm, Production, and Commerce, but their total number of on-map TIMPs is only nine. By comparison, in the Farm sequence alone Cradle now places 13 different images on the map!

5) Simplified Slot Button Graphics: Under the old system, the slot button graphic was just a smaller version of the on-map image. But what happens when there are multiple images per slot? There wasn't a single solution, but in general the idea was to keep the graphics simple while offering some hint as to what each represents and possibly adding a clue as to the level. For example, the lowest level of "Ocean Food" had one fish, Level 2 had two, and Level 3 used three.

6) Review each TIMP series: Most Tile Improvements are hard-coded to provide a very limited set of effects. A TIMP can affect the amount of food, gold, or production provided in addition to the base value assigned by each terraintype. And while there are a few other features (forts, watchtowers, etc), those which upgrade over time are mostly restricted to the main three. Accordingly this aspect of the project looked closely at how those gains were represented, and while most made sense (Farms for Food, Mines for Production) Commerce did not. More on that later.

7) PW Cost per TIMP: As a general rule, TIMP costs in Cradle 3 & 4 are much greater than those in AE. For example, Farms in CtP2 cost 200 PW but in Cradle the cost doubled or tripled. Likewise, the first level of Mines is 300-500 in AE but 900-1200 in Cradle. As a result, it's very difficult for the player to build a sufficient number of TIMPs, especially during the Early Game. Accordingly, most of the TIMP costs have been reduced in Cradle 5, and are now much closer to those in AE.



259. Previous Apolyton Edition Fixes (now in Cradle): The release of the new Source Code version had a side benefit, in that I discovered the AE_mod_readme.txt file, which mentions a number of fixes to the base game. Most were not applicable to Cradle, but several of them have been implemented:

1) "trade is slightly more profitable and less caravans are required, like SAP2": OK, looking into the SC team comments on this it seems the main change was to drop the CARAVAN_COEF from 0.04 to 0.02 (in const.txt). Cradle already changed this to 0.03, so I'm a bit hesitant to go any further. Still studying.

- The other factor would be the "Production cost" of Caravans. AE has them at 380 while Cradle increased that a LOT, to 600. Similarly, Freight Transports (the Modern Era version of caravans) are 1200 in AE and 1600 in Cradle. In addition, Cradle has an intermediate unit (Merchant Trader) and that is 1100 (no Comp in AE). Accordingly I'm going to change all of them to bring the Cradle costs more in line with AE: Caravan to 400, Merchant Trader to 800, Freight Transport to 1200

- Files Changed (for #1): Units.txt - DONE

2) Units (various):

- "aircraft carrier: carry small or medium air > carry only medium air, so it can't carry missiles and nukes, otherwise a bunch of other units are obsolete." Yes - DONE

- "cargo helicopter: now transports only small rather than medium land units." Yes - DONE

- "cruise missile: increased firepower from 1 to 4, so it can actually damage something stronger than a warrior." Yes - DONE

- "eco ranger: now a stealth unit as it says in the GL." Partially implemented. Now the unit is Stealthy but can't see Stealth (same as diplomats) - DONE

- "sea engineer: settle size 1 > 3, now creates the buildings in a new city (like urban planner)." Yes - DONE

- "spy plane" size medium > size large so it can't land on (and enable anti-air defence on) aircraft carriers." Yes - DONE

- Stealth Bomber & Bomber: size medium > size large. Since these can "carry small" it's a way to piggyback missiles onto the aircraft carrier, plus planes of this size aren't deployed on aircraft carriers. AE didn't change this, but Cradle 5 will - DONE

- Files Changed (for #2): Units.txt - DONE

3) Wonders (various):

- "Emancipation Act: eliminates slavers worldwide again (like it did in the 1.1 patched game), also removed the GL text about making slave-holding cities revolt or riot, since this isn't true in either case (but we should look into making them riot)." Cradle 5 already included the fix which kills all Slavers, but the "uprising" text was still in the GL (can confirm that it doesn't happen). GL text fixed - DONE

- "Field Dynamics Lab: +35% science > +10% science." Good idea - DONE

- "Genome Project: +10% prod., +10% health (+1HP) for units. > only +10% health for units." In addition, Cradle 3/4 had HP at +3, so that has been dropped to +1 and the 10% production benefit removed as well - DONE

- "World Peace Center: added increase regard (+50%), as it says in GL." Probably a good idea. Will add Regard, but not 50%, more like 30% - DONE

- Files Changed (for #3): Wonder.txt and GL.txt - DONE

260. New TIMP - Advanced Trawlers (Ocean Farm L4):

When most of the Ocean Food TIMPs were [altered into various forms of boats](#) (from the unknowable "blue-and-red-things" in vanilla CtP2 – see **Heading 67**), the only real issue was the tenuous link leading from the new L3 **Trawlers** (sailing vessels) to L4 **Aquaculture**.

The L4 **Advanced Trawlers** TIMP solves that problem by offering an intermediate level which alters the maritime fishing technology from Sail to Engines. Among other things, this is a good interim step because the food levels previously doubled when going from Trawlers to Aquaculture, but now the increase is incremental. For example, food from "Shallow" tiles rises from 10 (Fisheries) to 15 (Trawlers) to 20 (Advanced Trawlers) to 30 (Aquaculture). Also, while there were only 3 graphics for Trawlers, we now have 5 with Advanced Trawlers (see attached).

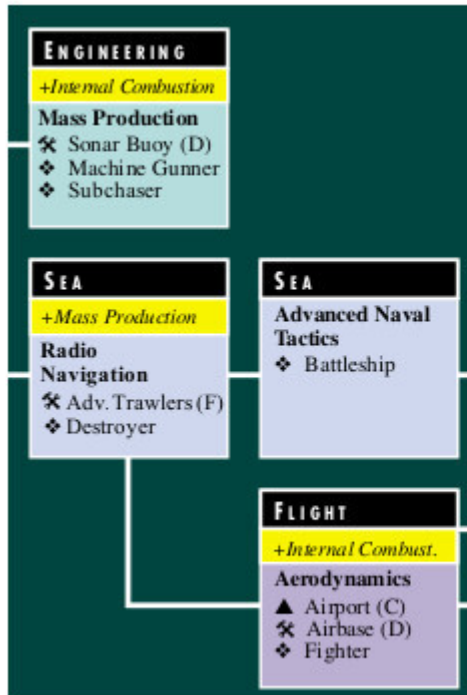
In addition, even though Aquaculture previously had only a single graphic, it now includes a new submersible variant (the "Undersea Harvester") which can only be constructed on undersea Volcanos and Oceanic Rifts (visible on the center-right of the attachment), from which fixed ocean-floor facilities like Aquaculture Pens and Undersea Tunnels are prohibited due to the dangers of seismic activity.



261. New Advance - Radio Navigation:

The existing Tech Tree didn't contain an Advance which seemed appropriate for this new technology, so here's the solution: The new L18 Radio Navigation Advance (left of attachment) is in the "Sea" series, with prereqs of Mass Production & Naval Tactics, and direct lines to Advanced Naval Tactics and Aerodynamics (replacing Mass Production in each case and eliminating two redundant advances in the process). Among other things, it also becomes the new pre-req for building the Destroyer unit (moved from Mass Production) and of course the new Advanced Trawlers TIMP.

And one other interesting Feature. Radio Navigation is also the pre-req for building a new type of Listening Post. It can only be constructed on Mountain Terrain but offers one additional vision hex (from 6 to 7) and it has a new "radio tower" graphic (left of attachment).

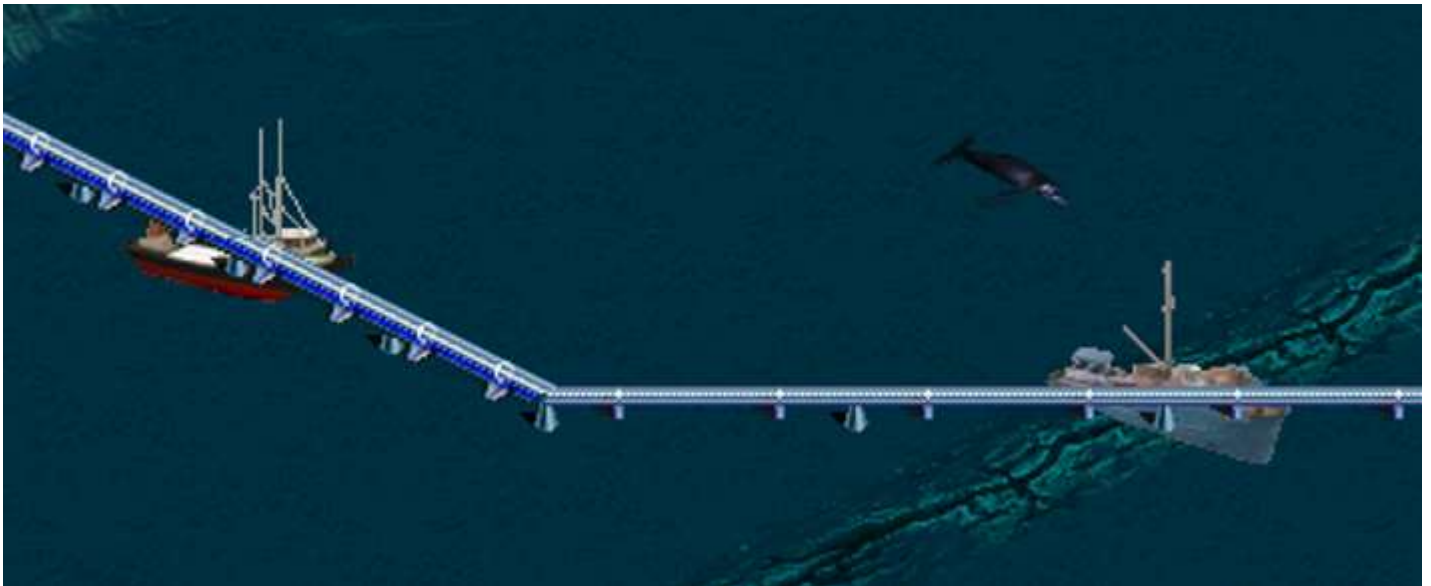


262. Issue: Undersea Tunnels and "Fishing Vessels":

During the testing, one rather horrific issue did surface. When "Ocean Food" graphics exist in the same tile as an Undersea Tunnel, the tunnel sits ON TOP of the TIMP. Graphically it's just an awful look, especially in the case of the "fishing vessels" which serve as TIMPs for Fisheries, Trawlers, and Advanced Trawlers (**see attached**). Now this isn't anything new of course, as Road-type graphics always sit on top of the TIMPs they co-exist with. And in most cases that's fine - road on top of a farm? Ho hum.

Of course even with vanilla CtP2, it didn't look great in the few cases where Nets and Fisheries coexisted with an Undersea Tunnel. However, in this case it was too much to bear so I've used our old friend, [the "Excludes" mechanism](#) to make it impossible to have a Fishing Boat or a Tunnel in the same tile at the same time. There was some concern as to whether that would put the AI in an "infinite loop" of building first one and then the other, in perpetuity. However, the Aquaculture TIMP - which sits on the ocean floor - is available with L23 Robotics, and Undersea Tunnels are only buildable with the very next Advance in that sequence, Nano Assembly.

Fortunately the AI never builds superseded TIMPs, so any fishing boats eliminated by Tunnels will be replaced by Aquaculture TIMPs, and those two do coexist. So, problem solved.

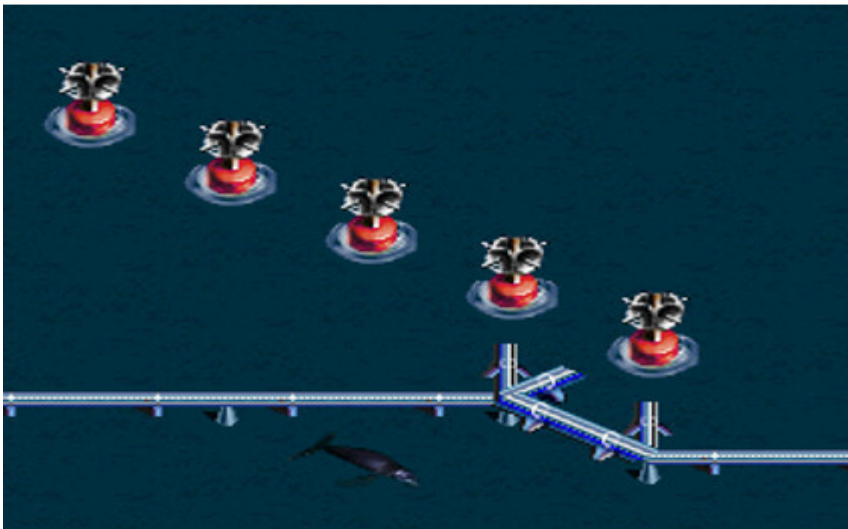


263. Issue: Undersea Tunnels and Sonar Buoys:

While we're on the subject of "Undersea Tunnel problems", you'll recall from [Item # 1 of the Status Report \(Heading 258\)](#) that any TIMP located on the Button Bank "Road" or "OceanRoad" columns has a special property - graphically it will be treated as a road. That means the referenced TIMP graphic is assumed to be one of 18, and the game will treat the next 17 graphics (sequentially by TI ID number) exactly the same way as all "other" road graphics.

Looking back at the attachment to that post, you'll see the "Sonar Buoy" is in fact located in the OceanRoad column. And because of that, when Sonar Buoys were first placed on the map the result was pretty nasty, a string of unrelated images (see upper frame in the attachment). So how was that resolved? The answer was to place the Sonar Buoy graphic in 18 consecutive slots in the til file (TI ID 520 through 537). As a result, the graphics always look normal (see bottom image), even when positioned next to each other. Of course, the game still wants to treat these graphically as if they are roads, and thus they will "link" when located adjacent to any tile containing a road, stone road, railroad, maglev, or undersea tunnel. The first four potential issues are eliminated simply by making it impossible to construct Sonar Buoys on Beach Terrain, thus permanently separating them from all land-roads. As for the Tunnel connections, they look a bit odd (see bottom of lower image) but you can always think of them as "maintenance tunnels" and besides, by their very nature Sonar Buoys are usually located sizable distances from one another anyway, so most won't be positioned near an Undersea Tunnel. They have no "transport" capability so it's just a graphical effect.

The final issue is that, like Fishing Vessels, Sonar Buoys and Tunnels cannot coexist in the same tile and there's no way to change that (due to the rules governing the "excludes" mechanism). Again however, their relative rarity makes it unlikely for this to be much of a problem, and it's easily overcome by keeping them separate.



264. New Commercial TIMP System:

I wanted to introduce the new TIMPs (**Advanced Trawlers** and **Mega Farms**) before getting into the systematic revisions made to the Tile Improvement system, but as you can see from the prior posts, the discussion was simply too disjointed. [The Ocean Farms system was completely rebuilt earlier](#) (see **Headings 67-71** above) and has the fewest number of new changes, yet even there it was impossible to talk about the new level without delving into other affected areas. In that regard, Land Farms and the others are as bad (or worse), so let's start over and begin with the biggest system change of all - the Commerce TIMPs.

As I mentioned in [Item 6 of the Status Report](#), (**Heading 258**) most Tile Improvements are hard-coded to provide three primary effects: Food, Gold, or Production. Of those, the basic premise for food (Farms or Boats) and production (Mines, both Ocean and Land) works quite well, but those for Gold were much less realistic. In both the original CtP2 and AE, the Commerce sequence begins with L1 Trading Posts, upgrades to L2 Outlet Malls, and finishes with the L3 Nature Preserve. The first two make some degree of sense since they are basically stores, but the third level has no connection to the other two, and frankly the idea that a "Nature Preserve" is the top level economic structure in any real-world commercial system is just laughable. Equally bad, the time frames for each level are completely out of synch with a game which starts in 4000 BC. Level 1 is a structure found historically in frontier America circa 1700 AD, Level 2 is a commercial system which originated in the 1960s, while Level 3 has roots going back to the early 1900s. Just a terrible, terrible mix.

And Cradle isn't much better since that also begins with the same 1700s era structure but then segues into a Roman enterprise from 2000 years earlier (the Latifundia) and then moves on to a system which arose in Europe during the Middle Ages (Township) before finishing with the same top level structure I derided earlier.

OK, so what then? Well, if we consider the matter historically, there's no doubt that commercial activity - from the beginning - has occurred in and has emanated from, human settlements. And certainly CtP2 recognizes that, because the primary economic engines of the game are the cities which are the foundation elements of every empire. What's missing are the smaller settlements, and those will become the Commercial TIMPs of Cradle 5.

265. Level 1 Commerce TIMP - "Village": First available with **L2 Pottery**, it can be constructed in Forest & Jungle terrain (each with a different "village graphic"). Historically villages could be found on many different terrain-types, but in the early stages of the game we want the AI to utilize Plains & Grasslands for Food while Hills & Mountains are reserved primarily for Production. Most of the new art is borrowed (and modified) from a few Civ3 images, but in general we're talking about "huts" and you'll see similar imagery associated with the initial land farms (more on those at the appropriate time). Accordingly, the Level 1 image on the ButtonBank is a single hut (as you can see in the attachment to [the "Status Report" post](#)). (**Heading 258**)

With the discovery of **L6 Aqueducts**, villages can now be constructed on Plains terrain, but since the AI can't help itself and sprawls these everywhere, they are restricted to "Plains terrain adjacent to the City" (using the new "NextToCity" tag in tileimp.txt). (**Edit:** Per **Heading 280** below, availability has been extended to additional terrain-types.) Finally, the discovery of **L10 Feudalism** allows villages to be constructed in Swamp terrain, and here we utilize a 4th graphic. Obviously a sequence in which different Advances trigger buildability on additional terrain-types isn't intuitive, so the new GL entry for Villages explains the system in great detail.

The attachment shows all four Village images, clockwise from Argos: Plains, Forest, Swamp, Jungle.



266. Level 2 Commerce TIMP - "Town": This is similar to the "Township" which existed in earlier versions of Cradle, but now it fits into the proper time sequence. First available with **L10 Feudalism**, these can be built on Plains terrain, but again only in the circle of tiles immediately surrounding a city (see **Heading 280** for modifications). This uses the Cradle township graphic. With the advent of **L12 Banking**, towns can now be built on Forests and we have a different graphic which uses "houses" similar to those seen in the Township, but now with a "Trading Post" as the central structure. A pair of these same houses are used in the L2 ButtonBank image. The final "town-granting" Advance is **L20 Advanced Urban Planning**, and this allows them to be built on Jungle and Swamp terrain (using the previous two graphics). As with "Villages", all this is explained in the associated GL entry.

The attachment shows both Town images, clockwise from Argos: Plains (plus Jungle) and Forest (plus Swamp).



267. Level 3 Commerce TIMP - "Suburb": First available with **L16 Electricity**, these feature the existing "Modern City" TIMP graphics used by all small cities once CtP2 (and Cradle) enters the "Modern Age". The L3 ButtonBank image has three of these structures, thus completing the "1-2-3" visual effect. Suburbs can be constructed on Plains terrain, but are no longer restricted to the immediate environs of cities since we're truly in the era of "suburban sprawl". **L19 Mass Transit** allows suburbs to be constructed on Desert and Grasslands, Forest with **L20 Advanced Urban Planning**, and lastly Hills become available with **L21 Global Economics**. While the others use a mix of the Modern City TIMPS, this final graphic is the CtP2 "Outlet Mall".

The attachment shows Argos with a Modern Era City Style (size 40+), and this time it includes the Level 4 image adjacent to the city ("Urban", discussed next) while clockwise from there we see three Suburbs on Grassland, Plains (also Desert & Forest), and Hills.



268. Level 4 Commerce TIMP - "Urban Area" (as shown in the attachment above): These become available with **L20 Advanced Urban Planning**. Similar to "Suburbs", this uses the third level "Modern City" TIMP graphics. Once again we restrict construction to the tiles immediately surrounding the city, but now we extend buildability to all terrain types except Mountains and Glaciers. Visually the result is a city surrounded by tall high rises and then a series of lower structures, but all with similar art.

Taken altogether, these result in a map which contains a vast amount of pleasing visual diversity, and utilizes a Commercial System that mirrors the one seen across the world, from the earliest of times until now, and on into the future.

Finally, while the depiction of the four Commerce Levels has radically changed, the PW costs at each level remain fairly close to what they were:

PW Cost (Old):

Trading Post: Grass/Plain/Forest/Jungle/Desert/Glacier/Swamp/Tundra +600

Latifundia: Grass/Plain/Forest/Jungle/Br.Hills/Hills/Desert/Swamp +1200

Township: All except Glacier +1500, Tundra +1800

Nature Preserve: All except Glacier/Tundra +2100

PW Cost (New):

Village: Plains/Forest/Jungle/Swamp +500

Town: Plains/Forest/Jungle/Swamp +1000

Suburb: Grass/Plains/Desert/Forest/Hill +2000

Urban: All except Glacier/Mountains +3000

Files Changed: tileimp.txt, tilerefund.slc, uniticon.txt, traits2.slc, gl_str.txt, tips_str.txt, Feat_str.txt, sounds.txt, Great Library, and the Tech Tree.

269. Revised Production TIMP system:

Unlike the Commercial TIMP system, Mines did not require a complete overhaul and there are still four levels, but the alterations were quite extensive. The major change (other than additional graphics) was to shift "Mine shaft" graphics from the second level of Mines to L1, and move the "Open Pit" graphics from Level 1 to L2. There were several reasons for this:

- The "open pit" is the underlying look for the existing mine TIMPs used in L3 and L4, so it's a more coherent sequence to use pits for the last 3 levels instead of going "pit-shaft-pit-pit".
- The new Shaft graphics from Civ3 are all smaller and look fairly primitive. Plus the reality is that large open pit mines (at least in early times) were primarily used for exposing and then excavating large sections of rock - things like marble, granite or sandstone. Conversely, the earliest forms of mining were tunnels of the sort used to obtain flint nodules or follow veins of metal into a hillside (thus "shafts"). Of course historically it wasn't "either/or", as both types co-existed in history and still do.
- For this reason the name of the first level will also change, from "Mine Shaft" to "Early Mines".
- Another major change is to remove buildability from the Plains terrain-type, primarily to keep it largely devoted to Food TIMPs.
- Lastly, the original CtP2 shaft graphic is modern in appearance, with a timbered entrance and a metal cart on rails. Accordingly, that graphic is more appropriate for a later era, and will shift to L3. That also means a new ButtonBank graphic is needed.

Level 1 Production TIMP - "Early Mines": Available with **L2 Mining**, these can be constructed on Dunes, Hills (2 types), and Mountains (3 types). They use three Civ3 "mineshaft" graphics borrowed from the Modern Times Mod, with one dedicated to Dunes, another in Hills, and the third in Mountains (counterclockwise from Pylos in the attachment). A new ButtonBank graphic was also created using the "Dunes" version.



270. Level 2 Production TIMP - "Mines": These become available with **L7 Iron Working**, use "open pit" graphics, and all are buildable on the same 6 terrain types as Early Mines. From a visual coherence perspective, the LotR Mod mine graphic (used at this level) has the same "rock border" used by several of the "Farm" graphics featured in the roughly contemporaneous "Advanced Farms" series. In addition, the metal scaffold has been replaced by the wood struts from the AOM graphic, and those are featured in all three of this level's mine graphics (see attached).



271. Level 3 Production TIMP - "Advanced Mines": First available with **L15 Modern Metallurgy**, this is yet another upgrade TIMP that's buildable on the same 6 terrain-types as the earlier levels. Once again there are three graphics, one of which is the original CtP2 mine shaft (used exclusively on Alpine Mountain terrain). With the discovery of **L17 Oil Refining**, Advanced Mines are buildable on Desert terrain (the graphic is an Oil Derrick) while **L18 Corporation** extends availability to Tundra terrain (with an Oil Pumper graphic) (see attached).



272. Level 4 Production TIMP - "Mega Mines": These are buildable on all designated terrain-types with **L21 Global Economics**. The original CtP2 graphic appears on Hills and Dunes, a modified version is used for Alpine and Brown Mountains, a third image (an edited version of the CtP1 space station) appears on Polar Hills and Mountains, and a grey-colored oil pumper is seen in Deserts (see attached). The final Mega Mine graphic is the one used for Carbon Sinks ([as previously discussed here](#)) (see **Heading 254** above)

With that, there is far more visual diversity associated with Mines, even though - it must be emphasized - the underlying benefits remain the same at each level. On the other hand the PW costs have been significantly reduced on the early levels (which brings them more in line with AE).

PW Cost (Old):

Mine Shaft: Dunes +1200, Hills +1500, All Mtns +1800

Mines: Dunes +900, Hills +1200, All Mtns +1200

Adv Mines: Desert +1500, Tundra +1500, All Hills +1800, All Mtns +2400

Mega Mines: Desert +1800, All Hills +2400, All Mtns +3300, Tundra/Glacier N/A

PW Cost (New):

Early Mines: Dunes +400, Hills +600, All Mtns +800

Mines: Dunes +700, Hills +900, All Mtns +1000

Adv Mines: Desert +1500, Tundra +1500, All Hills +1200, All Mtns +1800

Mega Mines: Desert +2000, All Hills +1500, All Mtns +2200, Tundra/Glacier +3000

Files Changed: tileimp.txt, tilerefund.slc, uniticon.txt, traits2.slc, gl_str.txt, tips_str.txt, Feat_str.txt, sounds.txt, Great Library, and the Tech Tree.



273. Granaries and Early Farms:

Before examining the revised Land Food TIMP system, let's review a small but significant change to the Tech Tree. All the early Buildings (Bazaar, Ziggurat, Shrine, Walls) are available at Levels 1 or 2, while Granary is Level 3. Yet historically the Granary preceded most of them, and should be one of the first buildable structures. As an additional indicator of the problem, it was usually possible to reach the Dynasty Gov-type before Granaries were even available.

While not a perfect solution, the chosen fix was to shift the **Granaries** Advance to L2 and move **Water Lifts** (which holds the "Farms" TIMP) to L3 (see attached). The pre-req Advances are fine (except with respect to each other), while the research costs have been modified to match their new levels (they are still sequential Advances in the "Environment" series). In addition, we'll alter one of the **Dynasty** pre-reqs to Granaries (the old pre-req of **Brick Making** is still part of the chain), thus ensuring they are researched before Dynasty.

The main downside to all this is "Farm" TIMPs have now shifted out to L3, when in reality that was also a very old technology. Accordingly, I'm going to add a new feature to the "Pasture" TIMP, allowing them to be constructed on Grassland with the discovery of L1 **Agriculture**. This is a very cheap improvement (100) which adds a modest +5 to the Food level. Although they have a unique graphic and appear as "Early Farms" on the Tech Tree and in the Great Library, the name will appear as "Pasture" when you see them on the map (similar to how "Carbon Sink" is really just a version of the "Mega Mine").

Files Changed: Advance.txt, advancelists.txt, tileimp.txt, GL.txt, and the Tech Tree

ENVIRONMENT	ENVIRONMENT	ENVIRONMENT
Agriculture	+ <i>Brick Making</i>	+ <i>Astronomy</i>
✂ Early Farms (F)	Granaries	Water Lifts
❖ Swordsman	▲ Granary (F)	✂ Farms (F)
⊞ Farmer		

274. Revised Food TIMP system:

Similar to Mines, the "Land Food System" did not require wholesale changes, but the alterations were quite significant. The L1 "Pasture" has been enhanced, and while L2 Farms and L3 Advanced Farms are mostly the same, they feature new graphics. L4 Mega Farms is one of the new TIMPs (and will be reviewed in detail) while L5 Hydroponic Domes features several alterations.

Level 1 Food TIMP - "Pasture": The original pasture is still available with **L1 Domestication**, and can be constructed on Plains, Dunes & Hills. As discussed in the previous post, this TIMP also serves as **"Early Farms"** and can be built on Grasslands with the discovery of **L1 Agriculture**. This has a new graphic which features a pair of huts adjacent to a tilled field.

The attachment shows both the original Pasture and the new Early Farms, L-to-R below Miletus:



275. Level 2 Food TIMP - "Farms": Available with **L3 Water Lifts** and buildable on Grassland and Desert, the two current TIMPs were taken from the LOTR Mod, but both have been significantly revised. The Grassland TIMP now uses the "in-process" farmland graphic which has 2 green quadrants and two brown, indicating that half the land is fallow. That will be the centerpiece and also replaces houses with huts, adds trees, and removes the "rock border fence" as a further indication of primitive early farming.

The Desert TIMP has been replaced with the "African Village" style previously allocated to the L3 Advanced Farms, with the added change that the trees along the border are now Palms rather than Deciduous.

To simplify the ButtonBank graphic, there's now a new one based on the "green and brown" quadrants in the grassland TIMP, but without the huts and trees ([see top image, left column](#) in the "Status Report" attachment). (**Heading 258**)

This attachment shows both Farms (Grassland and Desert), R-to-L below Miletus



276. Level 3 Food TIMP - "Advanced Farms": Available with **L10 Agricultural Revolution** and buildable on Grassland, Plains and Desert. All three TIMPs are from LOTR, except the color of the farmland is different. In addition, the Desert Farm has been modified to add Palm trees along the edge of the field.

The attachment shows all three Advanced Farms (Grassland, Plains and Desert), R-to-L below Miletus:



277. Level 4 Food TIMP - "Mega Farms": This is the second of two new TIMPs, thus completing the utilization of all 36 ButtonBank slots (the other being [the previously reviewed Advanced Trawlers](#)). (**Heading 71**) First available with **L18 Corporation**, there are 3 new TIMPs (one for each of the Grassland, Plains and Desert terraintypes), all of them heavily modified but based on the CtP2 "Crop Circle" graphic. The original image is used in the ButtonBank ([see bottom image, right column](#) in the "Status Report" attachment) (**Heading 258**)

I made fun of it earlier, but there is a proper role for the "Nature Preserve", just not in the Commerce group. Instead it will be the 4th TIMP in the Mega Farms group, available with **L20 Conservation**, and buildable on Jungle and Swamp terrain. [Similar to the approach taken with the "Carbon Sink"](#), (**Heading 254**) Nature Preserves have a very different set of attributes from the other Farm-type TIMPs. Although they provide small Commerce and Food bonuses, their primary function is a -20 to Production, thus providing a small offset to the global rise in pollution.

The attachment shows all four Mega Farms (Grassland, Plains, Desert & Jungle/Swamp), R-to-L below Miletus:



278. Level 5 Food TIMP - "Hydroponic Domes": Available with **L23 Genetics**. The primary change is that Hydroponic Domes used to be buildable on all Land Tiles, but that has been reduced to 8 (no Mountains/Jungle/Swamp/Glaciers). In addition, the original TIMP is only used by 4 terrain-types (Desert/Forest/Grassland/Plains), while the others use a modified version of the CtP1 Hydroponic Space Dome.

The attachment shows both Hydroponic Domes, R-to-L below Miletus

Once again we're adding a lot of new eye candy to the map, although the underlying benefits are largely the same at each level. However, as you would expect the new L4 TIMP provides better gradation between Advanced Farms and Hydroponics. And once again, the PW costs have been reduced to bring them more in line with AE, particularly for the early levels.

PW Cost (Old):

Pasture: Dunes/Hills +600, Plains +600, Grass (N/A)

Farms: Desert +300, Grass +600

Adv Farms: Desert +1200, Grass/Plains +1500

Mega Farms: Desert (N/A), Grass/Plains (N/A), Jungle/Swamp (N/A)

Hydroponics: Polar/Hills/Mtns +900, Forest/Desert/Jungle/Swamp +1800, Grass/Plains +2400

PW Cost New):

Pasture: Dunes/Hills +300, Plains +200, Grass +100

Farms: Desert +300 (No change), Grass +400

Adv Farms: Desert +800, Grass/Plains +1000

Mega Farms: Desert +1200, Grass/Plains +1400, Jungle/Swamp +1200

Hydroponics: All Hills/Tundra +2400, Desert/Forest/Grass/Plains +2000

Files Changed: tileimp.txt, tilerefund.slc, uniticon.txt, traits2.slc, gl_str.txt, tips_str.txt, Feat_str.txt, sounds.txt, Great Library, and the Tech Tree.



279. Six "non-ButtonBank" TIMPs added to the Great Library & Tech Tree:

Even though six of the "new" TIMPs are really just aspects of others (since they don't have their own icon on the ButtonBank), each has now been given its own Great Library Entry. This affects the **Early Farms** (see attached), **Radio Tower**, **Carbon Sink**, **Undersea Harvester**, **Nature Preserve** and the **Shopping Mall**. They also appear on the Tech Tree and are "searchable" in the TIMP section of the GL. Not only do the new entries explain what they do, but just as important, indicate which button activates them (along with a link to the "real" TIMP). This also required four new GL images.

Files Changed: tileimp.txt, uniticon.txt, gl_str.txt, Great Library and the Tech Tree.



280. Commerce TIMP Update: As discussed earlier (see **Heading 265** above), the **Villages** and **Towns** which are buildable on Plains Terrain are restricted to the hexes adjacent to the city. Unfortunately, testing proved that was too limiting of a condition. To improve the situation (and since they can't be built outside the ring anyway), both TIMPs can now be constructed on all terrain-types except Mountains and Glaciers (and those allocated to other Commerce TIMPs). Tested and works as expected.

The attachment shows a city surrounded by a Ring of Villages.



281. Additional TIMP cost reductions:

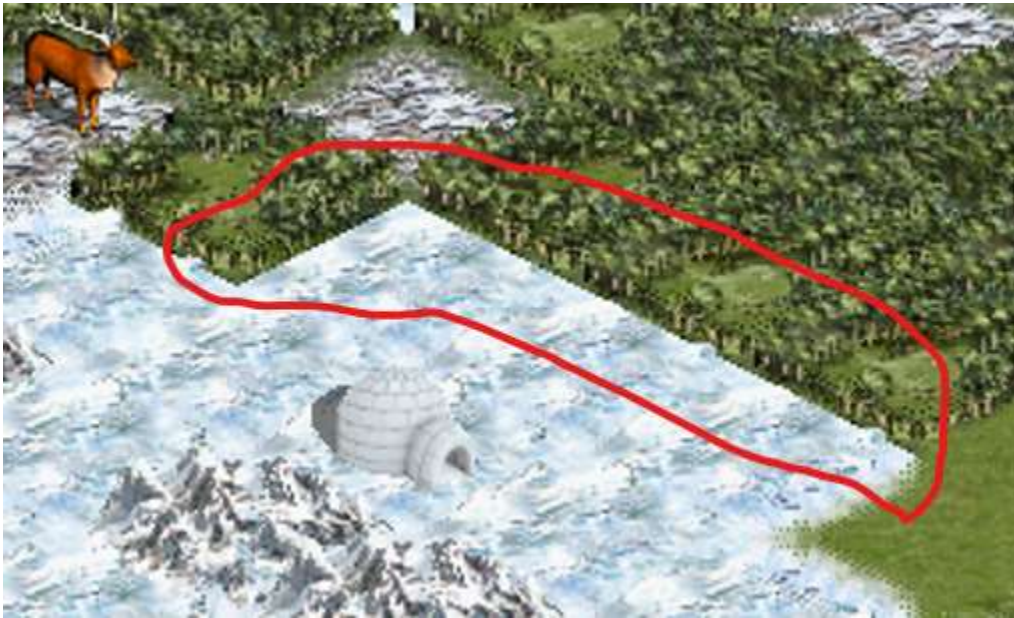
- 1) Port is 1200 in Cradle but 350 in AE. Will drop to 500
- 2) Airbase is 1700 and 2000 in Cradle, but 1000 in AE. Will drop to 1200 & 1500
- 3) Drilling Platform is 2800 in Cradle but 800 in AE. Will drop to 1200
- 4) Fort (and Shipyard) is 3600 in Cradle but 1000 in AE. Will drop to 2000
- 5) All 3 Undersea Mine levels: Rather than look at them in detail, I'll just note that all are much more expensive in Cradle. That makes sense given they are late-game TIMPs and realistically it would be difficult to build structures such as this, but the build cost will still be reduced by 1000 at every level.

- Files Changed: tileimp.txt & tilerefund.slc

282. Polar Hill Tiles don't merge properly with some adjacent terrain-types:

There's a long-standing graphical bug in which "Polar Hill" terrain doesn't merge properly with some (but not all) of the other terrain-types. The most common of these is where the upper edge of a Polar Hill meets a Forest, and what you see on the map is a straight line without the gradual merge one normally sees when two different terrains meet (see attached). And while it's not as frequent, the same thing happens when Polar Hills meet Alpine Mountains.

This issue has been present in the game from the very beginning, and has never been addressed, not even by the Source Code releases. I looked at it briefly a few times, but the solution wasn't obvious (assuming there was one), and since it had no impact on gameplay the priority was about as low as you can go. So why talk about it now? You can probably guess....



And here's where Polar Hills intersect with Alpine Mountains. Ugly.



283. Polar Hill Tiles (continued): A few days ago I decided to take a deeper look, and began by digging through the til files using the TileEdit program (the only way to edit Terrains and TIMPs - and hence a tool I'm now deeply familiar with). It turns out that all the terrain files are clean and neat except for five which have extraneous color pixels outside the standard diamond. Of course all five of these were Polar Hill terrain, and - long story short - that had NOTHING to do with the problem. Lost a whole day pursuing that red herring. 🚫

The real clue of course is that Polar Hills intersect properly with most other terrain types. Hills? Tundra? Looks great. So that meant it was probably something involving the "Border" files. I'll spare you most of the details because those are very esoteric in appearance and deployment, but eventually I figured out that yes, the border files connecting Polar Hills with Forest and Mountains were missing. But there ARE Border files for very similar intersections - Tundra to Forest and Tundra to Mountains. So I copied both of those, and added them to end of the Border Section of the til file (with new terrain connection codes), saved the til files, opened up a new game and....Voila. Problem solved (see attached).

- Files Changed: gtset555.til & gtset565.til



284. Stone Road Graphics Redux:

[As discussed way back in 2022](#), (see **Heading 54** above) the Cradle 3 "Stone Roads" (a light grey version of the Maglev) were replaced by the Tellius stone roads. The new roads were more natural-looking and seemed fine when built in long stretches without a lot of junctions, but the AI builds road networks of all types around it's cities and the result is a real mess - the Tellius Stone Roads are so wide they cover up the other TIMPs in the same hex, since each stone road is 6-7 pixels wide, double the width of the CtP2 "brown roads".

In addition, many of the pixels in the "Tellius Roads" are exactly the same color as the "shadow" pixels used by the TIMP code, so as a result there are black spots in the middle of these roads instead of the "medium grey" which would otherwise improve their appearance. Lastly, I examined the map from a recent long-running test game in which several civs were building stone roads. Not only do you see the TIMP coverup and the "black spots", but the roads themselves do not line up properly when they meet with "normal" roads, and in some cases don't even align with other stone roads (see attached).

In the final analysis, that is three major problems with these roads, and it would take a lot of work to reduce the width, clean up the "bad pixels", and most difficult of all, fix all the alignment issues. So we're going to do something different.



285. New Stone Road Graphics: Before discovering the Tellius Roads, I was working on a "grey" version of the standard CtP2 "brown road", but never finished the project. Fortunately it was nearly complete and after some final edits and tweaks, they have now been inserted as Stone Road replacements (see attachment). That resolves all three of the issues affecting the Tellius graphics, a fix which includes new ButtonBank and GL images.

- Files Changed: gtset555.til & gtset565.til



286. Breadbasket Error (response to Ekmek): It's fortunate that you showed up, because I've been experiencing a late-game CTD (2100 AD), which is caused by something called a "Breadbasket" error (see attached crash log). Apparently this was [a feature you added to the executable as part of build 707](#), and I've seen it reported a few times so it's not something unique to Cradle. Unfortunately it's a really nasty bug, as the only way to get past it involves using the Barbarians to wipe out several civs.

Whatever the "Breadbasket" is or does, there's no mention of it in the AE Readme file, and I can see that it's been removed from AE-2025. The question is, what exactly is this feature? If I knew what it is and how it's triggered, there may be a way to work around the bug in a more surgical fashion. Hopefully you can help!

```
1 Version 2018-11-28
2 0x004ca19a [?BreadBasket@Player@@QAENXZ + 0x7a]
3 0x004ca285 [?PreResourceCalculation@Player@@QAEXPVAVCityData@@@Z + 0x15]
4 0x004cdd58 [?BeginTurn@Player@@QAENXZ + 0x4d8]
5 0x0050eb2c [?GEVHookCallback@BeginTurnEvent@@EAE?AW4GAME_EVENT_HOOK_DISPOSITION@@W4GAME_EVENT@@PAVGameEventArgList@@@Z + 0xec]
6 0x005823b7 [?Activate@GameEventHook@@QBE?AW4GAME_EVENT_ERR@@PAVGameEventArgList@@HAAH@Z + 0x37]
7 0x00582d78 [?ActivateHook@GameEventManager@@QAE?AW4GAME_EVENT_ERR@@W4GAME_EVENT@@PAVGameEventArgList@@HAAH@Z + 0x28]
8 0x00580e9d [?Process@GameEvent@@QAE?AW4GAME_EVENT_ERR@@XZ + 0x2d]
9 0x005827f0 [?AddEvent@GameEventManager@@QAR?AW4GAME_EVENT_ERR@@W4GAME_EVENT_INSERT@@W4GAME_EVENT@@@Z + 0xd0]
10 0x00433405 [?dh_endTurn@@YAXPAVDQAction@@PAVSequence@@W4DHEXECUTE@@@Z + 0x35]
11 0x0042bac1 [?HandleNextAction@Director@@QAENXZ + 0xf1]
12 0x0040c3ab [?Process@CivApp@@QAENXZ + 0x11b]
13 0x006f2bce [?CheckForEasterEggs@ChatWindow@@QAEPAD@Z + 0x12e]
14 0x006f2a46 [?ChatCallback@ChatWindow@@SAXPAVui_Control@@IIPAX@Z + 0x66]
15 0x0067d432 [?TextFieldWindowProc@@YGPJPAUHWND__@@IIP@Z + 0xa2]
16 0x76ca15eb [__onexitbegin + 0x762c7533]
17 0x76c97cda [__onexitbegin + 0x762bdc22]
18 0x76c96580 [__onexitbegin + 0x762bc4c8]
19 0x76c88330 [__onexitbegin + 0x762ae278]
20 0x00407122 [?CivMain@@YGHFPAUHINSTANCE__@@OPADH@Z + 0x3d2]
21 0x00406b15 [WinMain@16 + 0x65]
22 0x00810c1c [WinMainCRTStartup + 0x134]
23 0x76a0fcc9 [__onexitbegin + 0x76035c11]
24 0x772182ae [__onexitbegin + 0x7683e1f6]
25 0x7721827e [__onexitbegin + 0x7683e1c6]
26
```


287. Game plays through to the end:

The timeframe for Cradle 5 (as with 3 and 4) is from 3000 BC to 2300 AD. And as you can see from the attached, it is possible to play the mod until the very end. Given the amount of time and effort invested in extending Cradle playability into the Future periods, that's a very important milestone.

For the past month, I've been giving Cradle a thorough playtest and at this point I'm confident that the mod is very stable (with a few caveats that will be elaborated upon shortly) and it's definitely a lot of fun - if you have fond memories of that "just one more turn" feeling, then Cradle 5 will be right up your alley.



288. Potential Issues: There are some issues that could potentially affect your game, so let's go through them:

1) Breadbasket CTD: As I mentioned in the earlier post to Ekmek, this is a really nasty CTD, and the only workaround I found was to go into Edit Mode and use the Barbarians to conquer several of the AI civs before the game would finally proceed to the end. Fortunately this is a very late game CTD, and it never appeared in any playtest until the calendar exceeded 2100 AD. In addition, it occurred in a "robot" game (where the AI runs the "human" player) and because the AI is rather feeble when it comes to city conquests, everything about this type of campaign is "non-typical". So it's possible - even likely - that in a fully human-controlled game the player will so dominate the AI civs by this point that the conditions leading to the CTD will not be present.

2) Revolting Civs CTD: One of the more persistent late game CTDs was finally traced to a situation where an AI unit causes an enemy city to revolt and become a new civ (the "Incite Revolution" special attack), and then immediately deploys the same attack against the new single-city Civ. That causes the new Civ to revolt into yet another new Civ, but

before the game has been able to process the existence of the first one. Four units have this ability (King's Eye, Spy, Secret Agent and Cyber Ninja), and the solution was to greatly reduce the likelihood of success while increasing the "death-chance" for each agent (percentages vary depending on the unit). Since that change was implemented I haven't seen any more of these CTDs, but it's still theoretically possible. The symptoms are that you'll see a message stating that "Civ X" has revolted and become "Civ Y", after which the game CTDs. If this happens in one of your games, one solution is to load an earlier save and use the Editor to delete the offending agent. Alternatively, edit the **units.txt** file to reduce the agent's chance of success to 0%, and then load the last save game. Run at least a few turns with the new settings and that should solve the problem (after which you can save, restore the original units.txt settings, and load the save).

3) Gigantic Maps: First of all, I absolutely LOVE playing with massive maps. The world just feels "bigger" and more realistic. The downside - again with "robot" control - is that the AI fills the map with units and cities and rarely eliminates any of the competition. So by the late game (1500 AD and beyond) the turns take forever and the game begins to experience the sort of instability (i.e. random CTDs) which is almost certainly game-memory driven. In other words, this is a game coded over 25 years ago, and it was never intended to handle a gigantic map (a size which was not part of the deliverable), much less all the additional TIMPs, Civs, and Slic code included with a mod of this size. In addition to the late game instability, the AI seems even more feeble than normal. However, most of this can be mitigated by selecting a "Regular" or even "Huge" sized map. Although once again, this may just be a side effect caused by using "robot-mode" for the human player.

4) Pace of Technological Change: This is affected by the number of civs and even the map size you choose. I've never played "one-turn-at-a-time" beyond 1500 BC, but in "robot-human" games, the technology proceeded at close to the historical rate with 12 civs on a Gigantic map. Conversely, 15 civs on a Regular map reached only the Modern Era by the time the game ended in 2300 AD. Just be aware that your starting choices will have ramifications in this area.

5) Rare "Upgrade Elite Unit" Bug: This has only happened once in 100's of playtests, and the requirements are rare enough that you'll probably never experience it, but here it is: If you have a single "Elite Spearman" unit (there is no bug with 2 or more) AND he is not located in a City or Fort when you discover the "Bronze Working" Advance (which triggers the Upgrade), the Slic code will deliver some bogus messages and will NOT move on to the "Militia Upgrade" options which should follow immediately thereafter. If this happens to you, the best option is to load an earlier save and move the unit into a city or fort. Failing that, disband it. The optimal solution would be to re-write the code in **updater3.slc**, but I can't spot the problem so unfortunately it's not an option.

6) "Lost Tribe" related CTD: There are several possible results from "popping" a Goody Hut, such as gaining Gold or a new Unit, and the range of options and associated percentages are controlled by the **risks.txt** file. In the standard game, one of these options is to find a "Lost Tribe" and thereby gain a free city. However, in very rare instances the AI will build a city right next to one of these "Lost Tribe" Goody Huts, and popping THAT causes an incompatibility with the game code (which prohibits founding cities in adjacent tiles). That issue - possibly exacerbated by Slic Code - soon causes the game to CTD when being saved, so it's a serious bug. Accordingly (after a brief flirtation), Cradle 5 now sets this chance at 0%, so it's not a CTD you have to worry about. However, I know people like to tweak their gameplay settings, and the "Lost Tribe" Goody Hut is a fan favorite. But in this case it is too dangerous, so don't make it part of your Cradle games.

7) Visible Wonders "Bugs": Sometimes the player (usually the AI) completes a Visible Wonder, but the graphic does not appear on the map. Although infrequent, this can be caused by several things:

- No available terrain to place it on. In the most extreme example, a single hex island has no adjacent land hexes, so Visible Wonders will never appear if built by a city located there. More common is lack of suitable terrain (for example, only mountain or glacier terrain). Another possibility is that all the suitable terrain is already occupied by other Visible Wonders ("normal" TIMPs will be overwritten if nothing else is available).

- Although this next occurrence is rare, in some instances the AI completes the Wonder and has suitable open terrain (unoccupied by any TIMPs) on which the code can place the Visible Wonder. But because the AI is an idiot, on the same turn that it completes the Wonder, it will start building a DIFFERENT TIMP on the same hex. Even though it is impossible to start building a TIMP on top of a COMPLETED Visible Wonder, it is possible to do so in the single turn it takes for the Visible Wonder TIMP to be completed. And when that happens, it will replace the Wonder TIMP.

289. Final set of Improvements: The extended playtests (both robot and fully human) identified a few improvement opportunities:

1) Visible Wonder for Ramayana: This wonder has a simple effect (+1 Happiness until Feudalism) but now includes an "on-map" component. Even though it's effectively the "Book Wonder" for the Hindu religion, it doesn't have as many benefits as the others (Islam, Christianity, etc). In this case we'll use a Ziggurat TIMP from the Visible Wonders mod, which Hex modified to add trees and other structures, thus giving it an "Indus Culture" appearance appropriate to the Ramayana Era. Files changed: tileimp.txt, mapwonders.slc, Great_Library.txt, gl_str.txt & gtset555.til

2) New Great Library: My attempt at a "Great Library" Visible Wonder graphic, while perhaps technically accurate (nobody knows for sure) was too fuzzy and washed out compared to the others. It has now been replaced with a new one based on the "Baalbek" graphic from one of the Civ3 modders.

3) New Taj Mahal: The previous graphic came from the old CtP2 Visible Wonders mod, but it was small and the image quality poor. This too has been replaced with a new one (edited for size) from one of the Civ3 mods.

4) The "Colony" TIMP (an Egyptian-style pylon surrounded by houses) looks very dated by the late game. Once again a graphic was borrowed from Civ3 and the numeric link in tileimp.txt will be switched as part of the "Modern Era" file swap.

5) City compatibility with City Wall: Cradle 5 has a lot of new cities, and most of them look really nice. But what I hadn't considered was what happens when the player constructs the "City Wall" building. This creates an on-map graphic - a smooth stone wall surrounding the city - and that provides a visual cue, warning the player to expect improved city defense against both military and slaving attacks. The problem in this case was that 3 of the 4 ancient-era Celtic city sprites were off center, and thus appeared to "float" over the city wall graphic. And the same was true with two of the Mycenaean cities. All are now fixed.

6) New Mesopotamian cities: To be perfectly frank, the 4 city sprites I created for the Mesopotamian Medieval & Renaissance eras were just awful. Instead they are being replaced with 4 new ones taken and edited from a Civ3 city mod (**see attached**). In addition, the Ancient Era will now begin with a central temple (the ziggurat comes later) and the original levels 1 & 2 will become 2 & 3. The Classical era will continue to use the original 1, 2, and 3 (so no change to those). This does require an additional city sprite slot (since we're at the maximum), once again taken from the "Palace" group. File changed: agecitystyle.txt



290. Cradle5 Download and Installation: Without further ado, the Cradle 5 mod is now available for Download from Dropbox (link):

<https://www.dropbox.com/sc/fi/eincjs3hogwj24wdym6sp/Cradle5.zip?rlkey=evghca3f7qkrnirnmxli1j0y7&st=hqimqziz&dl=0>

Installation instructions are fairly simple:

- 1) Unzip the download into your CtP2 Game folder. If you did it properly, you will see a folder named "Cradle5" at the same level as the "Scenarios" or "ctp2_data" folders.
- 2) Inside the "Cradle5" folder you will see a file named "userprofile.txt", which needs to be copied into the ctp2_program\ctp\ directory. WARNING: You may want to preserve the userprofile.txt file which is already present in the ctp\ directory, so rename the existing one (to something like "userprofile (original).txt") BEFORE you copy in the new file.
- 3) Start up a session of CtP2 as you would normally, and it will automatically begin with the Cradle movie (hit <enter> to bypass) and start-up screen.

Additional Items:

- Cradle 5 does not have an instruction manual but there is a document called "Cradle5 posts at Apolyton" in the Cradle5/Documents folder. As the name implies it is a compilation of all the posts made to the Cradle 5 development thread at Apolyton, and is text searchable. In addition, the in-game "Great Library" includes detailed descriptions of all the many new units, features, and concepts.
- Inside the Cradle5 directory there is a file called "Cradle 5 Tech tree.bmp", which should prove very useful. It includes a "Legend" at the center/right/top of the document.
- Swap File System: The Swap File System is NOT present in this initial download of Cradle 5. It's designed to improve immersion by modifying text message and some graphics as a prelude to the Modern Era, and - once implemented - will be enacted by a single-click executable after the player has researched the "Age of Reason". This should have minimal impact on your game because either it will be included with a later "bug-fixed" version of Cradle5 or else (assuming no bug fixes) it will be save-game compatible with this version of Cradle5.
- Soundtrack: What would CtP2 be, without the music? The soundtrack is in the Cradle5 directory.

