Advanced Civ

Mod for BtS 3.19 version 0.89 17 October 2017

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User Manual

AdvCiv is a modpack for advanced players, building on karadoc's K-Mod. AdvCiv does not add content, and, so far, makes few balance changes apart from changes to the AI. It hasn't been tested for multiplayer. For questions, comments and current activities, please visit the development thread on CivFanatics.

Installation

AdvCiv is installed like any other mod into `Beyond the Sword\Mods`, except that, if you rename the AdvCiv folder, you'll also need to change the name in `Assets\XML\Art\CIV4ArtDefines_Misc.xml` (see Known Issues); `AdvCiv.ini` inside the (renamed) AdvCiv folder should then be renamed as well. When the mod is loaded for the first time, it creates a folder `My Games\Beyond the Sword\AdvCiv` for the BUG settings. You'll have to remove this folder manually to fully uninstall AdvCiv.

The above assumes a BtS installation from optical disc on Windows 8 or earlier, though I understand that it works the same way on Windows 10. A Steam installation may require a patch in order to run any mods. There is, apparently, no way to play this mod on macOS.

To start the mod through a Windows shortcut, create a shortcut to `Civ4BeyondSword.exe`, open the shortcut's file properties, and add a space and `mod=\AdvCiv` to the `Target` field.

Mod components

- UWAI: Utility-Based War AI. Rewrite of the AI parts dealing with decisions on war and peace. Based on a single function to evaluate the utility of any war plan, whether it's hypothetical, in preparation or ongoing. The new AI is more consistent, more adjustable and much more complex.
- DDiplo: Dynamic AI Diplo. Revision of AI relations modifiers, aimed, in part, at making it easier to reconcile after a war.
- BBarb: Better Barbarians. An overhaul of all things Barbarian. Barbarian activity increases gradually until 67% of a continent is settled; fewer Barbarians on poor-yield tiles; creation rate adjusted to game speed; land units can spawn aboard Galleys; fogbusting nerfed; Great Wall reworked; more plausible development on all-barbarian continents (e.g. Terra map).
- Immortal Culture: Culture of dead civs stays in the game and can cause anger and revolts. Revolts can occur in any cities, not just near a border. Shortened occupation countdown in conquered cities, but the countdown decreases only probabilistically based on the strength of the occupying force.
- K-Mod by karadoc: substantial AI improvements (incl. BBAI); usability improvements (incl. BUG, which in turn includes Civ4lerts, reminder, Exotic Foreign Advisor and several optional advisor screens); bugfixes (incl. the unofficial patch); improved developer tools (AIAutoPlay, Civ Changer); performance tweaks; minor balance changes (several from PIG, incl. Lead From Behind); practically no flavor changes other than Actual Quotes. As far as I can tell, the main BBAI contributors are jdog, EmperorFool, Afforess, Fuyu and LunarMongoose. For credits for BUG, see the BUG help file (Alt + Ctrl + O in game).
- Show Hidden Attitude Mod by DaveMcW
- My own changes and fixes in the spirit of K-Mod; see chapter Misc. changes.
- SPaH: Start Points as Handicap. Game option that gives an Advanced Start to the AI civs, but not to the human civs. Start points can also be assigned unequally to the AI civs; the mod then places the civs with the most points the farthest away from the human civs initially.
- R&F: Rise and Fall. Game option that divides the game into chapters; you take control of a different civ in each chapter. A score is awarded after each chapter based on how the standing of your civ has changed. The overall objective is to maximize the total of the awarded scores.
- PerfectMongoose map script (v3.2; main authors: Cephalo and LunarMongoose)

To enable UWAI, leave the "Aggressive AI" option disabled. For players unfamiliar with K-Mod, I've written a chapter summarizing the gameplay changes. I also recommend taking a look at the chapter on Start Points as Handicap (and the "King" difficulty setting) before using that option. Other than that, I haven't made any *fundamental* changes. Still, some BtS tactics will not work as well in AdvCiv. All major changes are listed in the following. Most of the AI and UI changes are low-key though, and only covered by the (extensive) changelog after the last chapter. I've assigned an id to each batch of changes; when an id is mentioned, there's always a link to further details and rationales in the changelog.

The components written by me (UWAI, BBarb, DDiplo, Immortal Culture, SPaH and R&F) are not available as separate mods, except for an earlier version of SPaH.

Utility-Based War AI

UWAI is enabled by default, but players who prefer the K-Mod AI, can use the "Aggressive AI (K-Mod)" option on the Custom Game screen to disable UWAI; that option also enables the Aggressive AI mode. There aren't separate options for UWAI and Aggressive AI because UWAI doesn't have an aggressive or non-aggressive mode (see also change 019), and the K-Mod AI is notoriously belligerent with and without Aggressive AI. (K-Mod without Aggressive AI can still be configured in `GlobalDefines_advc.xml`.) The K-Mod AI is probably the better choice for team games; UWAI should, in principle, work too, but these types of games haven't been given much thought and hardly any testing.

The table below shows the major differences between UWAI and BtS/K-Mod. I've written briefly about differences between K-Mod and BtS with regard to decisions on war and peace here on the CFC forums (and here only about BtS).

UWAI	*BtS/K-Mod*
Military analysis: UWAI predicts how ongoing and hypothetical wars might develop in the medium-term, i.e. over the next 25 to 50 turns. The projection is based on power ratings for various military branches, namely the army (land and air units available for offensives), home guard (only available for defense), fleet (sea units), logistics (cargo ships) and nukes. Simulates military build-up (based on estimated per-turn production), clashes of army stacks, naval landings and attempted conquests of specific cities. The outcomes include cities lost and conquered by the various war parties, invested production and lost military power. These predictions aren't intended to be accurate; they only need to be plausible enough to result in plausible AI behavior.	The BtS military analysis simply compares present power ratings. Each civ has a single power rating, i.e. land and sea units aren't distinguished. K-Mod adds a projection of military build-up.
Power: Power ratings are based on per-unit military power values that are, essentially, computed as combat strength raised to the power of 1.7. E.g. Swordsman has about 21 power and Cuirassier 93; this value also accounts for the faster movement and other useful abilities of Cuirassiers. Caveat: The power graph on the Info screen is still based on BtS power ratings.	Power values are usually equal to combat strength values; e.g. two Swordsmen count as much as one Cuirassier. That is, BtS underestimates the power of technologically advanced units.

The **evaluation** of the expected military outcomes is broken down into 26 aspects, each dealing with one specific reason for war (e.g. greed for conquered assets or loathing for a war opponent) or against (e.g. diplomatic ill will or invested production). The result of the evaluation is a utility value indicating how worthwhile the war (plan) in question is.	The AI considers attitude, military power, geographical proximity and victory strategies. These factors are combined in an arcane manner by a function called `startWarVal`. Peace is evaluated separately by the `endWarVal` function, which is based on war successes, finances and the tactical situation, i.e. very different from `startWarVal`. K-Mod has expanded `startWarVal`, but it's still inconsistent with `endWarVal`, leading to war-peace oscillation, and too ad hoc for this important part of the AI.
War plans are fully **re-evaluated** each turn while in preparation, and canceled if they no longer appear worthwhile. The target of a war plan can change during preparations.	War plans in prepration are only canceled in exceptional circumstances. The target can't change.
The only necessary condition for beginning (and continuing) war preparations is a **positive war utility**. Attitude, power and proximity are all covered by the war utility computation and no longer work as hard requirements. That said, attitude has a particularly strong impact on war utility, so that a relatively peaceable leader like Saladin doesn't go to war against a civ that he is Pleased with unless there are unusually strong reasons for the war. Once preparations are concluded and war is imminent, it's too late for a change in attitude to stop the war.	Thresholds for attitude, power ratio and shared borders serve as necessary conditions for war; in particular, many AI leaders never start war preparations against civs they're Pleased with. (K-Mod ignores this restriction in some cases during the endgame.)
If war utility is positive, the AI begins war preparations with a per-turn probability based on personality and the utility value. As a result, the AI can be **quick to declare war** in response to another declaration of war or some rapid shift in power (e.g. after upgrading to Riflemen).	The per-turn probability is based only on personality and attitude.
The AI **makes peace** if and only if war utility is negative or outweighed by reparations.	Apart from an `endWarVal` check, there are some special conditions for peace, such as having fought to a long draw or being alone in what had started as a dogpile war.

After a declaration of war, the AI **refuses to talk** for just one turn. After that, the AI can be contacted unless the price for peace would be more than the other side could pay. Exception: If war was declared at the request of a third party or through a defensive pact, the refuse-to-talk duration is as in BtS.	The refuse-to-talk duration is based on AI personality and war success. Possible reparations don't play a role.
The AI can start a war **while already in another war**. It's possible to hire an AI civ for war even if that AI civ is already preparing or fighting a war, but the price is often prohibitive.	The AI doesn't consider war preparations when it's already in a war; K-Mod relaxes this restriction in the endgame. In both BtS and K-Mod, the AI can't be hired for war while already conducting or planning war.
The AI refuses requests for starting a war regardless of war utility if either its attitude towards the proposed target is too high, or its attitude towards the sponsor is too low. (Such plans are too sensitive to even discuss with anyone who isn't a trusted partner.) Otherwise, the necessary payment is computed based on war utility. If the result exceeds a threshold, the AI refuses to declare war, stating "We are afraid of their military might" if the power ratio is highly unfavorable, and "**We have enough on our hands right now**" otherwise. Thus, "enough on our hands" doesn't imply that the AI is already preparing another war. AdvCiv shows an alert message (regardless of whether UWAI is enabled; change 210a) when an AI leader becomes willing to discuss a sponsored war.	Same: "We couldn't betray close friends" or "We don't like you enough". The AI also refuses categorically if the power ratio is too unfavorable or when already preparing or fighting a war. In BtS, if the trade screen says "enough on our hands", then the AI is definitely preparing a war. In K-Mod, other reasons for not wanting to start a war can block the enough-on-hands tell, and, unlike BUG, K-Mod does not show a fist icon on the scoreboard when an AI civ is preparing war; see karadoc's explanation here.
While the utility of a war plan against a human player is positive but small, and the AI hasn't begun war preparations yet, there's an increased probability of demands for **tribute** or a gift or a change of religion or civics.	Tribute demands are made randomly against any disliked and militarily weaker human civ. Whether the AI is currently ready to start a war doesn't play a role.
UWAI continues to use almost all of the AI **personality** values from BtS. Many work differently, but, in most cases, to a similar effect. For example, in UWAI, a high `MaxWarNearbyPowerRatio` leads to an optimistically biased military analysis, which can make an AI leader willing to start wars that he or she may well lose.	Each AI leader has some 20 personality values affecting war and peace, set in `CIV4LeaderHeadInfos.xml`. `MaxWarNearbyPowerRatio` is a threshold that rules out war if the military power ratio is too unfavorable.

Hiring war allies, granting or denying tribute, UN peacekeeping and some **other decisions** that imply war or peace are made based on war utility. Decisions about vassal agreements are still largely made by the K-Mod AI (with many adjustments; change 112); ditto defensive pacts.	Separate heuristics for these decisions, based on some combination of power ratio and attitude.
Unless a city is clearly about to fall, the AI is *less* inclined to make peace when there are **enemy units near** its cities. This does not apply to capitulation; the AI capitulates only when faced with a threatening number of hostile units inside its borders (change 112b). This is the only part of UWAI that cares about positions of units on the map. UWAI does not control *how* war is conducted, only *if*.	The AI is *more* willing to make peace when there are hostile units near its cities, but can't evaluate if these units actually pose a threat. This can be exploited for better peace deals. Positions of units have no bearing on whether the AI is willing to capitulate.

Dynamic AI Diplomacy

Many of the AI relations modifiers in BtS needed work for one reason or another. DDiplo makes AI diplo more consistent, and makes it easier for relationships to shift. About changes to vassal agreements, see the end of this chapter.

- "Our mutual military struggle ...": A bonus of more than 1 now requires getting involved in the war, that is, to inflict or incur losses. The bonus decays over time. (In BtS, it's sufficient to be formally at war, and, once accumulated, the bonus stays for the rest of the game.)

  Fighting inside an ally's borders is especially effective at increasing the diplo bonus; fighting barbarians inside another civ's borders counts too, even when there is no shared war. Change id: 130m

- "You agreed to come to our aid in wartime": Joining a war at the request of an AI civ results in a +1 relations bonus that is remembered for 100 turns on average. 130s

- When a war ally is brought in, the two allies automatically sign a 10-turn peace treaty. 146

- "Years of peace" only start to count once a civ is met. 130a

- "You stopped trading with us": It's no longer possible to propose a trade embargo against one's own trade partner; will first have to cancel those trades. The target of the embargo refuses to talk with both the civ that proposed the embargo, and the one that agreed to it. (Except when a master asks its vassal to stop trading.) The embargo severs even recent deals that couldn't otherwise be canceled. 130f

- "You made an arrogant demand" now only applies when a tribute demand is granted; no diplo penalty if the AI refuses to pay. However, if a player declares war on an AI civ that remembers having paid tribute, that civ and all AI civs it has met refuse tribute and help requests by the player for (on average) 80 turns. When an AI civ declares war, it forgets

all tribute demands, i.e. it can be attacked without repercussions. 130o

- "You press us too hard": There is always a chance that the AI refuses a request for a gift for no particular reason. A refused request is therefore not a reliable way to determine if the AI is preparing war against the player who makes the request. The AI is willing to grant a gift about every 30 turns (20 in BtS). 144
- "You're getting ahead of us": AI civs now dislike civs that are ranked slightly higher on the scoreboard, but not those ranked much higher. These rank-based modifiers work differently in BtS (and BtS hides them from the player). 130c
- "A first impression is a lasting one": Another hidden BtS modifier; this one remains static for the entire game. It is based on leader personalities and affects mostly inter-AI relations. DDiplo reduces the modifier a bit, specifically the impact of "peace weight", to make diplomacy less preordained. 130b
- "We oppose your ruthless expansionism": Having a high number of cities with foreign majority culture results in relations penalties from everyone. These penalties complement the ones for having vassals ("worried about our rivals being vassals to your empire"). 130w
- "Our trade relations have been fair and fortright" and "You have traded with our worst enemies": No longer based (primarily) on how recently a civ was met, and more difficult to max out in the late game. Open Borders contribute to the enemy-trade penalty. 130p
- Friendly AI civs are more angered by bad actions than pleased and cautious AI civs; annoyed and furious AI civs are the least bothered – they expect nothing better. Conversely, positive actions have a stronger/ longer effect on disgruntled AI civs than on friendly ones. For example, a declaration of war causes -4 relations with a (heretofore) friendly civ, but only -2 with one already annoyed or furious. 130j
- The AI forgets actions of other civs, like "You gave us help", a little less randomly, whereas the tracking of e.g. "years of peace" or years of supplied resources is now a bit randomized. (In BtS, e.g. "years of peace" pay off after exactly 50 turns.) 130k/130j
- All AI memory decays. For example, memory about how "you razed our cities" decays by one city every 60 turns on average. 130r
  The other decay times (no decay in BtS):

Memory type	*Turns*
"You razed our cities"	60
"You razed a holy city"	150
"Your spy was caught"	40
"You made an arrogant demand"	30
"You liberated our cities"	150
"You granted us independence"	10x30

Memory type	*Turns*
"You nuked us"	120
"You nuked our friends"	80
"You negotiated a trade embargo"	60
"You declared war on our friends"	120
"You brought in a war ally"	70
"You declared war on us"	150

- "You declared war on us" penalty reduced to -2 if the declaration of war is triggered by a defensive pact. 130y
- "We are upset that you have signed Defensive Pacts with our rivals": Not if we like these rivals, or have our own defensive pacts with them, or if we're too weak to attack them anyway. Also no penalty about voluntary vassals ("our rivals being vassals to your empire") if we like those vassals. 130t

- The AI refuses to sign a Defensive Pact if it was recently canceled (same mechanism as for canceled Open Borders). 130p
- "We care for our brothers and sisters of the faith"/ "You have wisely chosen your civics": If many civs share a religion or civic (e.g. Hereditary Rule), the relations bonuses are reduced. Conversely, the AI is more tolerant towards different religions if its own religion is shared by few.

  The AI only gets upset about another religion once it encounters a city with that religion. 130x
- "You accepted our state religion/ favorite civic": The bonus applies only so long as the player keeps running that religion or civic. 145
- Got rid of some odd special cases: a civ being its own vassal's worst enemy; war-on-friend penalties in addition to war penalties when attacking a civ with vassals; deals not getting canceled despite soured relations; vassal tribute deals continuing after the vassal agreement has ended; becoming a civ's worst enemy by trading with their worst enemy. 130d/130h/133/130p

The vassal system remains in need of an overhaul. For the time being, I've tried to make the vassal AI more consistent by treating **capitulated vassals** (which practically never revolt) as will-less zombies doing their master's bidding (change 130v). They now have Friendly attitude toward the master, share the master's attitude toward rivals (but no better than Cautious), can't be anyone's worst enemy and are ineligible as war targets and for elections (014). On the flip side, the master civ is now held responsible for grievances caused by its capitulated vassals, in particular, razed cities, border troubles and trades with someone's worst enemy. The master is not blamed for things that the vassal civ did prior to the vassal agreement, nor for the vassal's religion.

Peacefully acquired vassals still work as in BtS, i.e. as largely independent. I've tweaked the conditions under which an AI agrees to a vassal agreement though: civs only look for a master if they feel threatened – having fallen behind isn't reason enough (112). If a master civ fails to protect its voluntary vassal (35% territorial loss or nuked repeatedly), the vassal cancels the agreement (143). A vassal that gets close to a victory condition also cancels the vassal agreement (112).

When a vassal makes peace or breaks free, its memory about past war declarations is decreased. When a capitulated vassal is freed because its master capitulates, the freed vassal gives +2 "You granted us independence" to the master of its former master. Freed vassals automatically make peace with their liberator (though without signing a peace treaty). These changes should make it easier to have productive relations with former vassals after helping them break free. 130y

Happiness from vassals ("We influence other civilizations!") is now only gained from voluntary vassals, and it's capped at +1. 142

Better Barbarians

I've revised most aspects of Barbarians, mainly for improved game balance.

Barbarian activity increases gradually: The activity peak is reached when two thirds of a continent is claimed by cultural borders. This happens typically by the early Medieval era, which fits historically with the Migration Period in Europe and the Sixteen Kingdoms in China. In contrast, BtS Barbarians peak shortly after they first appear.

Fewer Barbarians on low-yield tiles: The number of Barbarians that appear on a continent is based on the number of (culturally) owned and unowned tiles; in BtS, all land tiles count equally. AdvCiv disregards tiles with 0 food yield, but adds 50% of the number of coastal tiles surrounding the continent. Thus, continents with large (arctic) deserts produce fewer Barbarians than in BtS, whereas snaky continents with long coasts produce more.

Barbarians can no longer appear on tiles with 0 food. They're less likely to appear on tiles with a total yield of 1, i.e. jungle and tundra, and more likely on all other tiles. The aim of this change is to help civs that are surrounded by poor land, and to disadvantage civs that have much good land to settle.

"Fogbusting" nerfed: In BtS, Barbarians can't appear within two tiles of any unit. This makes it easy to keep Barbarians at bay with just a few Warriors. AdvCiv removes this 2-tile restriction. That said, Barbarians still can't appear on tiles visible to any civ. So, fogbusting remains a useful tactic (ideally from hills for extra visibility), but covering the entire frontier is often infeasible.

Adjustment for game speed: The rate at which defeated Barbarians are replaced is now adjusted to the game speed setting. In BtS, Barbarians tend to be much more dangerous on slow settings than on fast ones; this should not be the case in AdvCiv.

The Great Wall reworked: TGW now has two out of the three following abilities depending on whether Barbarians are raging (RB), standard or disabled (no Barbarians, NB):

- +1 trade route in cities on the same continent except when playing with RB;
- prevents Barbarians from entering your borders on this continent except with NB;
- +100% emergence of Great Generals inside your cultural borders if RB or NB.

To match the flavor of the trade route ability, TGW generates **Great Merchant** points instead of Great Spy points. TGW now **requires Archery**, costs **250 production** instead of 150 and requires **two Walls** (i.e. Masonry is still required indirectly). The prerequisite Walls can be in arbitrary cities (like the Monuments for Statue of Zeus). The ability to shut out Barbarians for just 150 production (75 with Stone) is, in my estimation, too powerful when playing with RB, and it's useless with NB. The new abilities should be reasonably balanced for all Barbarian settings. As for the increased cost, bear in mind that Barbarians don't become a major threat until the Classical era in AdvCiv, so there is no need to build this wonder very early.

A high number of extra trade routes can incentivize city spam, therefore, TGW goes **obsolete with Corporation**, and I've taken this opportunity to weaken The **Great Lighthouse** (GLH): Now obsolete with Astronomy instead of Corporation. The **Colossus** goes obsolete with Chemistry instead of Astronomy.

Barbarian naval assaults: Barbarian land units can appear aboard Barbarian Galleys in the fog of war. Once a Galley has cargo, it moves towards some nearby city for a naval

assault. The units can also be dropped along the way, randomly, or in order to attack an unprotected non-combat unit. The intention is to make Barbarian Galleys harder to ignore, especially for civs without seafood at stake.

When a Barbarian Galley enters visibility, there is generally no way to tell if it carries land units. It does in, perhaps, one out of three cases.

Barbarian sea units are now created for each continent separately, based on the number of surrounding coastal tiles. A low-profile change; for one thing, Barbarian ships no longer pile up near remote islands.

Great General points (GGP) from Barbarians: In BtS, up to 10 XP per unit can be gained from combat with Barbarians, but that XP doesn't translate into GGP. This is probably to disincentivize "farming" of Barbarians in tiles that are deliberately left unobserved. AdvCiv counts 50% of XP from Barbarians as GGP, rounded down. To avoid farming, XP from attacks on Barbarians is reduced to 75%. This results e.g. in only 1 XP and 0 GGP from a successful attack at 90% odds – no risk, no GGP.

Animals (minor changes): There is now a "No Animals" option on the Custom Game screen, taking the place of the useless "No Espionage" option. "No Barbarians" still means that no animals appear. Patrolling animals now favor their native terrain and features; they still enter other tiles, but with a smaller probability. I took this idea from Mongoose SDK.

New World Barbarians: I've made numerous changes for maps that have initially unsettled continents like Terra. To me, Terra still doesn't work because cities founded in late Renaissance often take too long to pay off, and the AI doesn't make a coordinated effort to settle the New World. So, there is more work to do (see also change 040), but the Barbarians are ready.

- Barbarian cities begin to appear on continents without any civs earlier than they do in BtS. This way, a patchy network of Barbarian cities tends to be cover the New World by the time it is discovered; reminiscent of Sid Meier's Colonization. Since these cities produce lots of units by themselves, I've disabled the placement of (free) Barbarian units on continents without civs, and I've added a mechanism that disbands Barbarian units when a continent (or shelf) becomes too crowded. Barbarians act relatively peacefully so long as their cities on a continent outnumber those of all civs taken together. This gives civs settling the New World time to establish themselves before the Barbarians undertake concerted attacks.
- Barbarians now stop advancing technologically once they stop sharing a continent with any civ. This usually prevents the New World Barbarians from reaching the Medieval era. Once the New World is colonized, Barbarian research catches up quickly, allowing the New World Barbarians to adopt gunpowder weapons. I've unlocked Musketman, Cavalry, Anti-Tank and SAM Infantry for use by the Barbarians.
- To reinforce the notion that each Barbarian city represents a separate tribe or city state, I've made sure that the borders of Barbarian cities don't meet. Barbarians can no longer build any cultural buildings, and they don't build culture directly either. Consequently, their borders don't expand beyond the inner city ring. When Barbarian cities are created, the city site is chosen only based on the inner ring. This is for plausibility, but also to make conquered Barbarian cities a bit less useful. Barbarian Workers only improve their home cities and don't build roads to other cities.

For more details, see change ids 300 et seq. in the changelog.

Immortal Culture

- Eliminating a civ no longer removes that civ's tile culture. The remaining culture can cause anger, now listed as "We resent being ruled by a foreign culture" instead of "We yearn to join our motherland". 099
- Revolts can occur in any cities, not just those close to foreign borders, and culture of dead civs can cause revolts. However, only border cities can flip. Cities can never flip from a master to its vassal. If a city can't flip, it loses one population on the third revolt and on subsequent revolts. 099c
- The occupation timer after conquest or revolt decreases only with a per-turn probability. That probability is computed based on the city's revolt probability. The nationality bar on the city screen shows both probabilities. The occupation timer after conquest starts at no more than 3 turns (in BtS: 3 + 50% population).

  Revolts can happen during occupation unless the city owner is at war with the owner of the foreign culture.

  Siege units, tanks and damaged units are less effective at suppressing revolts. 023
- "Cruel oppression" anger in a city makes revolts considerably harder to suppress. (Otherwise, Slavery would be a too obvious answer for anger from foreign culture.) 101
- A message is shown when a city's revolt chance becomes positive. 210b
- Flipping-after-conquest is enabled by default. (The game option is now called "No City Flipping after Conquest" and it's unchecked by default.) 101
- K-Mod also makes changes to culture and revolts. AdvCiv keeps some of these changes – see the first few bullets in the next chapter –, and reverses others:
  - Revolt chance is again proportional to the percentage of foreign culture, as in BtS; K-Mod sometimes required infeasibly large garrisons to bring the revolt chance down all the way to 0. 101
  - AdvCiv disables culture from trade routes (still optional via XML). 125

K-Mod

See also the K-Mod thread on CFC.

BUG (Better Unaltered Gameplay): Many BUG options are disabled in K-Mod, but can be enabled from the in-game main menu. K-Mod does not include BULL, meaning that some help text and unit actions added by BULL are unavailable; cf. this Git Issue. I've merged the Show Hidden Attitude Mod (included in BULL but not BUG; change advc.sha) and added Sentry behavior to Fortify-Heal (change 004l). The decay of invested worker turns (Misc. changes; 011) should make BULL's pre-chop action dispensable. So, I don't think there's anything crucial in BULL that isn't in AdvCiv.

For players who aren't familiar with K-Mod, I'm listing the major gameplay changes. For players who *are* familiar with K-Mod, I'm also listing the K-Mod changes that I've reverted (end of this chapter).

- Culture system: Culture levels (e.g. "Influential") matter less in culture wars, and specific city culture values matter more. Moreover, the range at which culture of a city affects borders has been increased, meaning that the number of border cities and their culture

are less decisive. Some roads to culture victory have been nerfed:

- Cathedrals, Mosques etc. increase culture by 40% instead of 50% and cost only 240 instead of 300.
- Free Speech increases culture by 50% instead of 100%.
- Culture from Great Works ("culture bomb") is adjusted to the game era.
- Sid's Sushi Co. provides less culture per resource.
- About a dozen Great Wonders have their culture output reduced a bit.
- The Spread Culture mission only affects tile culture, i.e. can no longer be exploited for an "espionage victory".

– City flipping: Revolts happen faster, but cities don't flip until the third revolt. "The net effect of these changes is that (...) it's a bit more predictable and less dependant on luck." (from the K-Mod changelog)

  The revolt probability is halved if a unit with the Leadership promotion is present.

– Vassal agreements: Can instruct vassals to start war preparations via "Let's discuss something else". The impact of vassals on number-of-cities maintenance is more noticeable than in BtS.

– The number-of-cities maintenance cost is no longer capped, meaning that very large empires can incur very high city maintenance.

– Expendable units are chosen as defenders when no defender has favorable odds. (Lead From Behind mod component)

– Buffed considerably:

  - Serfdom +1 commerce on farms and plantations; -1 on towns
  - All cargo ships +1 capacity
  - XP from Great Warlord increased based on the number of units in the tile

– Production overflow: In the late game, cities can produce two or more units of a kind within the same turn. (BtS turns the overflow into gold in these cases.)

– Trades offered by the AI can come with a discount. The discount is foregone if the player makes a counter-proposal. (In AdvCiv, the offer can also include more gold than the AI would normally consider; change 026.)

– When a religion spreads, one of the older religions is sometimes (randomly) removed.

– Cities that the AI isn't willing to trade aren't shown in the trade screen, and unrevealed AI cities are treated as secret; no BUG alerts about AI cities being founded on invisible plots either.

– AI uses espionage more for various "take that" missions.

– Nerfed slightly:

  - War Elephant +10 cost
  - Quechua cost +5 cost
  - The Colossus +100 cost

- Buffed slightly (incomplete list):
  - Vassalage -25% number-of-cities maintenance
  - Mercantilism upkeep Low
  - Grenadier +10% city attack
  - Machine Gun +10% vs. Mounted units
  - Watermill +1 commerce initially, but only another +1 from Electricity
  - Drill I -15% collateral damage
  - Protective trait production bonus to Security Bureau
  - Aggressive trait production bonus to Jail; Jail gets -2 espionage (regardless of trait)
  - Industrial Park +1 free Engineer (i.e. 2 in total), +50 cost
  - Nuclear Plant meltdowns less disastrous
  - Ship of the Line can be built with Copper (or Iron)
  - Ironclad +1 speed
  - Guided Missile +1 range
  - Space Elevator another +50% production to spaceship parts
  - Forest Preserve +1 commerce
  - Environmentalism doesn't penalize corporations, yields +1 happiness from Public Transportation, but has High upkeep. Environmentalism and Public Transportation both reduce bad health from population instead of granting good health.

Some that I couldn't put better, quoted from the K-Mod thread:

- "Barbarian Galleys get -10% strength"
- "Tech requirements for corporations changed: (...) Sushi Co: Refrigeration, Cereal Mills: Medicine, Creative Constructions: Steel, Standard Ethanol: Combustion"
- "Mining Inc now uses Aluminium and Uranium instead of Gold and Silver (this should make Mining Inc slightly weaker, and Civ Jewelers more viable)"
- "Cereal Mills also has +0.25 food output"
- "In the diplomacy screen, pressing ``Lets stop this fighting...´´ will now bring up the trade screen with the AI's suggested peace terms. (Originally, it just made peace instantly without any trades - it was a horrible button.)"
- "Tech trades in which the receiving player is more than 2/3 of the way through researching the tech or when the tech is two eras behind the 'game era' no longer count towards tech trade memory; i.e. they don't contribute to causing ``we fear you are becoming too advanced´´."
- "Global warming has less of an impact on the map, but (in long games) causes unhappiness to those civs contributing to pollution. There's a new advisor screen [Environment tab on the Economics Advisor] about this."

Reverted by AdvCiv:

- See Immortal Culture about reverted changes to culture and revolts.

- Gifting Great People to the AI does not provide a relations bonus. 141
- No impact of global research on inflation; instead, adjusted start turn and tech costs based on difficulty for a more realistic tech pace. Immortal games now start on turn 10 and Deity games on turn 20. 251
- Some minor balance changes undone that weren't pulling their weight in terms of added complexity (change 200):
  - Colosseum back at cost 80, no culture boost
  - 2 culture from Monastery, not 1; 4 culture from Madrassa, not 3
  - Eiffel Tower back at Radio
  - Civilized Jewelers back at Mass Media (not Corporation)
  - 1 Artist from Hippodrome (K-Mod 2, originally 0)
  - Drill does not lead to additional promotions
  - No change to maintenance of individual corporations (all at 100% as in BtS)

Revised by AdvCiv:

- Changes made in order to smoothen/ reinforce K-Mod balance changes:
  - Forest Preserve at Biology instead of Scientific Method. 901
  - Watermill takes 4 turns to build, and Lumbermill 5 (instead of 8 both). 902
  - Serfdom has Medium upkeep instead of Low. 912
  - Colossus is obsolete with Chemistry. 310
  - The Great Lighthouse obsolete with Astronomy; cost 250 (300 in K-Mod, 200 in BtS). 310
  - Submarine gets 2 first strikes and another 10% withdrawal chance instead of the 25% attack bonus from K-Mod. For consistency, Attack Submarine gets the same abilities, but also loses 2 strength. Slightly raised cost of Battleship and Stealth Destroyer to make subs more effective against those units. Strength of Stealth Destroyer reduced to 33 (36 in K-Mod, originally 30). 906
- Changes kept from K-Mod versions prior to 1.45:
  - Scientific Method +1 research per specialist (1.45 moves this to Computers and has Scientific Method provide +10% commerce)
  - Lumbermill at Guilds with +1 commerce, but no production bonus until Replaceable Parts (1.45 gives them +1 production already at Guilds)
- Fixed AI issues introduced by BBAI and K-Mod:
  - AI razes fewer cities and less randomly; 116
  - uses Slavery and Drafting less aggressively; 121, 017
  - uses malicious espionage only against civs it dislikes; 120
  - replaces Forts on worked tiles. 121

Important miscellaneous changes in AdvCiv

- Attacking a Worker or Settler no longer yields a captured Worker; the attacked unit just dies. I.e. no more Worker stealing. 010
- Trade routes can only come from revealed cities, and the paths to those cities need to be revealed as well. Cities are temporarily unavailable for trade when in occupation or anarchy. Trade along rivers doesn't require any tech (as in Warlords/ Vanilla; BtS demands Sailing). When borders of a war enemy block trade, a naval blockade can override this. 124
- AI leaders are reluctant to sign Open Borders with civs that they haven't located yet (not a single revealed land tile) – "We would have nothing to gain." At Pleased, most AI leaders sign Open Borders regardless of revealed tiles. 124
- When mountain peaks block off part of a landmass, the parts are treated as separate continents. This is relevant for the placement of barbarians, colony maintenance and wonders that affect only one continent, though the main point is to make things easier for the AI. 030
- Starting positions worsened a bit overall. Large clusters of Gold or Gems made less common. Hidden resources are now disregarded when assigning starting locations, meaning that resources are no more likely to be revealed near a starting plot than anywhere else. 108, 129
- When a plot with unfinished Worker-builds is left alone for more than four turns, the invested Worker turns begin to decay. This is mainly to disincentivize pre-chopping. 011
- Forest and Jungle provide only 25% defense, and none if the tile is owned by the attacker. 012
- Can no longer chop Forests and Jungles on unowned tiles. 119
- AI trains more Workers and chops more Forests. 117
- AI evacuates land units that can't defend well from cities that are about to be attacked and untenable. 139
- Granary stores only 40% food, but provides food also after starvation. 160
- Praetorian strength reduced from 8 to 7, cost from 45 to 40, starts with March, still no city attack bonus, and renamed to "Legionary". 907a
- Galley, Trireme and Caravel +1 move. Cost of Galley and Trireme reduced from 50 to 45. Trireme gets no bonus vs. Galley, but 3 strength, which makes it the most efficient warship until Chemistry. 905
- Switched the no-war-probability of Roosevelt and Darius, meaning that Darius can start wars when pleased, and Roosevelt (normally) cannot. 005a
- When more than 3 messages would be displayed at the beginning of a turn, the Event Log is opened instead. Great Person births in faraway lands are no longer reported. 106
- "Show friendly moves" and "Show enemy moves" (player options) cause much less delay during AI turns: I've disabled most of the pointless AI patrols and excluded Worker moves from being shown to the player. 102

- Espionage slider not shown on the main interface if it's at 0. Can adjust the slider on the Espionage screen. 120c

  About other minor user interface improvements, see 004.

- The Spy unit can investigate rival cities as in Vanilla/Warlords. 103
- Get to choose from more civics and religions when using the "Change civics/religion" Spy mission, or when negotiating peace or trading with a vassal. 132
- Can no longer bypass the Theocracy restriction by gifting missionaries. 123/ dlph.4
- Defensive pacts aren't canceled when triggered by a third party that declares war on one of the signatories. dlph.3
- In Hotseat, resource bubbles are no longer automatically deactivated at the end of a turn, and BUG alerts now work in Hotseat. 135

Start Points as Handicap (SPaH)

I see three motivations for giving an Advanced Start only to the AI:

A) You find the game too easy on moderate difficulty, and dislike the crass ongoing AI bonuses on the high difficulty settings, perhaps for reasons of immersion; this is where I'm coming from. A big head start for the AI can be taken to mean that the AI civilizations emerged earlier than mine, like how the Romans appeared later than the Egyptians, whereas the ongoing AI bonuses on Immortal are hard to rationalize or overlook.

   A big AI head start can narrow down the viable strategies in the early game. It helps to assign start points unequally to the AI civs because this leaves some targets for early warfare, and a few far-ahead AI civs can't build all the early wonders.

B) You find the game too easy on moderate difficulty, and dislike the big AI head start on the high difficulty settings (e.g. a free Settler and Worker on Deity), perhaps because it makes the early game too tense and narrow (see above). Since Advanced Start replaces the AI freebies from the difficulty setting, you can reduce the AI head start by setting a modest amount of AI start points, e.g. Deity with 400 start points.

C) If you like the balance between AI head start and ongoing bonuses in BtS, you may still not want every AI civ to receive the exact same freebies because it creates some distortions. For instance, the Zulu get only one additional tech (Archery) on Immortal because they start with Hunting and Agriculture in any case.

Usage (id 250b):

You'll need to check the "Advanced Start" option on the Custom Game screen in order to unlock the "Base Points" box; without Advanced Start, the SPaH option has no effect. If you enter at most 9999 Base Points, then each AI civ simply receives the amount of points entered. If you enter a five- or six-digit number, SPaH assigns start points unequally. The box is then assumed to contain two distinct numbers: a percentage in the two digits to the right and an integer in the three or four digits to the left. E.g. 110045 means 1100 and 45%. The left number says how many start points the bottommost AI civ receives, i.e. the civ in the bottommost AI slot. The topmost AI civ (topmost AI slot) receives a *fraction* of the bottommost's points equal to the percentage. In the example, that's 45% of 1100 = 495. The remaining AI civs receive values in between those two bounds. (Combined with Monarch difficulty, the 1100/45% setting should be a challenge close to Immortal.) Of course, it would be much simpler to use two separate text boxes, but, sadly, mods can't

add text boxes to the Custom Game screen.

SPaH never gives an Advanced Start to human civs, i.e. they start as normal with a Settler and Warrior or Scout. Humans receive starting locations based on the difficulty setting, i.e. the best ones on Settler and the (almost) worst ones on Deity. Then, if an unequal point distribution is used, the AI civs with the fewest points (top AI slots) are placed in the locations closest to the human civs, and the AI civs with the most points (bottom AI slots) are placed the farthest away.

Once the game has started, the start point distribution is shown on the Settings tab of the Victory screen. You'll also notice that the game doesn't start on turn 0. This is done to reinforce the notion that the human civs are late arrivals, and to have the game year match the overall development of the world.

Unequal distributions are incompatible with team games, which is to say, they should technically work, but the assignment algorithm makes no effort to balance the teams' start points and locations.

AI civs receive at least the 150 start points needed for a city, even if fewer points are entered. An AI civ with a small number of points may have difficulties repelling a human Warrior rush, so I recommend against going far below 400.

General changes to Advanced Start (250c):

BtS allows start points to be converted 1:1 into production, which is usually far better than a 1:1 conversion into research. In order to make technologies a bit more attractive in Advanced Start, I've changed the conversion rate to 1:1.5 for production, meaning that cities, units and buildings now cost 50% more. Improvements, visibility and culture still seemed overcosted in comparison, so I've reduced the costs of these.

Advanced Start costs are no longer adjusted to the game speed setting. This makes it unnecessary to manually adjust the start points entered on the Custom Game screen to match the game speed. When playing without SPaH and on a difficulty higher than Noble, the AI receives more start points than entered. This was apparently intended by the BtS developers but not correctly implemented. Conversely, human start points are no longer adjusted based on difficulty (this was working in BtS); you get exactly as many points as you enter.

For reference, the AI freebies for each difficulty setting, and the number of start points that would be needed to buy those freebies (given the above changes to Advanced Start costs):

Difficulty	Prince	Monarch	Emperor	Immortal	Deity	King
Free initial items per AI civ	1 Settler 1 Warrior	1 Settler 1 Archer 1 Warrior Archery	1 Settler 2 Archers 2 Scouts Archery Hunting	1 Settler 1 Worker 3 Archers 2 Scouts Archery Hunting Agriculture	2 Settlers 1 Worker 4 Archers 2 Scouts Archery Hunting Agriculture The Wheel	1 Settler 1 Worker 3 Warriors Pottery
Worth in pts.	187	330	466	699	992	422

Includes 15 extra points for the 10 free initial production that the AI civs receive on all difficulty settings. In AdvCiv, the AI civs do not receive this free production after an Advanced Start.
On Prince, Monarch and King, if an AI civ starts with Hunting, one of the Warriors becomes a Scout.

King difficulty (250a): An additional difficulty setting that is like Monarch, but gives the AI civs a bigger head start. I don't use it much anymore now that SPaH is implemented. The main differences from Monarch are:

- Human civs get the worst starting locations.
- The AI starts with a free Worker, a total of three free Warriors (but no Archer) and Pottery (not Archery).
- The per-era modifier is -3 as on Emperor. This (BtS) modifier determines how much the ongoing AI bonuses increase with each era. E.g. the cost for training a unit decreases by 3% each time the AI reaches a new era; decreases only by 2% on Monarch.

Rise and Fall (R&F)

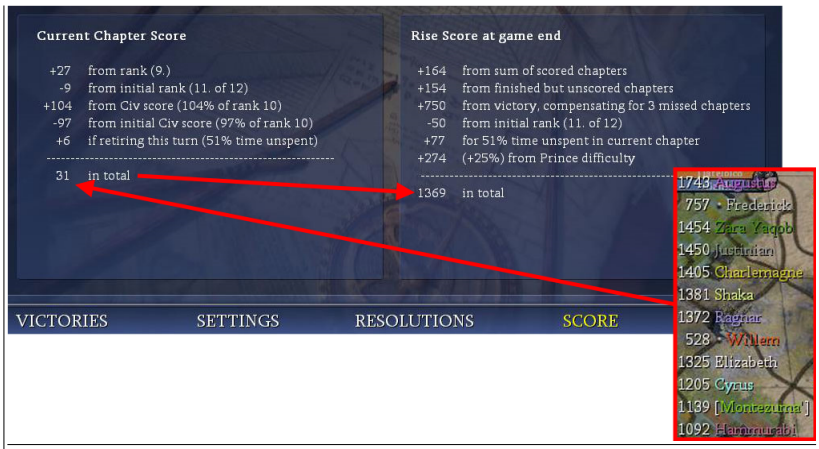
If the R&F game option is enabled on the Custom Game screen, the game gets divided into several *chapters* (of history). During the first chapter, you play as the leader and civ set on the Custom Game screen (random also works). Once a chapter ends, you have to select one of the other civs in the game. During the next chapter, you control the selected civ, while your previous civ is controlled by the AI. After each chapter, a score is awarded that measures how much your civ has improved since the start of the chapter. If you manage to fulfill a victory condition, the game ends, and you score a premium, which is, again, based on the standing of your civ at the start of the chapter. To maximize the total score, you need to pick civs that are doing badly, but have the potential for improvement. If you play well, civs will "rise" under you control, and begin to decline after AI control resumes – this is the "fall" part. (I.e. there is no special collapse mechanism like in the Rhye's and Fall mod.) The goal behind R&F is to tell more interesting stories than the usual 6000 years of one civ being successful, and doing so without hinging on the capabilities of the AI. The High to Low challenge in Kael's Assimilation mod has been an inspiration.

Supported and recommended game settings: Single-player only, no teams, no Permanent Alliances. The number of chapters is 6 on Quick speed, 7 on Normal, 8 on Epic and 9 on Marathon, provided that there are enough civs in the game. Since a different civ is supposed to be played in each chapter and some are usually eliminated before the final chapter, it's advisable to configure at least 1.5 times as many civs as chapters. If you dislike playing on Huge maps, you can fit enough civs on a Large map (up to 16 I'd say) or even a Normal map (up to 11) if you set the sea level to Low (assuming a standard map script like Fractal or Continents). You may want to take a look at the "Score" tab of the Victory screen at game start in order to verify that the number and length of chapters is as intended.

I haven't tested unusual settings much, but R&F should, in principle, work with any map script or scenario (except Earth1000AD). Advanced Start should be fine too, but not SPaH. Later-era start results in fewer chapters.

R&F is intended to be played at a difficulty that wouldn't normally be challenging, but that makes it challenging to take a civ from a rank near the bottom to a rank near the top over the course of a chapter. That's probably going to be two or three difficulty levels lower than what you normally play on.

Objective: The objective is to maximize what I'm calling the *Rise* score. When the game ends, that score is computed as the sum of the *chapter* scores plus a premium for victory. What the scoreboard on the main interface shows are scores based on population, technology etc.; this score is computed as in BtS, and I'm calling it *CIV* score to distinguish it from the chapter score. Chapter score is based on the change in CIV score and rank since the beginning of a chapter. Lastly, there is the *normalized* score which is shown on the Dan Quayle screen. In non-R&F games, the normalized score is computed directly from the CIV score. With R&F, it's computed from the Rise score, and should give an impression of how close to optimal your Rise score is.



The CIV score from the scoreboard on the lower right feeds into the chapter score on the left of the Score tab, which feeds into the Rise score on the right of the Score tab.

Delayed scoring, AI changes: A chapter isn't scored right after it ends, but during the subsequent chapter. This is done to disincentivize shortsighted plays toward the end of a chapter, e.g. conquering cities that aren't tenable in the long run. The first chapter is scored in the middle of the second chapter. With each chapter, the scoring delay decreases a little; the penultimate chapter is scored one quarter into the final chapter. The exact turn on which scoring happens is shown on the upper half of the Score tab. On that turn, a popup with a breakdown of the chapter score appears.

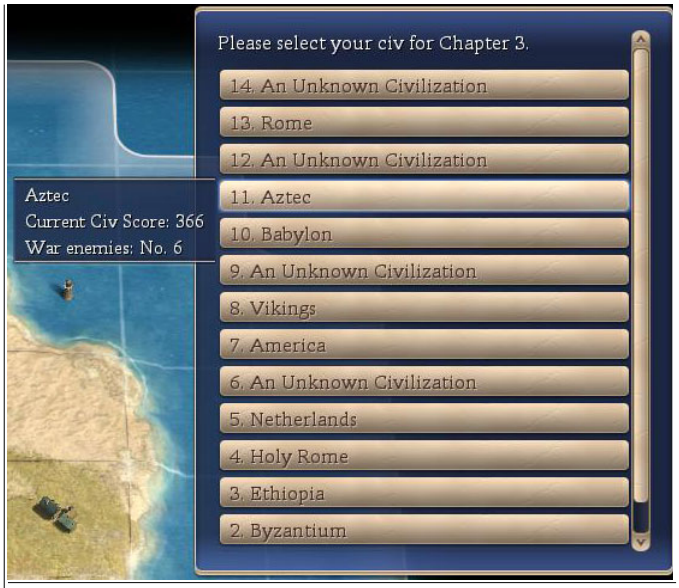
A side-effect of delayed scoring is that you have a stake in two civs during the first portion of each chapter: the one you're currently playing and the one from the previous chapter. This creates an awkward incentive for helping the civ from the previous chapter. Similarly, toward the end of a chapter, there can be an incentive for helping whichever civ you're going to take control of in the next chapter. In order to limit such collusive help, I've made the following changes to the AI:

- Doesn't accept unsolicited gifts, and asks for gifts less frequently than normal. No units can be gifted.
- Rejects offers that are heavily lopsided in favor of the AI.
- Is reluctant to get paid for things of questionable value to the player: civics and religion changes, embargoes, sponsored war and brokered peace.

These restrictions do not apply to AI civs that have already been scored, nor to any vassals of the player; and during the final chapter, the restrictions only apply to the civ from the penultimate chapter (until that civ is scored).

Intermediate periods: In between every two consecutive chapters, there is an "intermediate" period of 5 to 10 turns (depending on game speed) during which you control no civ. During an intermediate period, most elements of the user interface aren't updated, meaning that you have practically no vision and agency. A countdown on the upper right shows how many turns remain until the start of the next chapter. The main purpose of the intermediate periods is to prevent military cooperation between the civs played in two consecutive chapters.

Civ selection: When an intermediate period ends, you're prompted to select a civ for the upcoming chapter. Each civ should be played for at most one chapter. Sometimes, this is impossible because too many civs have been eliminated already; therefore, it's allowed to play the same civ repeatedly, but the chapter score is halved then. Playing the same civ for two chapters in a row is not possible, and any vassals of the most recently played civ are off-limits too.



Popup for civ selection

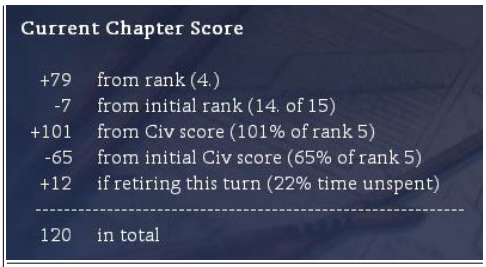
The selection popup lists civs in order of recommendation: First, non-vassals not previously played, inversely ordered by rank, then, vassals not previously played and, last, civs previously played. Civs known to the most recently played civ are listed by name, the others as "unknown". Hovering over an entry shows the civ's current CIV score, whether it's a vassal, and if so, if capitulated or voluntary and the identity of the master, and lists any war enemies. A victory stage between 1 and 4 is shown if the civ is close (at least stage 3) to fulfilling a victory condition. All this information is provided even if the name of the civ is unknown. It's often unwise to take over a civ that is at war with a stronger opponent. If you select a voluntary vassal, you'll be able to cancel the vassal agreement at any time. As a capitulated vassal, you'll have to acquire enough land and population in order to break free.

Chapter scoring function: The computation of chapter score isn't entirely simple, but it's not necessary to know the specifics: Simply playing for victory as if the chapter would never end, if done well, results in a good score.

- When a chapter is scored, 0 to 100 points are awarded based on the rank ***r*** of the scored civ on the CIV scoreboard at the time of scoring:

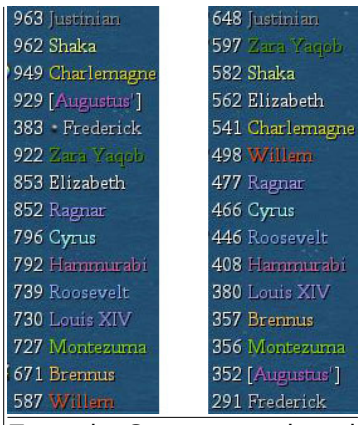
  100 * (worst rank – ***r***) / (worst rank – 1)

  That's 100 when ranked first (***r***=1) and 0 when ranked last. In this context, the civ currently controlled is always considered to be ranked behind the civ that is being scored; this way, success in the current chapter can't hurt the score for the previous one. A score for the *initial* rank, i.e. the rank at the time that the scored civ came under human control, is computed in the same way, and subtracted from the score for the current rank. Thus, the total score from rank is maximized (100 points) by starting in the last place and climbing all the way to first. A civ that starts in rank 1 can at best gain 0 points from rank by staying in rank 1, and otherwise loses points.



Chapter score breakdown (Score tab)

- Points are also awarded directly for CIV score; otherwise, it would be pointless to continue a chapter when it's clear that the current civ can't climb another rank. The CIV score of the next best rank is used as a point of reference. In the example on the right, Rome is currently fourth, so its score of 929 is divided by that of the fifth rank (Ethiopia, 922), and the resulting percentage (101) is added to the chapter score. At the start of the chapter, Rome's score of 352 was 65% of the fifth rank (Charlemagne, 541), and that percentage is subtracted, resulting in a net gain of 36 points from CIV score.



Example: Current scoreboard (left) and scoreboard at the start of the current chapter

- If the chapter was ended prematurely through retirement (see "End of chapter" below), the chapter score from rank and CIV score is increased by half the percentage of the turns remaining at the time of retirement. For example, if 14 out of 65 turns remain, the portion of unspent time is 22%, so the chapter score is increased by 11%.

If the bottom line is -10 or worse, a square root is applied in order to reduce the loss of points. This is done so that a single failed chapter can't ruin the total Rise score.

End of chapter: All chapters have the same length except for the last one, which can be a bit longer or shorter than the others. The chapter length depends on the number of chapters and the game speed. To see how many turns remain, hover the mouse over your civ's flag on the main interface. During the last three turns of a chapter, a countdown is shown directly on the main interface, and at the beginning of the final turn, there is a popup reminder.

As the end of a chapter approaches, you should try to put your civ in a state that its AI leader can work with because the civ comes under AI control for some time before scoring happens. E.g. Gandhi might not continue your war of conquest. Don't rely on pre-programming decisions for the AI: When the AI takes over, the mod clears your slider positions, governor settings and the queues for city production, research and unit missions.

You can end a chapter early by selecting "Retire" from the main menu. This button, which normally concedes the entire game, works very differently with R&F. By retiring early, you earn a bonus to your chapter score (see "Chapter scoring function" above) and the chapter continues on AI Auto Play until its regular end turn. Retiring makes sense when your civ is getting so far ahead of the others that the AI might run away with the game once the chapter ends.

Chapters

1	Zululand	Turn 0 to 64 (1440 BC)	**57 points**	**Scored on Turn 118**
2	England	Turn 73 to 137 (540 AD)	**107 points**	**Scored on Turn 191**
3	Rome	Turn 146 to 210 (1500 AD)	154 points	Scored on Turn 264
4	**Aztec**	**Turn 219 to 283** (1826 AD)	31 points (**turns remaining: 34**)	Scored on Turn 337
5	?	Turn 292 to 356 (1936 AD)	?	Scored on Turn 410
6	?	Turn 365 to 429 (2009 AD)	?	Scored on Turn 483
7	?	Turn 438 to 499 (2049 AD)	?	Scored on Turn 499
		Total so far:	349	

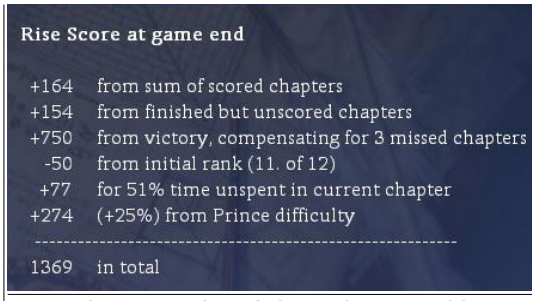
List of chapters on the Score tab, showing start and end turn (with end year), chapter score and scoring turn for past chapters, the current chapter and future chapters. Score values not shown in bold indicate the score that would be awarded if the chapter were scored right now; the chapters with score values in bold have already been scored.

Game end: The game ends immediately when one of the BtS victory conditions is fulfilled by any civ. If the previous chapter hasn't been scored yet, it is scored now. If an AI civ wins, then the current chapter is scored as well and the Rise score is simply the sum of the chapter scores. If the human civ wins, then the current chapter is not scored, i.e. rank and CIV score don't matter. Instead, a victory premium is added to the total score from the earlier chapters. This is, once again, a bit complicated; in short, the incentive is to win as early as possible if it can be done from a poor position, but not to win a quick victory by picking a civ that is already about to win.

- 150 points plus 150 for each chapter that hasn't started yet.
- The premium above (***P***) is reduced based on the rank r_0 at the start of the chapter (initial rank) by subtracting

  (***P***/1.5) * (worst rank – r_0) / (worst rank – 1).

  However, even when the initial rank is 1, the premium is never reduced below a lower bound of ***P***/3.



Rise score breakdown (Score tab)

- In the endgame, score isn't a good measure of a civ's standing. Therefore, whenever R&F considers ranks, those civs close to a victory condition (stage 3 or 4) are considered to be ranked higher than those not close to any victory, and civs at stage 4 outrank those at stage 3. Victory stages are computed by the AI and are normally only used for AI decision making; see change 115 for some more info about victory stages.
- Regardless of the initial rank, the percentage of turns remaining in the chapter in which victory has been achieved is added.
- Finally, the Rise score is multiplied by a factor based on the difficulty setting.

On the Hall of Fame screen, the Rise score is shown in the "final score" column. Use the "score victory" filter in order to display only results of R&F games.

A defeat of the human civ does not cause the game to end unless it happens in the final chaper. Instead, human defeat causes the game to continue on Auto Play until the chapter ends, and then a new civ is selected as normal. A defeated civ is scored immediately and is treated as having 0 CIV points.

For some additional technical details, see change ids 700 et seq.

PerfectMongoose (PM)

The PM map script is based cephalo's PerfectWorld3 (PW3), which employs models of plate tectonics, wind patterns and hydrology. The basic ideas are best described in the old CFC thread for PerfectWorld2. LunarMongoose ported PW3 from Civ 5 to Civ 4, incorporated changes by AIAndy and Fuyu, and made changes of his own, which are listed in the PM thread on CFC.

- PM vs. Tectonics: LDiCesare's Tectonics script, which is included in BtS, also models plate tectonics and wind, but, as far as I can tell, in simpler ways. PM has about three times as many lines of code as Tectonics does if that's any indication. An updated version of Tectonics is also included with AdvCiv (change id 021a).
- PM vs. Totestra: Totestra is a PW2 fork by vktj. Totestra offers more custom map options than PM, but PM has a more advanced terrain generator.

I've customized PM (change 021b) because I felt that the starting locations were too unbalanced and it played too differently from the standard map scripts. In particular, there was too little arable land and too much dense forest. Civ 4 Reimagined has changed Totestra in similar ways, and I've adopted some of those changes.

In many ways, PM can supersede the Fractal map script, but since PM tends to generate more continents than Fractal, the space available for expansion tends to be distributed less evenly. Some other caveats:

  - Huge maps might take a couple of minutes to compute.
  - Duel maps often have way too little land. I'd say that Duel size isn't really supported.
  - The Old World Start option doesn't always manage to create multiple continents. If you get just one continent, the map is still playable – just be aware that a New World isn't guaranteed to exist. I think Normal and High sea level almost always lead to multiple continents, so this is perhaps only an issue with Low sea level.

I've removed the custom map options for using the (legacy) PW2 land generator and climate system, and the option to "break Pangaea with meteors". Instead, the script tries to break Pangaea if and only if the Old World Start option is set.

Known issues

- No known serious bugs, but the mod is generally still in an experimental state. I recommend setting a narrow `AutoSaveInterval` in `Documents\My Games\Beyond the Sword\CivilizationIV.ini`. If UWAI (which contains the bulk of the new code) causes errors, that component can be disabled even in a running game by saving, exiting and setting either `UWAI_IN_BACKGROUND` or `DISABLE_UWAI` in `Assets\XML\GlobalDefines_advc.xml`, and then restarting and reloading.

  The update history since v0.8 might give you an idea about the sort of bugs that are still getting fixed.

- Most of the Custom Game settings have been tested only superficially through AI Auto Play. Permanent Alliances have hardly been tested at all; might crash.

- Networked multiplayer hasn't been tested. K-Mod is known to be a stable multiplayer mod, it's just my additions that I'm concerned about. I did play some 50 turns, and it didn't crash and didn't go out of sync. (Not with a release DLL anyway; it went out of sync with a debug DLL on the first animal attack, but perhaps that's normal.) Haven't tested PBEM either. Hotseat has been tested a little.

- If the mod folder "AdvCiv" is renamed, the name also has to be changed in `Assets\XML\Art\CIV4ArtDefines_Misc.xml`. Otherwise, the mod will crash while loading: "Failed to initialize the primary control theme". This is a side effect of change 002b.

- Translations: There are German translations for everything except the changes to Civilopedia (id 008). I've only translated short bits of text into the Romance languages (and not very well).

For developers

The modified source code files can be found in `AdvCiv/CvGameCoreDLL`. In all modified files, changes and additions are labeled in-line with "`advc.id`" or enclosed in XML-style: `<advc.id> ... </advc.id>`, where `id` is one of several three-digit numbers I've (somewhat arbitrarily) assigned to sets of related changes. In retrospect, I should've used a version control system from the beginning; I've only now (v0.8) put the code on GitHub.

Changes from K-Mod-Extended are instead marked with `kmodx`, and those adopted from DarkLunaPhantom with `dlph`. (Some of these have been merged into K-Mod 1.45, but I had merged them into AdvCiv before 1.45 was released).

Developer documentation for UWAI is not included in this file; the changelog (id 104) only describes the integration of UWAI into BtS. Parts of UWAI are adjustable through `AI_Variables_GlobalDefines.xml`. If you've enabled logging (`LoggingEnabled = 1` in `My Files/My Games/Beyond The Sword/CivilizationIV.ini`), you can change `REPORT_INTERVAL` in `GlobalDefines_advc` in order to have UWAI log AI internals to `My Files/.../Logs/debug.log`. The logfile is formatted in Textile. I've been using Borgar Þorsteinsson's Textile-JS to parse it (free web interface). If cheats are enabled, AI war plans can be checked in-game by holding down the `Alt` key and hovering over the AI leaders on the scoreboard; same as in the BBAI mod.

Changelog

Not a chronological record; the change ids are assigned pretty arbitrarily. Changes since v0.8 are tracked through Git: commit history.

001	Minor bugfixes (not a complete list)
See also	Fixes merged from other mods: kmodx, dlph.
Corrected the city culture output shown during disorder by K-Mod/BUG with enabled Building-Actual-Effects option.	
AI refuse-to-talk duration was lowered purely based on a war success ratio in BtS, not absolute war success. This way, killing a single stray unit before stack combat could make the AI willing to talk. Added a lower bound for enemy war successes.	
Barbarians no longer spare a single target city per continent from pillaging. In BtS, they apparently try to conquer that city intactly.	
Reduced the chance for building a "priority fort" from 80% to 20%, which, I suspect, was intended. (No clue if it's wise.)	
Since K-Mod 1.44, Gunship had been able to capture cities if they contained a visible non-combat unit. Reported by Zholef here. Also fixed in K-Mod 1.45, but I've kept my own fix instead.	
Eliminated AI civs can no longer do diplomacy. In BtS, there is a slim chance for this to happen right after an AI is eliminated by another AI.	
AI no longer trades for resources needed only for obsolete units (merged from Better BUG AI).	
Integer overflow when a large amount of culture is added through WorldBuilder. Thanks to xaster for pointing out the issue on CFC.	
001b	Can't build air units in cities already filled with air units.
Rationale	A bit of a judgment call; could argue that the cap should only matter when construction finishes, but this isn't practical.
001c	Displayed GP birth probabilities computed based on current GPP per turn
AdvCiv	*BtS*
Corrected the birth probabilities shown in the help text of the GP bar on the City Screen. Now project the city's current per-turn GPP into the future.	Birth probabilities are based on the GPP collected so far; no projection. The probabilities adjust only gradually when a specialist is reassigned.
Tbd.	Should perhaps take into account a foreseeable increase of the GP threshold due to other cities finishing their GP earlier. And Golden Age length if currently in a Golden Age. That said, I might at some point change the way the threshold increases; better to leave the UI-side alone for now.
001d	Unrevealed cities shown as "Unknown" on Top 5 cities (K-Mod: "Unknown" only if owner not met).
Rationale	Not exactly a bugfix. Before v0.88, this change also hid national wonders of other teams from the BUG Wonders tab, and I thought showing them was a bug because a comment said "only display national wonders for the active player's team", and that isn't what the code does. However, it's better to display the wonders. Which is to say, the game game really shouldn't make all buildings of all revealed cities visible to the player; it's way too much information, but it's difficult or possible to hide them, and since the info is available it should also be on the Wonders tab.

001e	No more stop-trading requests about a civ that has just stopped being worst enemy; and no offers for Defensive Pact from a civ that has just been attacked.
001f	Foreign cities no longer become unrevealed upon conquest by a third party

When a city is conquered, it remains revealed to all civs that knew the city prior to conquest.	When a city is conquered, it is treated as a new city, revealed only to the new and former owner, and any third parties that happen to have visibility of the city at the time that it is conquered.
Rationale	Hard to say if this is really unintentional. The BtS code explicitly sets the city to be revealed to the former owner. Were third parties not considered? Doesn't make sense to me that third parties learn about the conquest, but not about the aftermath.
001g	Deleted duplicate `MemoryAttitude` entries about Suleiman and all leaders after him in Leader Head XML (it's ordered alphabetically); used the mean when two values contradicted each other. Those before Suleiman didn't have duplicates.

001h	Industrial bad health

AdvCiv	*BtS*
When a building leads to bad health with a strategic resources (Factory, Coal Plant, Industrial Park with Coal or Oil), the AI assumes that the city already has these resources when evaluating the effect of bad health.	Only bad health that the city will suffer directly, i.e. from currently available resources, is taken into account. E.g. Factory counts as just 1 bad health so long as Coal/ Oil aren't available.
Starting in the Industrial era, so long as a city doesn't have power yet, the AI treats the city's current health as 1 less when evaluating the effect of bad health.	The AI does not aim at keeping a health surplus available; just aims at balanced health given the immediate effect of the building.
Increased the (negative) weights of bad health and food deficit in building evaluation.	
Hopefully no more (or only minor) population loss from bad health in Industrial AI cities.	AI ends up building Factories and Coal Plants before getting Oil and Coal. If health is just balanced at that point, once Coal and Oil are connected, the city is at -8 health. The AI then shrinks the population gradually by 8 to avoid wasted food (more with Industrial Park, not to mention Poisoned Water). BBAI and K-Mod have largely rewritten the building evaluation code, but this bit works as in BtS.

Rationale	Treating health as one less should lead to some leeway for later bad health, especially from power.
See also	160 makes Poisoned Water less dangerous, and 120d improves the AI response to that mission.
Tbd.	The bad health effects are very badly balanced. Too much at once, bad health for no reward (Factory doesn't actually get better with Coal or Oil), punishing for tall strategies. Shouldn't even be possible to build a Coal Plant without Coal.

001i	Replaced a couple of `isOpenBorders` calls with `isFriendlyTerritory` – had apparently been missed when BtS introduced vassal agreements (which allow passage even without an OB agreement). AI evaluation of Missionaries should be improved now.
001j	Deleted two (K-Mod) calls to `CvPlayerAI::AI_getNumTrainAIUnits` because `CvPlayerAI::AI_totalAreaUnitAIs` already counts those units.
See also	017 fixes a bug that also has to do with confusing these two function.

001k	AI plot-danger checks no longer (indirectly) check `isMadeAttack`
AdvCiv	*BtS*
When the AI checks whether a plot is in danger of being attacked by a unit, it doesn't check whether that unit has already attacked this round. As a side effect, the AI may not be able to tell that shelf ice plots are in no danger from non-submarine ships; hopefully no other problems with my fix.	Vanilla Civ 4 did not check for an earlier attack; BtS added this clause.
Rationale	Plot danger is only checked during AI turns, and the active AI civ then wants know if another civ could attack on that other civ's next turn; it doesn't matter if the unit could immediately attack. Perhaps the BtS developers hadn't realized that the `MadeAttack` flag persists for an entire round of turns. Hard to say how significant this bug is; the plotDanger functions are called in dozens of contexts. I don't remember how I noticed it; some situation in which the AI clearly underestimated plot danger.

001l	Fixed an inconsistency in the AI trade value modifier for gold
AdvCiv	*K-Mod*
The AI uses the same modifier for computing the trade value of gold regardless of whether a human proposal is put before the AI, or if the AI proposes a trade involving gold.	When one side is in financial trouble and the other isn't, the AI can be brought to propose deals that it won't accept if the player proposes them.
Tbd.	Perhaps the modifier shouldn't depend on financial trouble; just use a fixed value (of 200%). I don't think the code works as intended anyway, i.e. doesn't make the AI reluctant to trade away gold when in financial trouble. See karadoc's comment about the deficient BtS trade AI above `CvPlayerAI::AI_cityTradeVal` in `CvPlayerAI.cpp`.

001m	Scoreboard gets updated when a leader name changes
AdvCiv	*BtS*
When the player enters a different leader name (Alt + D), the name is immediately updated on the scoreboard after clicking "OK".	The scoreboard isn't updated until end of turn unless the player manually closes and reopens the scoreboard.

001n	Potential OOS bugs (just 1 so far)
Improper use of random numbers, unsynchronized user input and uninitialized memory are the usual causes of out-of-synch errors in multiplayer. Of course, uninitialized memory is also problematic in singleplayer (and difficult to debug). CFC post by karadoc on the subject of OOS errors: link	

002	Cosmetical changes
002a	Minimap shows lighter player colors on water tiles (like in Military Advisor)
Rationale	CFC forum post (also with screenshots)
Config	Switch in `GlobalDefines_advc.xml`. Also allows uncolored water tiles like in Civ 3.
002b	Increased font sizes. Shortened some leader names, e.g. "Augustus Caesar"→"Augustus" when used outside of Civilopedia. Shortened "Native American Empire" to "Amerindian Empire".
Rationale	People play on rather high resolutions nowadays, and the fonts don't scale properly. Long leader names take up (even) more room with the larger fonts. This is a problem for Native America because the text covers up the civics icons during diplo. Would be better to use only short descriptions there, but that seems to be programmed outside the SDK.
Credits	Inspired by VIP mod and I also took a look at vincentz's setup. This tutorial was helpful, although neither the downloadable package nor the code in the tutorial actually worked for me.
Tbd.	Can't seem to change font sizes without defining a custom theme, which appears to mandate copying 25 thm text files. I was at least able to avoid copying all the tga files, which make up 15-30 MB – this would've been prohibitive for distribution. I think there may be a way to make this work by copying just one or two files, but I can't figure it out (and I don't think other modders have). Had to hardcode the mod folder name in `Assets\XML\Art\CIV4ArtDefines_Misc.xml` in order to plug in the custom theme. Several boxes are now a little too small for their text and could use some adjustment. The help text area should be a little wider; has some stupid linebreaks for units with many promotions. Perhaps not possible outside the EXE; `HELP_TEXT_MINIMUM_WIDTH` doesn't do the trick.
002c	Added a couple of translations for K-Mod game text entries.
Credits	Also merged translations by Zholef. I haven't marked these changes in the XML files.
002d	Changed the icon of the specialist-commerce ability introduced by K-Mod 1.45 to show a Scientist; was Citizen. (Depending on which commerce type gets increased, the icon could also show a different specialist, e.g. Engineer for production.)
002e	Disabled glow effect on units ready for promotion except for the currently selected unit and foreign units.
Rationale	Too obtrusive. Players don't select units just to assign promotions; they select them in order to move or heal, and assign promotions at that opportunity. No need to constantly indicate unassigned promotions on the world map.

	The glow is needed on foreign units because there is no other way of telling that a foreign unit has unassigned promotions. Shouldn't be a secret either. (Rarely relevant in singleplayer as the AI always assigns promotions right away.)
Config	Can be toggled in `GlobalDefines_advc.xml`
002f	Changes to city icons: Defense icon moved behind the defense modifier; city network icon removed.
Rationale	Should be easier to guess now that the tower icon isn't some status indicator, but just stands for the word "defense". The city network icon is at best helpful in the early game, though probably not at all for experienced players. Can always look at the list of trade routes on the city screen.

003	Minor refactoring, utility functions, comments about unused or otherwise dubious code; in particular:

Macros `TEAMREF` and `TEAMID` that I use a lot to shorten code. E.g.
`GET_TEAM(GET_PLAYER(ePlayer).getTeam())`
becomes
`TEAMREF(ePlayer)`	

Some utility functions for dealing with floating point numbers. Floating point arithmetic is easier to read and less error prone than the iSomethingPercent stuff. I also try to round values as late as possible in order to avoid rounding artifacts.	

003b	Misc. performance tweaks
See also	003d: Faster Quick Load

003c	Addded an assertion that checks if XML data loaded through `GC.getDefineINT` actually exists. Found just one (unimportant) error this way and corrected it. Had to change some calls that happened before XML was even loaded; no functional change.

003d	Faster loading of savegames	
AdvCiv		*BtS*
When using Shift+F8 to Quick Load in fullscreen mode, the game exits to the main menu for a second before loading the Quick Save slot.		When loading any savegame while playing in fullscreen mode, the game hangs on "Initializing" (doing who-knows-what) for a period of time appears to depend on the complexity of the game state. Can easily be 30 seconds. This delay does not occur when loading from the main menu (nor when exiting to the main menu).
Rationale	This (apparent) bug has been long known, though these three CFC threads are the only web sources I can find that mention it. It's possible that it only occurs on some systems. My fix only covers Quick Load. Since the "Load Game" menu is outside the SDK this is probably all I can do. Workarounds: a) manually exit to the main menu before loading; or	

	b) play in windowed mode; or c) (my preferred choice) press Alt+Tab two times when the delay begins. This seems to finish the "Initializing" stage immediately. Could easily replace the "Initializing" text with a recommendation to minimize the game if loading is taking long. I've tested this and found it quite helpful because I keep forgetting about this. But the recommendation would also show up when generating a map, and this is misleading because Alt+Tab does not speed up the map script. The replacement text also needs to be very short; no room to explain that it only applies when loading a savegame. Had to leave it at a regular loading screen hint (008d) that shows up randomly.
Tbd.	Italian and Spanish translation.
See also	009 is a prerequisite because it repairs BUG code for finding the `My Games` directory where savegames are located. 004m enables resource bubbles at game start. They normally stay enabled when loading a savegame, but not when it's done via the main menu. Therefore, 004m, keeps track of the status of resource bubbles, and 003d restores that status after loading.

004	Minor usability improvements
See also	101 adds help text to the Nationality bar (city screen). 120c hides the espionage slider when it's at 0. 210 adds BUG-style alerts.
Misc: Show the turns-left countdown only when at most 30 turns away from time victory (instead of 100); inspired by RFCEurope. Health from trait shown on city screen as "from Trait" instead of "from Civilization".	
004a	Bulb button shows next bulb targets

AdvCiv	*K-Mod/BUG*
The help text for the bulb ("Discover") button of a GP shows all techs that the GP will be able to discover if an additional tech is researched, e.g. "next tech: Astronomy (with Printing Press)".	The help text only says which tech the GP can discover right now.
BUG Tech Advisor disabled by default.	BUG Tech Advisor shows bulb paths. Enabled by default.

Rationale	For players who don't plan their bulbs (long) in advance, the added help text should usually suffice. Moreover, the BUG bulb paths look confusing, and aren't integrated well into the Tech Advisor.
Config	BUG Tech Advisor can be enabled from the in-game BUG menu.
004b	Found button shows projected health, city tile yield and increase in city costs
Tbd.	Should also show free initial buildings (Palace, more with Medieval start or later).

AdvCiv	*BtS*
The help text for the found ("Build City") button shows how much the Total Expenses (Economics Advisor) will increase if a city is founded on the current tile. Does *not* project the gold income of	No such projection. Can only quicksave and found to see how costs will increase.

the new city, e.g. from trade routes. The increase is computed as • maintenance for the new city, including State Property, vassal cities etc., plus • increased maintenance in other cities, including those temporarily exempt because of disorder or celebrations, plus • increased civic upkeep plus • decrease in unit cost (from the +1 population) plus • decrease in unit supply and cost from the lost Settler • times inflation.	
Tbd.	There's a small (rounding?) error of apparently at most 1 gold that I can't figure out.
The help text on the found button shows health from features, traits (Expansive) and freshwater. All features revealed in the (full) city radius count. While a Settler is selected, the help text of any tile shows health effects. Found-button help text shows the projected city tile yield.	Forests provide +0.5 health, Jungles -0.25, Flood Plains -0.4 and Fallout -0.5. City tile yield only shown once a city has been founded. Usually just 2 food, 1 production, 1 commerce, but occasionally more.
See also	016 changes the effect of extra yields from random events on city tiles.
004c	Changes to bombardment
Can bombard at 0 defense in order to prevent city defense from recovering. Air units and siege units with the ability to ignore defensive buildings have their bomb(ard) rate increased to match the building defense. For example, when a city that has 100% defense from a Castle, but just 60% from culture, is bombarded by a Cannon (bombard rate 12), city defense is reduced by 20 percentage points. Units that ignore defensive buildings see 48% defense, the others 80%.	Can't bombard cities with 0 defense. If a city isn't bombarded for a turn, its defense begins to recover on the next turn. The ability of Wall and Castle says "+... defense (except vs. Gunpowder-based units)" and those Gunpowder-based units have the XML tag `IgnoreBuildingDefense`. However, Siege units with the tag don't actually ignore defensive buildings; they only ignore the bombardment reduction effect that Wall and Castle also have. In the example on the left, the Cannon player would see 60% before bombardment, and 52% after.
Rationale	I wouldn't mind Walls and Castles having defensive abilities against post-Medieval units, but the implementation is unacceptable from a UI pov. By the Modern era, stacks often consist entirely of units that ignore building defense, and then the player only gets to see the defense from culture, which somehow doesn't decrease as fast as it should. An alternative solution would be to show city defense including buildings when a siege unit is selected; in the example, the player would then see defense decrease from 100% to 88%. Not trivial to implement (can't just take away `IgnoreBuildingDefense` because siege units still need to ignore bombardment reduction), and my solution is conceptually simpler: post-Medieval siege units entirely ignore defensive buildings.
Tbd.	Clearly, Walls and Castles could use a buff. Would be nice to have the help text for the Bombard button state the bombard rate.
004d	AI says "not right now" to peace when war is recent
AdvCiv	*K-Mod*
When a player tries to broker peace, the Trade	Says "we'd love to, but you'd have to ask them"

Screen says "not right now ..." if the war is still too recent. The AI will agree to brokered peace with a third civ as part of a peace treaty with the human even if the AI would normally still refuse to talk to that third civ.	instead. Often, both sides say this. (As far as I recall, peace could be brokered even when a war was recent in BtS.)
004e	Leads-to info added to promotion buttons
AdvCiv	*BtS*
The help text for promotion buttons lists the promotions enabled by the current promotion. E.g. "Flanking I Leads to Flanking II, Navigation, Sentry"	Can only look this up in Civilopedia.
004f	Disabled celebrations
No celebrations (We-Love-The-King Day) ever.	If a city has at least 8 population, no anger and no bad health, celebrations happen with a probability of population / 1000. The reward is 0 maintenance for 1 turn.
Rationale	Celebrations grant just -3% maintenance on average in a size 30 city, which is insignificant. I'm not even listing this as a balance change. Celebrations were potent in Civ 2, but already irrelevant in Civ 3. They've only confused players. Something no one will miss who doesn't know it's disabled.
004g	Misc. changes of confusing help text (not a complete list)
"Our shared borders spark tensions"	"Our close borders spark tensions" Too similar to "closed", and doesn't imply that they're touching.
"We don't like you enough"	"We just don't like you enough" Sounds like this is the only obstacle, but often isn't.
"Your x has attacked a y: 22% damage". Removed the minus sign.	"Your x has attacked a y: -22% damage"
"Some wonders on this continent are making us happy" for the Notre Dame ability. (Only changed in English and German)	"Some buildings are making us happy", listed twice when there is also e.g. a Colosseum.
Financial Advisor says commerce from "Trade" Credit to Th334	"Foreign trade" in K-Mod (but it's actually all trade)
"The anarchy is over" in white letters	In red letters, like it's a bad thing.
"We are afraid of their military might" when sponsored war refused on account of nukes	"Surely, you must be joking."
Polar desert called "Snow" instead of "Ice".	Both polar desert and shelf ice are called "Ice".
In-game main menu called "Game Menu".	Called "Main Menu", same name as the menu where you go after "Exit to Main Menu".
004h	(Disabled for now.) Highlight full city radius when Settler selected
When a Settler is selected, both the inner city radius and the full city radius are highlighted.	Only the inner radius, i.e. the adjacent tiles are highlighted.
Rationale	Highlighting the adjacent tiles isn't helpful at all; showing the full city radius is at least somewhat helpful.

Config	Disabled through `CvUnit::showCityCross`
Tbd.	Showing both inner and outer ring separately is too distracting. I see no way to get rid off the inner ring from within the DLL. The outer ring alone might still be too obtrusive. It would probably be best to show no city radius at all (use Alt + X for that instead), and also no yield display. Since none of this appears possible (the "Show City Radius" graphics option has no apparent effect either), it's best to leave it as it is.
004i	Message about gold stolen by enemy spies says how much was stolen
Credits	Idea from Civ 4 Reimagined 1.2
004j	Regenerate map past turn 0
In singleplayer games, the map can be regenerated until (incl.) turn 3. Exception: Can't regenerate after any civ has met another civ.	Can only regenerate the map on turn 0.
After regenerating the map, the Dawn of Man (DoM) screen is shown again, and the camera centers on the player's active unit.	The DoMscreen isn't shown after regenrating, and the game tries to center the camera on the player's starting plot, but somehow this has no effect; camera stays at the previous starting plot.
Rationale	More convenient for testing, and I generally see no reason to prohibit regeneration after turn 0. It seems that the regenerate function can't handle diplomatic contacts, or perhaps just not certain kinds; haven't tried it. I'm also not sure if regenerate can handle all other game state changes. Safer to remove the option after a couple of turns. Also don't want it to clutter up the main menu. I don't really have an opinion on whether the DoM screen should appear after regenerating, but, somehow, DoM allows the camera to move (though the line that wants to center it on the starting plot still seems to have no effect).
004k	Removed Sea Patrol mission
Rationale	No one seems to use it; leaner interface is better.
Tbd.	Would prefer to leave the mission available via its keyboard shortcut. That's not so easy to implement. (Shortcuts are handled in `handleAction`, which checks, ultimately, `canDoMission`, which is also responsible for the displayed mission buttons.)
004l	Fortify-Heal works like Sentry-Heal outside cities
When a unit is fortified "until healed" outside a city, that unit will ask for orders when a hostile unit approaches. Forts behave like cities in this context, i.e. units healing in Forts don't wake up until fully healed.	Units that are fortified until healed only ask for orders once they're healed.
Rationale	BULL has a separate Sentry-Heal mission that is missing from K-Mod. My change to Fortify-Heal should result in the desired behavior in most cases. Units already have so many rarely used buttons; don't want to add another.
Tbd.	The help text should say "Sentry until Healed" when not in a city. I've written the help text (`Civ4GameText_advc.xml`), but showing it dynamically based on whether a unit is in a city isn't straightforward. Will have to implement a separate Sentry-Heal mission, and disable Fortify-Heal outside of cities (and disable Sentry-Heal inside cities). And make sure that it works in networked multiplayer; the current implementation should be fine, but new action buttons can introduce OOS bugs.
004m	Increased initial camera distance and enabled resource bubbles by default
Rationale	I always zoom out a bit at game start, and I recall reading somewhere that customer

	research (on Civ 4?) had shown that most players play from rather far away.
Tbd.	Would be better to (re-)store the status of resource bubbles by means of some .ini file; I've no experience with this sort of thing. The SDK doesn't even say whether the layer is enabled, but I've worked around this (function `CvGame::isResourceLayer`) for change 003d.
Config	Both optional through `GlobalDefines_advc`
004n	Arrow button on city screen shows all local units
One normal click on the right-arrow button on the city screen shows icons for all local units.	One full row of unit icons is shown when opening the city screen. If there are more units in the city tile than fit in one row, each click on the right arrow next to the unit icons shows one additional unit. If Ctrl is held when clicking, 10 more units are shown.
Rationale	At least at 1280x1024 resolution – and I think most players have that much –, even 100 units don't really obstruct the city screen. Showing them one by one is needlessly slow and complicated.
004o	No start-revolution button on the new-civic popup
The change-civic popup only has the buttons "No, the old ways are best" and "Let's see the big picture".	"Let's get this revolution started" directly starts a revolution.
Rationale	Players sometimes forget other civic changes that could be made along with the one suggested by the game (especially if more than one civic becomes available at a time). This is frustrating and happens easily.
004p	No commerce breakdown in city screen if slider at 0
When showing help text for any of the four commerce types on the city screen, a breakdown of raw commerce is shown only when the slider position is above 0.	Raw commerce is shown even when the slider is 0. E.g. "Culture: 1000 ==== Base commerce: 50 +50% for Capital ------- 0% of 75 = 0"
Rationale	Makes the culture-bar help text harder to read, and could be confusing for new or returning players since the culture slider isn't even available at the start of a game.
Don't show the player's total culture output on the main interface.	Total culture output (sum of the culture rates in all cities) shown next to the culture slider.
Rationale	Not an important statistic; not worth being constantly on display. Even a bit confusing as total culture doesn't have any effect of its own.
See also	120c hides the espionage slider when it's at 0
004q	Sum of the relations modifiers shown along with diplo breakdown
e.g. Pleased **(+7)** towards Gandhi +1: "Years of peace ...	Players have to sum up the modifiers by themselves to find out the total relations value: Pleased towards Gandhi +1: "Years of peace ...
004r	Report resources discovered on unclaimed tiles

When a tech reveals a resource, sources in unowned and barbarian territory are reported as well, and there's message when no source was discovered or only on tiles owned by rival teams.	Only resources on the player's current territory are reported.
Rationale	All sources could be interesting to the player, including those owned by other teams, but mustn't flood the screen with messages. The warning about no source probably matters most for Animal Husbandry; easy to forget to check whether Horses have been revealed anywhere.
004s	Economy ("GNP") curve doesn't count culture and espionage; yield curves show moving average
AdvCiv	*K-Mod*
The Economy graph on the Info screen is named "GNP (Gold+Research)" and shows the net sum of the gold generated by all cities plus the sum of the research generated by all cities. This sum doesn't include any costs (e.g. city maintenance or civic upkeep). It does include (no change) all gold and research modifiers (e.g. Bank, Library) and commerce from trade routes, buildings (Shrine) and specialists.	Called "GNP (Gold)" and shows the sum of all commerce produced by cities, including culture and espionage. (So far, as in BtS.) Gold is reduced by the sum of all gold costs, including inflation. Research is increased based on modifiers that apply to the currently researched tech: from tech diffusion and from knowing multiple prereq. techs.
All the yield curves show moving averages based on three samples.	All curves show the game state at a given turn, not an average.
Economy and Industry ("goods produced") curves show a (very short) straight line for revolution turns.	When a revolution turn is sampled for one of the curves, a sharp, brief decline is shown.
Rationale	Culture and Espionage have their own curves. Both can reach far higher rates than research and gold normally do; e.g. a settled Great Spy produces 12 espionage per turn, a settled Great Scientist only 6 research. This makes it hard to tell from the Economy curve if a civ has a strong economy or if it's merely focusing on culture or espionage. A single curve for gold and research is OK; they're on the same scale. By including costs, the curve would essentially become a research curve, which is probably more useful than some commerce curve, but then it would seem like a "Gold" curve is missing. Another issue is that UWAI uses the Economy history for some important computations, and removing costs roughly cancels out the removal of culture and espionage, so I don't have to revise the UWAI formulas. Excluding costs is also consistent with the Agriculture curve ("crop yield"), which doesn't include food consumption. As for research modifiers: Any modifiers that apply only to the currently researched tech (which can change any turn) are misleading. Perhaps tech diffusion should be included; if they're behind on the current tech, they may well be behind on the next one ... Moving average: The Economy and Industry curve fluctuate a lot in BtS, to the point of being hard to read, and removing culture and espionage (which rarely fluctuate) from the Economy curve makes it worse. The fluctuation is caused by AI juggling of citizens. Apart from usability, the average is also supposed to obscure the changes from one turn to the next a bit. I can't make much sense of them, but it might be possible to derive some specific information, e.g. about AI war planning or wonder building, that the player isn't supposed to have. The power curve has that issue too; however, it might be confusing if the enemy power curve doesn't immediately drop after defeating an enemy stack.

	Revolution turns: The negative spikes are confusing because revolution turns aren't always sampled when drawing the curves.
Tbd.	"GNP" is a bad name because "Goods produced" would have to be included in a GNP.

004t	No tech and production recommendation unless Sid's Tips enabled
AdvCiv	*BtS*
When the "Sid's Tips" player option is disabled, no recommendation is given in the tech and production chooser popups. The items are still ordered based on AI recommendation.	Disabling Sid's Tips only gets rid of the summary texts in the tech/ production chooser; still says "Recommended by such-and-such advisor" next to the top two items.
Rationale	Disabled this change again because it looked strange to have the two recommended production choices on top without explanation, and though the recommendations are pretty bad, they're still better than starting the list with Settler and Worker all the time.
Config	Can enable this change (i.e. disable the recommendations) through `ENABLE_POPUP_RECOMMENDATIONS` in `GlobalDefines_advc.xml`.

004u	More info in message about Great General (GG) death
AdvCiv	*BtS*
The message about the death of a GG states the owner of the GG and the owner of the unit that killed the GG, and indicates the location of the battle between the two on the map (if it is revealed).	The player only learns the name of the GG. Can only search the Turn Log for the birth message (if it hasn't expired) to find out the GG's owner.
Rationale	Debatable if the location should be indicated; more flavorful this way I think.

004v	Changes to scoreboard help
AdvCiv	*BtS*
The hint about Ctrl for trade table and Alt for DoW are merged into a single line.	Two lines of UI help, one above the line about worst enemy, the other below.
Rationale	Cleaner this way.
See also	106d changes BUG settings concerning the scoreboard.

005	Minor flavor changes
005a	Leader personality tweaks
AdvCiv	*BtS*
`MaxWarMinAdjacentLandPercent=2` for Bismarck. While he eventually gave up his reluctance to off-shore colonies, he was never keen on distant parts of Europe (let alone Asia): "The Balkans are not worth the healthy bones of a single Pomeranian grenadier." Also lowered his attitude threshold for defensive pacts to Cautious (realpolitik, Triple Alliance), and increased his weight for diplomatic victory and lowered the one for domination victory. Conversely, gave Brennus higher weight for domination and lowered weight for diplo. While I was at it (further minor changes): Shifted Catherine's	Was 0. It's a preference for long-distance land wars, ranging between 0 and 4. 0 means Bismarck treats neighboring civs no different from other civs on the same continent when it comes to war planning. Threshold is at Pleased, like most other leaders. Victory condition weights have been added by BBAI. I don't think they actually have a big impact on the game.

weights from conquest towards domination and science. Added a bit of science weight to Ramesses, and reduced his conquest weight. Increased Saladin's weight for diplomacy a bit at the expense of conquest and space.	
`MaxWarDistantPowerRatio=70` for Napoleon. Napoleonic France fought few off-shore wars and even ceded Louisiana to the US.	Was 100. A preference for naval war. Napoleon is tied for the highest value, while his MaxWarNearbyPowerRatio (land wars) is only moderate.
`MaxWarMinAdjacentLandPercent=2` for Charlemagne and Cyrus. Charlemagne extended his borders gradually in all directions; Cyrus conquered several empires that weren't exactly at his doorstep.	Was 1 and 3 respectively.
`MaxWarRand=150` for Willem, i.e. now a bit less willing to start "total" wars. In part, because wars of conquest seem out of character for the small Netherlands; in part, because he's doing a bit too well in AdvCiv games in my experience (and more so than other Financial leaders – the overpowered trait is obviously the bigger issue). Also shifted his victory weight a bit from Conquest to Culture and made him a little less interested in dogpile wars.	Was 100.
Increased Roosevelt's `NoWarAttitudeProb` at Pleased to 100 and at Cautious to 70, but increased his `Build-UnitProb` to 25. Decreased `NoWarAttitudeProb` for Brennus at Cautious to 50 and for Darius at Pleased to 90.	Was 90 at Pleased, 50 at Cautious, 20 BuildUnitProb. Was 70 (Brennus, Cautious) and 100 (Darius, Pleased).

Rationale	(of the Roosevelt change): 90/50 NoWarAttitudeProb is the same as the Mongol leaders or Napoleon. Some peaceful leaders like Mansa Musa and Elizabeth also have it, but along with a low BuildUnitProb. This makes for leaders that are ruthless but powerless. This doesn't fit for Roosevelt at all. He's the leader most representative of the present-day America that doesn't invade partners, but has a big military. Changed Brennus and Darius to keep the overall balance. I don't know if that balance is exactly right, but if anything there are too many leaders that don't normally attack at Pleased.
Tbd.	May have to lower `buildUnitProb` for Willem (currently 25%, which isn't really that high ...). Nerf Financial trait first, and see what difference that makes.
005b	GP names assigned chronologically

AdvCiv	*BtS*
GP names are assigned in the order they're listed in `Civ4UnitInfo.xml`, i.e. roughly ordered by date of birth; no more Ancient Heisenberg. About every second name is skipped at random, so that GP names aren't the same in every game. There is an additional offset when starting in the Medieval era or later, i.e. early names are skipped. Corrected a few misspelled GP names, e.g. "Frank" Kafka. Replaced the two Great Generals that also appear as civ leaders with two new ones (Charlemagne→ Zizka; Boudica→ Hai Ba Trung).	When a GP is born, the name is chosen uniformly at random from among the GP with matching type. Heisenberg is just as likely to be the first Great Scientist as Socrates.

005c	City ruins bear the name of the former city

Help text shows the name of the most recent city in a tile with city ruins. Can't pillage city ruins, meaning they can only be removed by building	The name of the former city isn't recorded anywhere. Can pillage city ruins (0 gold).

an improvement on top.	
Rationale	For flavor. No pillaging because the name of a destroyed city could have strategic importance (albeit very little), and I wouldn't want players to destroy ruins in order to monopolize information (in multiplayer). Also, one can't really pillage ruins ...
005d	Spurious/ misattributed tech quotes corrected or marked as "ascribed to ..."
Credits	CFC discussion about Civ6 tech quotes: link; offshoot about BtS: link

006	Disabled some assertions
Disabled assertions that are supposed to be rare and were still under investigation by earlier modders. In some cases, I've tried to resolve these myself, in others I've disabled them because they were interfering with my testing of more immediate issues.	

007	Changes to info shown in debug mode
Few so far. No confirmation needed for entering WorldBuilder if already in debug mode. Red circles from BBAI only shown if Show-Yields view was enabled before entering debug mode. (Can also toggle the circles by toggling Show-Yields and entering and leaving a city screen.)	

008	Changes to Civilopedia content and hints
I've only changed content that is no longer accurate, and for some Game Concept pages, I left the content alone, and merely added a warning at the top that the info could be outdated. I've only changed the English version.	
Config	The modified bits are in a separate file called `CIV4GameText_advc.008.xml`.
Tbd.	Not all the strategy advice is up to date. Especially the tech and building advice is a lot of work to maintain, and much of it is redundant. The tech advice is only shown when Sid's Tips are enabled. Would be best to somehow disable these texts completely for anything past the Ancient era; the early-game texts actually do contain some advice.
008a	Civilopedia changes based on K-Mod gameplay
008b	Civilopedia changes based on AdvCiv gameplay
008c	Updated some of the hints that are shown while loading savegames (only English and German)
008d	New hints about AdvCiv changes and a few K-Mod changes that weren't previously covered. Gave all hints about modded content a higher probability of being shown than the hints from Vanilla and BtS (Warlords didn't add any). Tried to mimic the tone of the original hints.
Config	Increased the probability by duplicating entries in `CIV4Hints.xml`. Separate file for the new hints: `CIV4GameText_advc.008d.xml`.
Tbd.	Only English and German text so far. Some important changes aren't covered because they're subject to further change.

009	Setup of configuration files: BUG settings, GlobalDefines, BUG and BBAI help files

See also	002b also deals with file paths
Tbd.	Would like to rename the `Mod/AdvCiv/Settings` folder (doesn't actually contain important settings), but that's not so easy to do; see the `txt` file in that folder. Would be nice to use the SourceForge URL that BUG tries to access for Mac installations as a fallback when help files aren't found locally. (The local files should be working now though.)

010	Worker stealing disabled
AdvCiv	*BtS*
Settlers and Workers die when attacked; no captured Worker appears.	Settlers and Workers die and the attacker receives a captured Worker. The AI immediately disbands captured units.
Rationale	Unlike human players, the AI doesn't know how to look for exposed Workers and steal them; nor how to disband Workers that are about to be stolen; nor how to guard Workers on border tiles. If the AI could do these things, it would be largely impossible to steal Workers from the AI, and players would have to guard their Workers on border tiles, which would be very tedious. This might be why the original developers abandoned efforts to let the AI steal Workers (`CvUnitAI::AI_poach` is never called). So, Worker stealing as a game mechanism can only work against an unwitting AI. I do like the slave-raid flavor, but I don't think it's worth putting the AI at a considerable disadvantage. Early disruptive wars remain useful for destroying AI Workers (see Tbd.) and for keeping enemy tiles from being improved – I wouldn't want to make this tactic unviable. Flocks of Workers captured in conquered cities also contribute to Worker under-employment, which tends to slow player turns down. Work stealing also undermines difficulty settings that give the AI a free Worker (such as the added King difficulty). The DDiplo changes would make Worker stealing even more attractive than it is in BtS.
Config	Purely an XML change; can re-enable Worker stealing by restoring three values in `Civ4UnitInfos.xml` (look for `advc.010`).
Tbd.	Can still attack Workers on border tiles just to cripple the AI. Eventually, DoW should only take effect at the end of turn. This will give an attacked AI (or human) civ one turn to move any exposed units to safety. It's not ideal to have no reward at all for attacking civilians. E.g. after taking the only barb city on a landmass, surviving barb Workers will just sit there, and there's now no incentive to attack them. Could re-enable Worker stealing once delayed DoW is implemented.

011	Decay of invested Worker turns
AdvCiv	*BtS*
Once per round, when no progress has been made on any of a plot's unfinished Worker builds for the fifth turn in a row, the number of invested Worker turns is reduced by one for all unfinished	No decay of invested Worker turns.

builds in that plot.	
Rationale	BtS allows for some very fiddly micro-optimization, especially pre-chopping, but also e.g. pre-building of Forts to protect strategic resources. I don't want players to worry about leaving an improvement unfinished for some turns, e.g. until a barbarian unit has been dealt with, but I want decay to be fast enough to make pre-chopping an irrelevant tactic. This balance is a bit difficult to get right.
Config	Can be adjusted or disabled through `DELAY_UNTIL_BUILD_DECAY` in `GlobalDefines_advc`
Tbd.	Pre-build actions would still be nice to have, if only for any players who disable the decay mechanism. Ideally for any Worker build by holding down the Ctrl key.

012	Forest/Jungle defense reduced	
AdvCiv		*BtS*
Forest and Jungle provide no defense if the attacker owns the attacked tile, otherwise 25% defense. (Feature attack/defense bonuses from unit abilities or Woodsman promotion still apply regardless of tile ownership.)		50% regardless of ownership.
Rationale	Some players complain that removing Forests in the inner ring of a city is a no-brainer because the defense bonus for invading armies is too dangerous. I think even with my change, it's usually correct to chop inner-ring Forests because they provide the highest production boost. Well, this still leaves 12 potentially forested tiles in the outer ring to agonize about. I'm more bothered by the implausibly high defense bonus from Forest and Jungle, which leads to gameplay problems too, such as barbarians refusing to attack fortified units. Forested chokepoints are difficult to handle for the AI. It makes some sense that units can defend well in forests (forests offer material for palisades etc.), and it makes sense that the civ that knows its way around a forest (i.e. the tile owner) has an advantage; I'm assuming that these two factors cancel out.	
Tbd.	The Woodsman promotions should provide a (net) attack bonus against Forest and Jungle. Currently, only Woodsman III does.	

014	Capitulated vassals don't pursue victory strategies	
AdvCiv		*BtS*
Capitulated vassals can't be elected AP or UN leader, and can't be on the ticket for diplo victory.		A vassal votes for its master unless the vassal itself stands to be elected; no restriction on that.
Rationale	When even a capitulated vassal has more votes than the master civ's biggest rival, then the game is decided, and the master civ should win a diplo victory with the votes of its minions. And of course a capitulated vassal shouldn't win.	
AdvCiv		*BBAI/BtS*
Capitulated vassals don't pursue victory strategies, don't build team projects and don't build wonders of the world except Shrines.		Capitulated vassals pursue victory strategies and can actually win the game.

Rationale	Internet and Manhattan are things that the master may not want the vassal to build; SDI is covered by the master (change 143b); the other projects are for space victory. Capitulated vassal shouldn't build wonders that the master might want to build. Especially not UN, AP or Space Elevator, but it's simpler to just block them all.
See also	130v about capitulated vassals generally behaving like zombies. 112 about voluntary vassals breaking free when approaching victory. 143b scraps nukes upon capitulation.

015	Changes to Great People	
Tbd.	Will probably allow Priest and Artist to hurry certain wonders; move culture bomb to Spy.	
015a	Changes to tech flavor values	
AdvCiv		*BtS*
No production flavor for Constitution. I.e. can't be discovered by a Great Engineer.		3 production flavor, 4 gold, 2 culture, 2 growth. Thus a tech that Great Engineers can (and may have to) discover.
Rationale	Engineers inventing constitutions is too far a stretch for me.	
Tbd.	Fascism is also dubious (6 production flavor).	

016	Extra tile yields from random events not added to city tile yields	
AdvCiv		*BtS*
On city center tiles, extra yields from random events are added to the natural tile yield before raising the yields to at least 2 food, 1 production, 1 commerce.		City tile yield is computed as the yield from terrain, hill, unimproved bonus and river, all assuming that features (incl. Flood Plains) are removed. The result is raised to at least 2 food, 1 production, 1 commerce. Finally, extra yields from random events and yield bonuses from Golden Age are added.
Rationale	Should be treated like all the other yield effects; counterintuitive in BtS.	
Credit	Pointed out here on CFC by traius.	
Tbd.	Considering to change the city tile yield formula so that bonuses are applied after the raise step.	
See also	004b shows the city tile yield before founding	

017	AI trains fewer units when its military is already very large and drafts less in general	
AdvCiv		*BtS*
The probability of training a unit in a city is reduced based on the military power of the strongest potential opponent.		The military power of other civs affects the number of trained units only indirectly through the "Area AI type"; generally keeps building units so long as the maintenance is affordable.
Rationale	Better to develop the economy more than to train excessive armies. AI stacks of doom can also get too disheartening if the human player is behind when Drafting and Rifling	

	become available.
Decreased the base probability to train a military unit by 4 percentage points overall. Added an upper and lower bound for the city-specific train-unit probability based on the number of cities: The AI only gets to use very high or low probabilities when it has about five cities.	The probability is effectively 6 higher than set (per AI leader) in XML because the experience from Barracks is doubled and added in.
Rationale	The average probability to train a unit was about one in three, which seems a bit much in a situation where there is no war on the horizon.
AdvCiv	*K-Mod*
Don't draft away more than a third of a city's population unless defenders are urgently needed. (K-Mod has the same condition, but doesn't apply it to Rifleman.) Don't draft at all when there is neither a war plan, nor a reason to reduce population.	Draft as many units as allowed except when there are angry citizens or upkeep gets too costly (that's a high ceiling). Stricter rules when drafting sth. other than Riflemen.
When it's not urgent, only draft with a per-turn probability equal to the normal `buildUnitProb`.	No randomness in drafting.
Reduced AI utility value for Nationhood civic when already paying high unit upkeep.	Utility is only reduced when `maxUnitSpending` is exceeded.
Rationale	The K-Mod behavior leads to huge AI stacks once/ if the AI hits Rifling and switches to Nationhood. If the player can stay out of harm's way through diplomacy, it becomes too easy to overtake the AI economically. One third of the population is still a lot. Drafting without planning war is generally a bad idea; can draft units pretty quickly once they're needed. Probably shouldn't adopt the Nationhood civic without war plans either. The change to civic evaluation may help with that. Don't want to make war plans a hard requirement for Nationhood though – that would give away the AI's intentions. The probability should make AI drafting less abrupt, and reduce it a bit overall.
Tbd.	`buildUnitProb` should be taken into account in a more meaningful way: currently mostly slows AI drafting down. However, need to change the drafting rules before putting effort into the AI; drafting is too efficient currently.
The target number of warships to escort a naval assault is adjusted based on the number of coastal cities owned by the enemy and the game era. Potential bug fixed in BBAI code that may have lead to large AI fleets when only a "minimal attack force" had been intended.	Only the number of escorted transport ships matters, and if they can defend themselves (Galleons).
Rationale	No need for an expensive escort if the enemy has very few ships. Can't be sure of that, but the number of coastal cities should be a pretty good predictor (and don't want to just count enemy ships that the AI can't see).
Tbd.	Should check if the enemy can even train any dangerous ship; no need to protect (Industrial-era) Transports if the enemy ships are Frigates. Once that's implemented, should probably use `relativeNavyPower` if UWAI is enabled.

See also	905 buffs Trireme and stops the AI from using (and training) Caravels as escorts. Not sure if this has lead to fewer or more AI ships.

017b	Dynamic changes of unit AI type
AdvCiv	*BtS*
Caravels (and Carracks) trained by the AI as attackers (`UNITAI_ATTACK_SEA`) can turn into explorers (`UNITAI_EXPLORE_SEA`) if there is nothing to attack and there are too few explorers. Lowered the priority of guarding seafood when in `UNITAI_RESERVE_SEA`. Relaxed conditions for changing from `UNITAI_SETTLER_SEA` to `UNITAI_ASSAULT_SEA`.	Land units can turn into (land) explorers, and there is a narrow rule that can turn a Galley into an explorer after transporting a Settler; but Caravels can only act as explorers if they've been trained for that purpose. Explorers can adopt various other roles if exploration isn't needed anymore.
Rationale	Should lead to fewer Caravels; that's why I'm grouping this with change 017.
Tbd.	There are probably other sensible AI type changes that the BtS code doesn't consider. A comment by the Vanilla developers also suggests this: "move some of this into a function? maybe useful elsewhere".

018	Impact of Crush AI strategy reduced
AdvCiv	*K-Mod*
The "Crush" strategy no longer causes the AI to train more units overall, and doesn't shift its yield focus to production. On the contrary, the AI trains slightly fewer units with Crush. The AI doesn't adopt the Crush strategy until it's clear that the enemy doesn't pose much of a threat.	Crush makes the AI prioritize production. It also (no change in AdvCiv) lets the AI mobilize some of its defensive units as invaders, and trains more city attackers instead of defenders. At least with Aggressive AI enabled, some AI leaders adopt Crush in any "total" war that isn't going badly. The Crush strategy has been introduced by BBAI.
Rationale	In K-Mod, Crush seems to be used in situations where the AI might be able to win a decisive victory by concentrating all its resources on the war. This leads the AI to go all-in more often than I'd like. The AI can easily end up training far more units than would be needed in these all-out wars, which sets it on a road towards a military victory. The AI goes for military victories too often in K-Mod. Now the AI should use Crush only to bring war to a quick conclusion when it's winning anyway.
See also	115 and 104c also make the AI less willing to go for a military victory.

019	Less impact of Aggressive AI mode (AAI) in BBAI/K-Mod code
AdvCiv	*K-Mod*
Only minor impact of AAI in some of the BBAI and K-Mod code.	Especially K-Mod behavior depends on AAI in many places.

Rationale	For experienced players, I think there is a happy medium between aggressive and non-aggressive AI, and really no need for two modes. Even for inexperienced players, it would be better to tie AI aggressiveness to the difficulty setting instead of a separate game option. (To be fair, BtS does that too: `iAIDeclareWarProb` is based on difficulty.) In the original Civ 4 code, the non-AAI behavior is very passive, especially on the low and medium difficulty settings; this has been a recurrent player complaint even right after the Civ 4 release. Therefore, I haven't reduced the impact of Aggressive AI in the original code.
See also	AAI can only be disabled through XML; see chapter on UWAI. 120b: No impact of AAI on malicious espionage.

020	Changes to AI flavor values
AdvCiv	*BtS/Warlords*
Military flavor added to buildings that reduce maintenance; reduced on buildings that increase city defense. Gold flavor no longer associated with government center (reduced distance maintenance) and reduced on Courthouse. Gold flavor of corporate HQ reduced. Culture flavor added to modern entertainment wonders (Hollywood, Rock'n'RRoll, Broadway) and Growth flavor reduced. Culture flavor also on Temples and Cathedrals (in addition to Religion), and to some misc. wonders. Growth flavor added to some happiness buildings (Colosseum, Market, Broadcast Tower) and National Epic. Added Religion flavor to Apostolic Palace (how was that missing?). Plus some minor changes. I went through all buildings. Espionage flavor removed from West Point, Pentagon and Forbidden Palace. Instead, AI governors consider flavor when evaluating Great Person points.	Since Warlords, each AI leader has one or two flavor values, and prioritizes buildings (and technologies) that match those values. *Military* flavor is on buildings that increase city defense, grant free XP, increase unit production or reduce war weariness. *Gold* flavor for extra trade routes, increased gold rate or reduced maintenance. *Culture* for some of the buildings that generate culture (Monument, Stonehenge, Theater, National Epic, Hermitage, Sistine Chapel, Eiffel Tower). *Growth* on buildings that improve health or spur population growth, and on a few that increase happiness (Notre Dame, Globe Theater). *Espionage* flavor for buildings that produce espionage points or Great Spy points. Religion for religious buildings. *Production* for buildings with (generic) production bonuses.
Rationale	Military leaders don't usually want to get on the defensive and, therefore, shouldn't build Walls and Castles. I'm not removing the military flavor entirely because warlike leaders are also prone to counterattacks, and, (pre-)historically, militaristic cultures tended to build fortifications. Note that Protective leaders are still more inclined to build defensive buildings because of the production discount from the Protective trait; many of the Protective leaders have Military flavor. Reduced maintenance leads to a high science rate, which conflicts with buildings like Market that increase gold output. The Gold flavor does give some incentives for growing wide (trade route bonuses), but I still think it's more important not to have the same flavor on Courthouse and Market. The next best choice seems Military; militaristic leaders tend to conquer wide empires. Corporations aren't there for generating gold. The HQs pair well with +gold buildings, but Gold-flavored leaders try to build Markets everywhere, not just in the HQ cities. The missing Culture flavor on Hollywood etc. seems like an omission. While

	Cathedrals are more of a religious thing, they're so instrumental to the Culture victory that they should also have Culture flavor. If growth is supposed to support tall cities, it needs an even mix of health and happiness.
Tbd.	The Trade Mission ability of the Great Merchant also clashes with the plus-gold-rate buildings. Considering to give Great Artist and Prophets a hurry-production ability for (small and great) wonders that either generate GrAr/ GrPr points or have Culture/ Religion flavor.

021	Adjusted map scripts with simulated tectonics; see also chapter PerfectMongoose.
See also	Since these map scripts frequently produce mountain chains and large areas of uniform terrain, the improved AI handling of areas separated by Peaks (030) and the reduced probability of large resource lumps (129) are especially relevant. Also tend to generate oblong continents near the poles, and 027 improves the selection of starting areas in such cases.
021a	Tectonics

AdvCiv	*BtS*
Uses the latest version 3.16 (Nov 2008) of the Tectonics map script. "*[...] added more rivers. [...] Terra option now has a nice looking Arabia instead of some landbridges and islands.*" source	Uses version 3.15.
All map scripts are allowed to place Jungle on Plains. The impact on most map scripts seems very minor; most tiles at the equator are Grassland anyway. A sample (non-Tectonics) Pangaea map had only 8 Plains Jungles and 40 Grassland Jungles. (Not sure if that means that there would have been 8 fewer Jungle tiles without my change.)	Jungle can only be placed on Grassland. Since Tectonics maps have lots of Plains near the equator, these maps end up with very little Jungle.

Credits	It's LDiCesare's map script. It was included in BtS patch 3.17, and he updated it once more after that.
Config	The Jungle-on-Plains change is done in XML (`Civ4FeatureInfos.xml`).

AdvCiv	*Tectonics 3.16*
Tectonics landmass type options "Earthlike" 80%, 70% and 60% water.	Only 70% and 60%
Reduced the number of rivers for all landmass types, and a bit more for Pangaea.	Was supposed to be reduced (perhaps to the level of v3.15) only for Pangaea, but due to an apparent bug affected (only) 60% water instead.

Rationale	Corresponding to High, Medium and Low sea level. My 80% option actually does the same as the 70% option in the original script, the new 70% corresponds to the old 60%, and the new 60% is a new setting. I've noticed that far less land is generated than the old percentages said. My percentages are still too high. Actually, the ratios vary a lot. The new 60% option sometimes does lead to 40% land, but other times just

	23% ... 3.16 generally had more rivers than e.g. Fractal; I didn't like that. Not sure if Pangaea really needs special treatment. Seems to receive fewer rivers in any case (albeit longer ones than on maps with smaller continents).
Tbd.	Make the script produce reasonable land ratios reliably. Should be the same as Fractal; see the frequencies stated under 021b. I probably won't ever do this because the PerfectMongoose script obsoletes Tectonics in my mind.
Credits	4Dingo4 and LDiCesare have suggested formulas for the 50% setting here.
021b	PerfectMongoose (PM)
Config/ See also	It's all in the map script (Python): `PublicMaps\PerfectMongoose.py`. The version history is also in there. Out-of-synch errors were reported about the predecessor PW2. That seems to have been fixed by AIAndy, but if not, setting `self.UsePythonRandom = False` should help.
Credits	See chapter PerfectMongoose

AdvCiv	*PM 3.2*
I've measured the relative frequencies of all terrain and feature types for Fractal maps of various sizes, and tried to get PM to somewhat match those frequencies. For reference, the Fractal frequencies at Low sea level are approximately 28.5% land, 7% forest, 2% jungle, 1% peak, 5% hill. 6% river, 3% desert, 3% tundra, 8% plains, 12% grassland. Only 20% land at Medium sea level, 15% at High. The frequencies I've ended up with are closer to 30% land ratio (Low), 24% (Medium), 18% (High), with some +/- 3 percentage points fluctuation, and Low sea level sometimes produces as little as 22% land. There are also some more hills than on Fractal, and more plains, less grassland and more rivers, but shorter ones.	The land ratio is really hard to predict; depends not just sea level, but also on map size. Assuming a land ratio of 28.5%, forest typically covers about 10% of all tiles; 2% jungle, 3% peak, 9% hill, 5% river, 4% desert, 5% tundra, 7% plains and 7% grassland.
I've kept the larger grid except for Large and Huge maps, which are just about 15% larger than normal now.	A larger tile grid is used for all map sizes, leading to about 40% more tiles.

Rationale	One goal was to let players set the same number of players that they use for most other maps. Although PM now produces more land than Fractal (higher land ratios and larger grid), the number of decent city spots seems to be about the same, and that's what matters in the end. The main reasons why PM produces more marginal or unusable terrain seem to be the large stretches of plains, clusters of hills and terrain generally being less mixed. I wouldn't know how to change that, and I rather like it. For one, it gives the various regions of the map more character. Marginal terrain can also present a third choice between stopping to expand and waging war; and it's a historically plausible source of barbarians. That's why I've kept a slightly higher ratio of plains and hills. I don't see realistic terrain proportions as an important objective. E.g. if there isn't quite as much desert as in reality, one can simply assume that a Desert tile represents a larger area than, say, a Grassland tile (i.e. not a scale model), or that some arid

	regions of the Earth are represented as Plains or Tundra in the game.
Tbd.	The variance of the land ratio bothers me, but I don't want to apply some crude fix like aiming at a high land ratio and then removing terrain at random (say, through the meteor mechanism). For what it's worth, the Tectonics script has even higher variance (far worse even). It would be nice if rivers were a bit longer on average. Peaks appear only along coasts on map sizes smaller than Large. I guess this is because peaks are only placed at the boundaries of tectonic plates, and continents consisting of more than one plate occur only on sufficiently large maps. So I suppose the size of the plates doesn't scale properly with the map size. (The Tectonics script seems to get this right.) Or just turn some inland hills into peaks at random ...

Jungle can occur on plains, but is much more common on grassland. Oases don't have to be surrounded by desert; a few adjacent non-desert tiles are OK. No cold deserts near the poles.	Jungle only on grassland. Jungle is less dense than on other maps, but extends a bit farther north and south. Oases only on tiles entirely surrounded by desert. Sometimes large deserts are placed right next to tundra.
Rationale	Jungle on plains makes jungles a bit less scattered. (PM places a mix of plains and grassland in the tropical latitudes.) Oases that are totally surrounded by desert are rarely useful.
Reduced the amount of land near the poles. Limit the scope of the map to 80° latitude.	Often generates an Antarctica-like continent that connects temperate continents. Up to 90° latitude (same as most maps), but configurable in the script.
Rationale	Such a land bridge is unrealistic (armies can't traverse a polar desert), and wouldn't play well either: Diminishes the importance of ships, and long attack paths are difficult for the AI. Limiting the scope seems like an elegant way to reduce the extent of uninhabitable areas (tundra and snow) without sacrificing realism. For reference, the Arctic Circle (on PM and in reality) is at about 66° latitude.
The balancing ("normalization") of the tiles near starting plots is handled almost entirely by the DLL functions that most other map scripts use for normalization. I've kept the PM code that ensures at least 2 hills. The starting plots themselves are only chosen by PM if the Old World Start map option is set. Otherwise, the standard method based on AI found value is used. If PM does choose the starting plots, then starts in/ near the polar zone and on small islands are ruled out, and plots are evaluated based on yield weights from Civ 4 Reimagined.	All the standard normalization functions are disabled and replaced with custom code that seems very reluctant to make any changes: No rivers or lakes are added, no bad terrain (tundra) converted, jungles and peaks only removed when they occur in large numbers. Starting plots are always chosen based on custom code with strange yield weights (that appear to value commerce more than food). Starts on small islands and near the poles (not rarely both) are possible, and the distribution of the civs onto the continents is sometimes quite uneven.
Rationale	The PM code can lead to awful starting locations. BtS might do a bit too much balancing (especially for a map that's supposed to look natural), but, fortunately, I've already made some changes (id 108) that make the balancing a bit less aggressive.

	Starting plots need to be chosen based on `AI_foundValue` when possible; karadoc has improved that function a lot.
Tbd	Should use `AI_foundValue` and `CvPlayer::findStartingArea` also when Old World Starts is enabled. Even when `findStartingArea` is used, the space available for expansion is often unfairly distributed. I think that's simply because the continents are smaller than e.g. those generated by Fractal. Should try to make them bigger.

Resources are placed in the standard way (`CvMapGenerator`).	Custom code for resource placement. Seems to be largely the same as in `CvMapGenerator`. I guess cephalo wanted to make some changes without changing files other than the map script.
Rationale	I want my own changes (129) in `CvMapGenerator` to apply. Also, for whatever reason, the PM code creates large clusters of resources. I've seen e.g. a 2x3 rectangle filled with Ivory on a Small map.
Map options for land generator and climate system removed. Always use the defaults: PW3 Square Grid and PW3 Climate System.	Options "PW3 Generator (Square Grid - Accurate)", "PW3 Generator (Hex Grid - Interesting)" and "PW2 Generator" for landmass generation; and "PW3 Climate System" and "PW2 Climate System" for climate.
Rationale	I don't see much reason to use the old PW2 code, and it would've been a lot of work to adjust the land, feature and terrain ratios for PW2. As for the "accurate" versus "interesting" choice – how is a player supposed to decide this? I just went with "accurate" because that code was newer and it was the default setting.
Config	Not hard to bring the options back by editing `PerfectMongoose.py`.
"Break Pangaea" map option removed. Enabled if and only if the Old World Start option is set. The limit for the number of meteors is based on the map size.	If the Break Pangaea option is enabled (which it is by default), the script checks in the end if there is a single continent containing more than 70% of the land tiles; if so, circular groups of land tiles are removed (explained as meteor strikes) until all continents have at most 70% of the (remaining) land tiles.The number of meteors is limited to 15.
Rationale	I don't like the meteor mechanism: Often, numerous meteors are necessary in order to break up the land, and the map ends up looking like a plucked goose and having too little land. And, of course, real meteor strikes left much smaller craters and didn't significantly affect coastlines.
Tbd.	A better solution would be identify and remove isthmuses, or maybe to keep moving the plates until there are multiple continents. One could even just show a message "failed to generate multiple continents; please regenerate the map".
See also	I've added a recommendation about the number of players to the label of the Old World Start option. This is consistent with change 137, which adds such recommendation labels for Low and High sea level.

022	Changes to AI paranoia
See also	107 also deals with the AI's defensive strategies 109 sets Economy Focus when no threatening civ is known 130u treats human civs as Cautious toward everyone

Tbd.	I've considered basing paranoia on enemy war utility (if UWAI is enabled), but, so far, the K-Mod code seems to work well enough alongside UWAI (if it never correctly anticipated UWAI attacks, that would be bad).

AdvCiv	*K-Mod/ BBAI*
The paranoia value of an AI civ is based on the attitude and personality of rivals civs, not vice versa. Human rivals are assumed to be moderately bellicose with an adjustment based on the AI civ's attitude toward them. Made a similar change in the computation of `CityThreat` (non-immediate military threat toward a city); using a mix of defender and attacker attitude there. Decreased impact of rival victory strategy. Increased impact of geographical closeness; except when not on the same landmass. Some other, minor changes.	Paranoia is computed as a function of vicinity, power ratio, our attitude and personality, their victory strategies and whether we're their worst enemy. Paranoia determines if the BBAI strategies "Economy Focus" (low paranoia) or "Alert1" and "Alert2" (high paranoia) are adopted (neither if medium paranoia) Paranoia is greatly increased if a rival is at stage 3 of Domination or Conquest victory.

Rationale	A K-Mod comment in the CityThreat function says, "*For good strategy, this should probably be* their *attitude rather than ours. But perhaps for role-play it is better the way it is.*" For `CityThreat`, I think both arguments have merit, so I'm averaging the attitudes in this case. As for paranoia, producing additional defensive units against a benevolent rival makes little sense roleplay-wise, and can be quite damaging for the AI, therefore, only use the neighbor's attitude in that case.
See also	107 changes the computation of closeness between civs.

Reduced paranoia if the threatening civ is so powerful that resistance is likely futile.	The more powerful they are, the more paranoid we get.

Rationale	"Things without all remedy should be without regard."

023	Occupation countdown based on revolt probability
AdvCiv	*BtS/ K-Mod*
The occupation timer (after conquest or a revolt) is decremented only with a per-turn probability equal to the tenth power of 1 minus the revolt probability.	The occupation timer is decreased by 1 each turn.
When a city is conquered, the occupation timer is set to the minimum of 3 and the population size.	Occupation after conquest last for 3 turns plus 50% of the population size, e.g. 13 turns in a size-20 city.
A revolt sets the timer to 2 plus the number of prior revolts. Typically slow to decrease because of the revolt probability that causes the revolt.	Also 2 in BtS and in K-Mod 1.45 (but 3 in earlier K-Mod versions).
Damaged units have their culture garrison strength reduced proportional to the damage.	Unlike combat strength, garrison strength is unaffected by damage.
The Nationality bar on the city screen shows the per-turn chance to decrease the occupation timer.	
Extra AI defenders in cities that might revolt.	No code for this at all. The AI tends to put units in border cities though, against external threats.
Rationale	BtS occupation times get too long in Renaissance; one reason why it's difficult to catch up at that point. 10 turns is a very long time when the game may last just 100 more turns, and the city may still have to spend some 20 turns on essential buildings before it starts paying off. By basing the occupation duration on the revolt probability, I hope to reward players that conquer only one or a few cities at a time and can then afford to sit in them to make occupation end quickly. Generally, occupation durations should still increase as the game progresses – mature cities tend to have high revolt probabilities. Now, 3 turns is often just the time that units need for healing anyway, so this would hardly slow down conquests if it weren't for the reduced garrison strength of damaged units. I'm not showing a message when an occupation counter is decremented; could become too much when occupying several conquered cities. Since revolts no longer occur only in border cities, the AI had to be adjusted.
Config	The conversion of revolt probability into the probability of decrementing occupation can be tweaked in `GlobalDefines_advc.xml`. Can also restore the BtS rules there (longer but deterministic occupation).
See also	101 reverts the K-Mod changes to revolt probability. 099c makes revolts more common by allowing them to happen outside of foreign culture range. 023 wouldn't make much sense without 099c. 210b displays an alert when occupation ends.
Revolts can't happen in occupied cities (conquest or prior revolt) if the city owner is at war with the cultural owner. If they're not at war, a revolt in occupation is possible, but mitigated by the following special rules: • The revolt test is only executed if the decrement-timer test has failed. • Revolt probability is halved while in occupation • A revolt during occupation does not increase	No revolts during occupation.

the occupation timer; it does increases the revolt counter and can flip the city. Being at war does not increase culture garrison strength.		Culture garrison strength doubled while at war.
Rationale	If revolts were impossible during occupation, a player could withdraw all units to deliberately prolong occupation, which makes the city worthless for the current owner, but also to the cultural owner (can't flip). Regular revolts during occupation would be too punishing though. The halved probability only makes up for the loss of garrison strength when units are damaged as part of a revolt. I don't like having complicated special rules for revolt during occupation, but I don't see a better solution.	

024	Order in which AI contacts other AI randomized	
AdvCiv		*BtS*
When contacting other AI civs for trades, the AI goes through them in a randomized order.		Fixed order based on the player slot id.
Rationale	Some deals aren't mutually exclusive, but the AI can e.g. give away a resource only once, and may only have enough gold to convince one civ of a joint war. The fixed order leads to a slight bias for trading with AI civs with low ids.	

025	Reduced culture spread by capitulated vassal onto master's tiles	
AdvCiv		*K-Mod*
The tile culture spread by a city onto a tile is halved if the city owner is a capitulated vassal of the tile owner.		Capitulated vassals spread their culture normally.
Rationale	Even if cities can't flip to vassals (change 099c), the revolt-inciting culture spread is still a good reason not to accept capitulations. It's OK if capitulation isn't always the correct choice, and perhaps this is an interesting dilemma, but capitulation should be correct more often than not, and 099c makes it much harder overall to keep revolts in check.	
Config	Through `GlobalDefines_advc.xml`	
See also	130v neuters capitulated vassals in several ways	

026	More gold offered in AI-proposed deals
AdvCiv	*K-Mod*
When the AI contacts a human player with a trade offer, when trying balance both sides of the deals, the AI is willing to give away more gold than normally. If the player negotiates, the extra gold is no longer offered.	The AI can offer deals that are slightly more favorable to the player, but the portion of the AI treasury offered for trade isn't increased.
Rationale	The aim of the K-Mod change was to make it "worth considering the deal the AI offers [...] rather than going straight to the renegotiate button" (from the K-Mod 1.07 changelog). But a worthwhile offer still seemed very rare, so, while worth considering, it didn't exactly hurt to never consider AI proposals.
Config	`AI_OFFER_EXTRA_GOLD_PERCENT` in `GlobalDefines-advc.xml`
Tbd.	A general problem with any one-time offers: If the player can't just click "renegotiate", then the player doesn't know what else the AI might have. Encourages the player to routinely enter the Foreign Advisor during diplo. The only fix I can think of (other than removing the one-time offers) is to have the AI remember its initial offer. Then, if the deal is renegotiated, that offer remains available through "what would make this deal work": If the player offers to give the AI what it had originally asked for (or that and sth. in addition), or asks for what the AI had originally offered (or a subset of it), the AI suggests the original offer unless it finds an even better one. This way, the player would again always renegotiate, but would still take a look at the original offer in order to possibly get back to it. For now, I've added a loading screen hint about opening the Advisors during diplo. Another way to make one-time offers more attractive: Increase the trade value counted for "fair and fortright" trade if an AI offer is accepted without renegotiation (but don't increase the trade value for trade with worst enemy).

027	Changes to the selection of starting plots
AdvCiv	*BtS*
When computing the starting area score for a continent, count only those rivers and coastal tiles that aren't peaks, tundra, snow or dry desert. Take the land tile count times 0.5. Add 1.5 times the number of bonus resources.	When starting locations are not determined by the map script (and most map scripts don't), then a starting continent is chosen for each player by `CvPlayer::findStartingArea`. That function computes a score for each continent and selects the one with the highest score. Part of the score formula is the number of river edges, the number of coastal land tiles (to account for the water surrounding the continent) and the total land tile count. Bonus resources don't count directly, but the total of all tile yields does.
Rationale	Too many civs had been placed on continents near the poles.
Tbd.	Would be better to evaluate the surrounding water directly (than to count coastal land tiles); should be pretty easy to do through the Shelf class that I've added in change 300. Should perhaps sometimes, at random, leave a small-ish continent empty. This would make Fractal a bit more unpredictable (a good thing in my mind), but could lead to crammed starting locations.
See also	108 is concerned with the normalization of starting plots (after they've been selected).
If cheats are enabled, Shift+Ctrl+mouseover on a land tiles without any units shows a breakdown of the starting area score.	Various combinations of Ctrl, Shift and Alt reveal various internals for development purposes.
Rationale	I've used this to figure out where the assignment of starting areas goes wrong, and left it in the code for future adjustments.

028	Submarines as escorts
AdvCiv	*BtS*
When a stack with invisible and visible units is attacked, the attacking player sees combat odds against the best visible defender, but an invisible unit may replace that defender once the attack is ordered, i.e. if the invisible unit is the better defender (considering unit cost and combat odds). Invisible units don't defend if all the team's units in the tile are invisible (same in BtS), i.e. an attacker can't stumble upon an invisible stack, and invisible units don't defend units of other teams.	Invisible units only defend when revealed (e.g. by a Destroyer).
Rationale	Not plausible for a Submarine to sit by while e.g. a fully loaded Transport gets attacked by another Sub. The new behavior makes Subs worse in situations when the defenders are outnumbered by modern ships, e.g. a Transport (or just a Workboat) and a Sub against four Battleships. That said, players can easily prevent this by not stacking Subs with visible units. All in all, the change should make Subs (and Stealth Destroyers) a bit more useful.

029	Changes to recon missions	
AdvCiv		*BtS*
Tiles revealed by a recon mission remain visible until the *end* of the subsequent turn of the recon unit's owner, or until the unit carries out another mission. Consequently, it doesn't matter much if a recon mission is carried out early in a turn (manually), or after all other units have moved (auto recon or queued mission).		Visibility ends on the *start* of the owner's subsequent turn. If the options for showing foreign moves are enabled, the player still sees all foreign moves before the fog of war returns. Auto recon and queued recon missions are barely usable because tiles are only visible from the end of one turn to the start of the next.
Rationale	During the owner's turn, nothing happens in the fog of war, so there isn't much of a point in hiding the tiles at the start of a turn. (It can make a difference for air strikes.) The advantage of my change is that players no longer need to remember which units had been visible, and it makes it easier to automate recon.	
Tbd.	Would still be nice the have a "Recon until canceled" mission that repeats recon on the same tile every turn (akin to the Blockade mission; on that note "Blockade for one turn" would be nice to have too). OrionVeteran had started to implement something like this, but didn't finish it. I'd like to nerf recon a bit by allowing units on recon to be intercepted, ideally even when not at war (and no OB). And reduce the number of revealed tiles (-2 radius), especially for non-recon air missions (-3 radius).	

030	Peaks can separate areas	
AdvCiv		*BtS*
When one or several peaks make parts of a landmass unreachable by land, that secluded part is treated as separate land area.		Only water can separate land areas.
Rationale	Should make things easier for the AI. The AI still has to be able to handle dynamic obstacles because of closed borders, and it can (but not that well).	
Config	`PASSABLE_AREAS` flag in `GlobalDefines_advc`.	
Tbd.	Could additionally compute landmasses as in BtS, and base the rules for colonies and single-continent wonders on these landmasses; this way, players wouldn't have to adjust to the change. Shelf ice separating sea areas: Some of the (original) code currently relies on units being unable to go from one area to another (e.g. `CvPlayerAI::AI_isPlotThreatened`). Would have to track these code lines down to make submarines work. Other than that, simple: Just call `isImpassable` instead of `isPeak`. Could also limit the (step) diameter of water areas (by limiting the search depth of the `calculateAreas_visit` function), which might help the AI when the geography resembles the American continent (minus the Panama Canal).	

031	Changes to AI found value	
AdvCiv		*K-Mod*
AI considers settling on plots without any bonus resource in the city radius if the city can expect to work at least 3 freshwater tiles.		Plots without any nearby bonus resource are disregarded.
Settling one off the coast not completely ruled out.		I've never seen the AI settle one tile off the coast.
Reduced the impact of distance from capital based on era.		Strong and uncapped impact of distance in all eras, making the AI highly reluctant to settle the New World on Terra.
Rationale	A river (or oasis) without resources is rare, but can be worth settling on (esp. with Flood Plains). About the impact of distance: Need to be careful not to revive the AI habit of planting colonies on a far edge of foreign territory. I think that used to happen in Vanilla Civ 4 and in Civ 3.	
Tbd.	I've seen the AI settle on top of Gold resources semi-regularly. The K-Mod code to discourage this looks correct though (subtracts the improvement yield). Perhaps some more fundamental problem with weighing a single very good tile against several mediocre ones.	
See also	108 makes changes to the found value of the initial city (which is important for starting plot normalization). 040 assigns a found value to unrevealed tiles.	

032	Signing a peace treaty when there already is one causes turns-to-cancel to be reset	
AdvCiv		*K-Mod*
When a peace treaty is signed between two civs that already have a peace treaty, then the turns-to-cancel are reset to 10 turns. This can happen through a diplo vote or sponsored war (due to change 146). I don't think gifts and demands are possible when there is already a peace treaty.		Signing a peace treaty has no effect if there is already a peace treaty.
Rationale	More intuitive this way. Otherwise, e.g. the target of a peace proposal could get attacked just one turn after the vote.	

< 040	*Still unassigned*

040	AI improvements for settling other continents
AdvCiv	*K-Mod*
When an AI civ has no city on a continent, it counts unrevealed tiles in the city radius as average tiles when computing found values (with a number of exceptions and restrictions). (The Settler may change its mind once it gets to the spot and reveals its surroundings.)	Unrevealed tiles don't add anything to found values. This makes the AI very reluctant to settle a continent that it has only explored from the sea.
Rationale	Could instead try to improve AI exploration. Not so easy; how can the AI tell that a continent is large enough for land exploration (without circumnavigating it first)? Should Caravels be routinely accompanied by a Scout/ Explorer?
Tbd.	Would like a multi-stage "Colonization" strategy akin to the victory strategies (on Terra, colonization is sort of a path to victory). Stage 1: If expecting an unclaimed continent, get Sailing, Optics, Astronomy, prioritize sea exploration. Stage 2: If an empty continent is found, prioritize Settlers, Workers (if scarce), transportation, land exploration(!); seek peace on the home continent. 3: If several cities founded, ship over some military, and make economy (Courthouses!) the focus in the new cities. 4: If the new cities can stand on their own, consider measures to reduce maintenance: civics, move capital, create colony. But also need to make it more worthwhile to found cities in Renaissance and Industrial era. Probably make early-game buildings cheaper to build (also: to rebuild after conquest) as the game progresses. Would also like a Columbian Exchange mechanism that reveals resources in the Old World once a copy is obtained from the New World.
See also	300: Barbarian placement on continents without civilizations. 905 gives ships better stats (cost, speed, cargo capacity). 031 reduces the impact of distance on found value.

041	Can train ships in any coastal cities	
AdvCiv		*BtS*
Cities adjacent to any water area larger than a lake can train ships and construct a Dry Dock. The AI ignores this change, i.e. builds ships/ Dry Dock only in cities at a size-20 water body.		Can train ships and construct Dry Dock only in cities adjacent to a water area of at least 20 tiles. Other coastal buildings require only 10 water tiles, which is also the threshold for a salt water lake.
Rationale	Since BtS, it can make sense to train naval units in small water areas because Forts can act as canals into larger water areas. Implausible that this should not be allowed. Since the AI doesn't have a notion of canals, it had better stick to the old rules though. This change also eliminates the confusion about two different area size thresholds (10 for buildings, 20 for units). Cities are now either proper coastal cities, or only (fresh water) lake-side cities. Don't want to allow shipbuilding at lakes because it's confusing to see ships on the city screen of some inland city with a 1-tile lake.	
Tbd.	By allowing Lighthouse in lake-side cities, I could remove the awkward incentive for founding in tiles that are both coastal and lake-side. But I'd rather treat Lake tiles as being a terrain different from Coast, and thus unaffected by Lighthouse (and Colossus, Moai); then give Lake +1 food, -1 commerce from the start (i.e. like Oasis but 1 less commerce).	

042	BUG's City Cycle Arrows removed	
AdvCiv		*K-Mod*
Disabled "City Cycle Arrows" in BUG; can't enable them from the BUG menu either. City cycling from the City screen still works.		City Cycle Arrows enabled by default. When an arrow is clicked, the camera centers on the nearest city; if already centered at a city, centers on the next one. Perhaps there is also a BtS keyboard shortcut with the same functionality; this would also be disabled in AdvCiv.
Rationale	I had these arrows enabled without noticing them for years; now I've accidentally clicked on one and the game crashed. Doesn't crash in K-Mod, so this is an issue I must have introduced. No clue how to fix this, so this option will have to be removed for the time being. Clicking on an arrow leads to a call to `selectLookAtCity` in `CvDLLIFaceBase`, which always produces a "Procedure not found" exception inside the EXE. This is typically caused by changes to the signatures of exported DLL functions. I've restored some signatures that I had previously changed; can't find any others that might cause the crash. Can't easily rewrite the `selectLookAtCity` function either.	

043	Dan Quayle scale adjusted	
AdvCiv		*BtS*
For a "Julius Caesar" victory, a normalized score of at least 100 000 is needed; the next best victory is at 75 000, then 50 000, 40 000 ... 1000 is needed to avoid the worst title (Dan Quayle).		15 000 suffice for the best victory, the next thresholds are 14 000, 13 000, ... Dan Quayle is below 3000.
Rationale	Almost all my victories have been "Julius Caesar", so this is apparently too easy to reach for an experienced player. More of a logarithmic scale now, covering a wider interval of scores. It's possible that the original scale worked OK in Vanilla Civ 4; hasn't been changed in either of the expansions.	
Tbd.	The score formula needs work too; increase the weight of victory date and difficulty. The main incentive should be to win as early as possible on the highest possible difficulty. Though the bigger issue is that yields increase too much in the Industrial era.	
See also	707: The Rise & Fall scores are normalized to match this new scale.	

044	No auto-save after loading initial auto-save	
AdvCiv		*BtS*
No auto-save right after loading a savegame. There's still an auto-save after regenerating the map, which replaces the initial auto-save and deletes all other auto-saves.		When the initial auto-save is loaded, the game immediately auto-saves again, overwriting the savegame just loaded and deleting all other auto-saves.
Rationale	It's unnecessary to save right after loading, and the deletion of other auto-saves is somewhat unexpected; should only happen when a new game is started (via the main menu).	

< 099	*Still unassigned*

099	Culture isn't removed when a civ is destroyed	
AdvCiv		*BtS*
When a civ is eliminated, its culture remains in the game and keeps causing anger.		When a civ is eliminated, its culture disappears as well.
The civ is announced as having been "conquered".		An announcement says the civ was "destroyed".
Anger before and after conquest is explained as "We resent being ruled by a foreign culture".		Before elimination, anger from culture is explained as "We yearn to join our motherland". No anger after elimination (the motherland is gone).
Anger is 40% of the foreign population with Open Borders (or capitulated vassal or barbarian), 150% times 40% = 60% without OB (or if they're conquered), and 200% times 40% = 80% while at war; all rounded down.		Anger is 40% of the foreign population while at peace, and 150% of that, i.e. 60%, while at war, both rounded down.
Rationale	Removes one strong incentive for conquering a civ entirely. The goal is to make a vassal agreement the correct choice most of the time – less micro-management that way. Also intended to weaken military strategies.	

	It's also glaringly implausible that a culture would instantly disappear. No AI changes: conquering cities is still very desirable, and the AI doesn't consider anger from culture anyway when deciding whether to accept a capitulation.
Config	The anger can be tweaked through XML (`GlobalDefines_advc`), but can't re-enable cultural elimination. This is because BtS doesn't actually set culture to 0 in one place, but checks for elimination in numerous places and treats culture as 0 when appropriate, so making it optional is messy.
Credits	Contributions by Chronis, Ifgr and vincentz CFC thread
See also	Part of the Immortal Culture component. 130w adds a diplo penalty for cities with high foreign culture.

Each round, the culture value of each player (civs and barbs) in each tile is decreased by 1%. (This change does not affect *city* culture.)	Tile culture doesn't decay. It's treated as 0 when a civ is eliminated.

Rationale	For game balance reasons, foreign culture in conquered cities should be a serious issue only for some 50 turns, perhaps 100; – provided that the conqueror puts some effort into it. Without decay, that's not the case for cities conquered in Renaissance or later; these tiles have tens of thousands of culture points. This is not just an issue for dead culture; it generally takes a bit too long for culture rate to translate into relative tile culture. Another way of looking at the decay rate: If a tile receives culture at a constant rate, tile culture can't exceed that rate times 100, i.e. times the (multiplicative) inverse of the decay rate. Any measures that weaken military strategies should mostly apply to the first half of the game; later conquests don't have much time to amortize.
Config	`TILE_CULTURE_DECAY_PER_MILL` in `GlobalDefines_advc.xml`
See also	122 deals with culture after city trades (another situation in which culture magically disappears)
099b	*(Merged into 122; now unused)*
099c	Cities revolt regardless of culture range
See also	210b adds an alert about positive revolt probabilities

Any city with sufficiently strong foreign culture can revolt, but the revolt can only flip the city if the owner of the foreign culture is alive and has a city nearby. (And can't flip if flipping is disabled in game options.) AI made less reluctant to accept capitulation in general, but more reluctant so long as the vassal has cities with the master's culture.	Foreign culture can only cause a city to revolt if the owner of that culture is alive and has a city nearby, i.e. close enough so that the first city is within the culture range (based on culture level) of the second city.

Rationale	To remove another incentive for eliminating civs, to make conquests more costly and culture more relevant. Resurrecting a prior owner seems needlessly messy; the probabilistic occupation times (change 023) should make revolts from dead culture painful enough. Joining the barbarian civ would be easy, but strange, I think, because the city would then train units based on the barb tech level. Not sure if cities with high living foreign culture but outside of foreign culture range

	should be allowed to flip. Let's say the rebels only dare joining the homeland if the homeland is near enough to protect them.
Config	Can (largely) restore BtS behavior through `REVOLTS_IGNORE_CULTURE_RANGE` in `GlobalDefines_advc.xml`.

Barbarian culture can cause cities to revolt. They can't flip to Barbarian control though, and barbarian culture strength is only counted half in surrounding tiles. Cities can't flip from a master to its vassal; only go into occupation. Increased strength of foreign culture in cities of capitulated vassals.	Essentially the same, but barbarian cities have practically never enough culture range to cause another city to revolt. Culture in tiles adjacent to the city always contributes to the foreign culture strength, and, ultimately, the revolt chance. Can flip between vassal and master. No way then for the master to get the city back.

Rationale	Not sure about this. Seems more flavorful/ historical to let conquered barbarians revolt. Might play better without these revolts; players don't expect them, and conquering barbarians should be easier than conquering civs. Then again, barbarians don't generate much culture, so it doesn't take much effort to suppress them, at least not when the surrounding tiles don't count. Could say that only counting the city tile models the (political) disunity of the barbarians. Could easily implement flipping to barb control. Historically, that hasn't really happened; see the list of colonial uprisings here. More accurately modeled as a period of unrest. Flipping from vassal to master could incentivize elimination over capitulation. Also, I find it ultimately more annoying than challenging.
Config	`BARBS_REVOLT` switch in `GlobalDefines_advc.xml`
See also	025 reduces culture spread from capitulated vassals

The revolt chance is increased on account of city religions if a) the civ to whom the revolt culture belongs is alive, not a capitulated vassal of the city owner, has a state religion and that religion in present in the city; or b) if the city owner has a state religion, and that religion is not present in the city but some other religion is. No change: The revolt chance is decreased (which may just cancels out the above) if the city owner has a state religion, and that religion is present in the city. The revolt chance is also decreased (but only half as much) if the city owner has no state religion. AI city owner is slightly inclined to switch to the religion of the foreign population.	Only a) increases the revolt chance, and also applies to capitulated vassals. Dead culture can't cause revolts. When there is a non-state religion in the city, then an oppressive state religion (which is not present in the city) is no worse than no state religion.
Rationale	I almost removed this complicated stuff entirely, but it's kind of nice that spreading one's state religion can help flip a city. The BtS rule doesn't work for dead culture, so I felt that some replacement was needed to balance out the decreased revolt chance from owner's state religion. The BtS rule also doesn't work well for capitulated vassals

	of the city owner: The owner can just tell the vassal to switch to a different religion; not an interesting decision, and players that aren't aware of the religion/revolt rules get confused or screwed.
Halved the religion-based modifiers (see above).	
Rationale	Spreading one's state religion had made a huge difference previously, going from doubled to halved foreign culture strength, i.e. a factor of 4.
Config	`STATE_RELIGION_MODIFIER` parameters in `GlobalDefines_advc`.
If a city can't flip on the third revolt (because the cultural owner is dead or flipping disabled in options), it loses one population instead (and goes into occupation).	No extra penalty if flipping isn't possible; occupation periods just keep getting longer.
Rationale	To discourage players from ignoring revolt probabilities (the lost turns don't become punishing until numerous revolts have taken place). And it would be strange if cities could just keep revolting. The loss of population also reduces the revolt probability so that the city should eventually end up depopulated but pacified.
0 revolt chance in the first 10 turns (adjusted to game speed) after a city was founded in the Ancient era.	No such period of grace, but since cities can't be founded within the culture range of a foreign city, revolt chance is always 0 in newly founded cities.
Rationale	Now often an issue in the early game when founding anywhere near a foreign border. Probability tends to decrease quickly as the new city starts spreading tile culture, but can get unlucky with revolts until then. Don't want that randomness, don't want to punish settling near foreign borders (player can't even tell that there is foreign culture; not shown on unowned tiles), and don't want to scare players with an initially high revolt probability.

099d	Can't spread religions during civic disorder.
AdvCiv	*BtS*
Missionaries and Executives can't spread religions/ corporations in cities that are in disorder (from occupation, anarchy or a random event).	Can spread regardless of disorder, but there isn't much of a point because happiness and culture from religion have no effect during disorder, and revolt chance is 0.
Rationale	Now that the occupation duration is linked to the revolt probability, spreading a religion right after conquering a city could reduce the (expected) occupation time. Don't want players to micromanage missionaries to spread religions right after conquest. Also seems realistic that religious communities (or corporate branches) can't be established during disorder.
Tbd.	Would be better to show the Spread Religion button grayed out with explanatory text. Currently, the button isn't shown when a city is in unrest.

100	Changes to sponsored wars
See also	146: Peace treaty between sponsor and the civ that declares war.
AdvCiv	*BtS*
When an AI civ declares war at the request of another civ (hired/bribed for war), the DoW	Humans don't learn about AI bribes.

message informs the human players about this sponsorship: "...declared war on ... at the request of Alexander."		
Rationale	The information isn't terribly relevant strategically, but makes it easier to make sense of the AI, and makes it clear that the AI actually does sponsor wars. Moreover, if AI civs learn about sponsored wars ("You brought in a war ally against us!"), the human civs should be allowed to know this too.	
(Only relevant if UWAI is disabled:) AI civs are reluctant to be hired for war against a powerful civ. Either they decline fearing "their military might", or the price for war is high, up to two times higher than in K-Mod, depending on how disparate the power ratio is.		Weak AI civs are sometimes bribed into joining wars against powerful civs. An AI civ doesn't consider its individual military power, but only the total power of the war coalitions.
Rationale	War against a considerably stronger civ is a big risk, even as part of a coalition, and, in any case, the weakest link is unlikely to conquer any cities. Moreover, sponsoring wars was too cheap overall.	
Config	`WAR_TRADEVAL_POWER_WEIGHT` in `GlobalDefines_advc`.	
When negotiating peace, the no declarations of war against third parties can be discussed; no "Declare War On" items are shown on the trade screen.		Normally "We don't like you enough" or "will never trade with our worst enemy", but may occasionally be possible to hire an AI civ for war as part of a peace treaty.
Rationale	Shouldn't show the option if the AI practically always refuses, and Cautious attitude despite war is an oddity that shouldn't matter. Could instead remove the attitude checks while at war. Seems more realistic that such options can't be discussed. Would also take a bit of implementation work because the the war trade should be evaluated assuming that the peace treaty is already signed.	
100b	Brokered peace shown in replays	
Brokered peace is shown in the replay log ("brokered by ...").		Replay log only says "has made peace with".

101	Revolt after conquest	
See also	210b shows an alert when revolt probability changes from 0 to a positive value.	
AdvCiv		*K-Mod*

Reverted the K-Mod 0.9 change to revolt probabilities, and made some changes of my own. I did keep the K-Mod game speed scaling. Revolt probability increases (essentially) linearly with the percentage of foreign culture, as it does in BtS, but the strength of the culture garrison is now exponentiated. This means that doubling the garrison of a city more than doubles the protection against revolts, and a large stack of recent units can suppress any revolt. More specifically, the culture garrison strength (CGS) of each individual unit is reduced to two thirds, then taken to the power of 1.4, and the sum of these values is again taken to the power of 1.2.	Revolt probability increases superlinearly with the percentage of foreign culture, while garrison strength does not. There are some other mechanisms at work, but the effect is that sometimes, especially after conquest, no stack is large enough to keep a city from revolting. On the other hand, a medium-size stack is often enough to reduce the revolt probability nearly to 0, but not all the way. CGS values are set in XML to e.g. 3 for Warrior, 6 for Maceman and 9 for Rifleman (same in BtS). The total garrison stength of a city is the sum of these values.
Rationale	The K-Mod behavior is intended, i.e. it's not that karadoc hadn't considered flipping after conquest; see disussion here. I can see how keeping a city can be harder than conquering it in the first place, but not *that* much harder. Say, ten good units should generally suffice to hold on to a city. If this makes revolts easy to prevent late in the game – fine; it's mostly early expansion that needs to be paced. The near-0 probabilities in K-Mod are a really bad idea imo. Disastrous events with low probabilities are annoying, think of nuclear meltdowns (which are actually far less disastrous in K-Mod than in BtS). I'm doing the opposite by giving garrisons a superlinear effect, so that it's hopefully clearer whether a city is worth keeping and less up to chance.
Config	`REVOLT_TOTAL_CULTURE_MODIFIER` in `GlobalDefines_advc`.

AdvCiv	*BtS*
Revolt strength is reduced based on the highest tile culture of any civ, even if that civ doesn't have a nearby city. For example, when the owner of a city has almost no culture, say, 1%, and the only other nearby civ has some culture, but also not much, say 10%, the revolt probability is low or zero.	Only tile culture of nearby civs matters. The 10% in the example would lead to a high revolt probability because it's much more than the owner's 1%.
Rationale	Don't want to reward civs for just 10% (or so) culture, especially not uninvolved parties in wars. Also implausible that the 10% would find sufficient support for a revolt.
See also	A somewhat common issue because of 099 (culture of dead civs sticks around).

Revolt strength reduced if foreign tile culture isn't far higher than owner's tile culture. E.g. if foreign tile culture is just 25% greater than owner's culture, revolt strength is reduced to 25%. This makes revolts easy to suppress with one or a couple of units when the owner's tile culture is close to the foreign tile culture.	Revolt strength is increased by up to 100% if owner's tile culture is small, but high owner's culture can't reduce the base strength from population and surrounding tiles. Cities with up to 49% tile culture of the owner can still have a high revolt chance.
Rationale	Counterintuitive that a city could easily flip at nearly 50-50 tile culture. The change rewards the owner for building up culture, even if the owner hasn't (yet) reached parity.

City flipping after conquest enabled by default. (Actually, flipped the option to "No city flipping after conquest" and kept it disabled by default.)		The option is called "City flipping after conquest" and disabled by default.
Rationale	Part of my efforts to weaken military strategies. I want to build on the revolt mechanism, so it should be (fully) enabled by default.	
Reduced culture garrison strength of all mechanized units (Armored and Siege except Machine Gun) to 50% through the DLL.		E.g. Catapult has CGS 4, same as Axeman; Tank 12, same as Marine. Machine Gun 9, same as Rifleman.
Rationale	More flavorful, hopefully also more intuitive. One would assume Catapults to be less suitable for quelling revolts than Axemen or other infantry. It's asymmetrical warfare. This explanation also fits with early units having relatively high CGS. Important that Machine Guns are exempt because the AI uses these as standard city defenders.	
Tbd.	Consider giving Spy a positive CGS, possibly also recon units. Espionage should somehow help against revolts. ("Spread Culture" does in K-Mod, but needs to happen before conquering the city, which requires some foresight.)	
When a city flips while at war, the garrison is bumped. Only barbarian garrisons are killed.		The garrison is killed. Bumping only happens when flipping at peace-time.
Rationale	Killing a stack of units is pretty outlandish. Bumping barbarians would be unusual, and killing them is less problematic wrt. game balance. I guess they just lay down their arms.	
Credits	The issue had been pointed out (and narrowed down) by DarkLunaPhantom here.	
Added the number of prior revolts to the Nationality help text, and whether the city will flip on the next revolt.		Help text only shows the revolt probability.
All civs that know a city are notified about a revolt.		Only the actual owner and the cultural owner are notified.
Revolt probability (if > 0) shown on the main interface as part of the plot help text.		Need to enter city screen to see revolt probability; no way to see revolt probability of a foreign city.
Tbd.	In addition to the revolt alert (change 210b), the main interface should indicate when a city has a positive revolt chance (change 002f makes room for another indicator). An extra column on the Inland Advisor screen would be nice to have. May have to disable the notifications again if they turn out to happen too frequently (given change 099c) in large games. Revolt probability in visible foreign cities shouldn't be secret – all factors are public knowledge.	

Revolt probability is initially based on the current population of the city. If the city has ever had a higher population than currently, then, over the course of 75 turns (slightly longer or shorter on speed settings other than Normal), a gradually higher population is assumed, up to a maximum of the highest population ever. While there is hurry anger ("cruel oppression"), foreign culture strength is increased as if the city had 5 population more and the resulting foreign culture strength is increased by 50%. The AI doesn't use Slavery in cities that already have a positive revolt chance.	Always based on the highest-ever population of the city.
Culture in the eight adjacent tiles factors into foreign culture strength; the effect increases over time (same mechanism as above for population). After 50 turns (on Normal speed), culture strength is further increased when adjacent tiles are *owned* by the foreign civ.	Ownership of the adjacent tiles always counts, and can increase culture strength significantly. Culture points in those tiles don't count directly.

Rationale	I think the BtS rules are supposed to make cities flip faster once the adjacent tiles have flipped. Loss of tiles will often lead to population loss, which would normally reduce culture strength. I agree that cities enveloped by foreign culture should flip quickly, but I don't want conquered cities to be untenable, and I don't want players to feel compelled to continue their wars in order to push back foreign borders. My rules are supposed to give the conqueror time to build up some culture. That's all overly complicated (already in BtS), but hopefully players don't need to know the details. Slavery would be an easy way to get around anger from foreign culture, and to keep the population small, making the city easier to pacify.
Tbd.	Replace the Slavery civic with something else. The hurry ability distorts the game in many ways. When a tile is workable by only one city, then that city should get the tile regardless of culture. Once this is changed, the BtS rule about culture strength based on ownership of surrounding tiles will be pointless. Both of these changes will simplify the revolt rules a little.

102	Show fewer foreign moves
AdvCiv	*BtS*
"Show friendly moves" and "Show enemy moves" enabled by default.	Both disabled by default.
Rationale	Now that the biggest problems with these options are fixed, players should use them. Much better than having to inspect the map after every round of AI turns to find out which units have moved.
Config	`Civ4PlayerOptions.xml`

Tbd.	Changing the default doesn't have much of an effect because player options are read from `CivilizationIV.ini` unless it's a fresh installation. Could invert the options to "Don't show ...", but that's a little sneaky.
See also	108d shows a loading screen hint recommending the show-moves options

When a move starts in a visible plot and ends in an invisible plot, the camera is centered on the start plot and the player gets to see/ glimpse the unit moving out of sight. Not shown: Units that begin and end the turn in invisible tiles, i.e. move only through a visible tile.	Only moves ending in visible plots are shown. In the case of a multi-tile move ending in an invisible tile, not even the visible portion of the move is shown.
Rationale	Would make sense to show units moving through, but difficult to implement; can't catch the unit as it moves. What's easy to do is showing the empty traversed tile, but that's confusing, and it doesn't make sense that the player learns about the tile, but not the unit that moved. Better to not show those moves at all.
Tbd.	Often the unit moving out of sight is already gone when the camera jumps there. Not sure if this can be helped.

AI avoids patrolling within its own borders. Patrolling units tend to move in a consistent direction. Leads to wider patterns.	AI constantly patrols within its borders, especially with fast units like Knights. Patrol movement is memoryless; narrow patters.
Rationale	The patrols make "show enemy/friendly moves" unusable, and there isn't much of a point. After all, borders grant visibility. I guess patrols add some uncertainty to small-scale surprise attacks (can't be sure how many units exactly are going to be near a city at a given time) and could help against nukes. Well, anti-nuke AI behavior needs to be improved at a later point anyway.
Tbd.	I didn't disable inner-border patrols entirely because, in order to patrol unowned land, AI units may have to traverse owned land. Moving in one direction for a longer time also helps with that. That said, patrols in unowned land don't seem crucial either. Against barbarians, the guard-city-site AI routine is probably more effective. If there's too much or too little patrolling, I may have to find a cleaner solution.

Moves of non-hostile Workers, Missionaries and Executives within their owners' cultural borders are no longer shown when the "show friendly moves" option is enabled. As for non-hostile ships, moves of human ships and cargo ships are always shown (except AI ships on patrol), moves of other ships only when moving into sight, out of sight or inside the borders of the observing player.	All unit moves are shown.
Rationale	These land moves are practically never interesting. Even if Worker stealing weren't disabled (change 010), I doubt that seeing rival Worker moves would help. For ships, it's a bit trickier because a passing Caravel could matter (target for Privateer, or could be carrying a Spy), but mustn't show patrolling Destroyers. Cargo units that can carry city attackers need to be shown in any case. By not showing moves of cargo ships on patrol, I'm giving away some info about the intentions of the AI. That said, a single cargo is practically always a patrol, and patrolling AI Galleys are just too annoying to watch.

Config	`SHOW_FRIENDLY_WORKER_MOVES` and `SHOW_FRIENDLY_SEA_MOVES` in `GlobalDefines_advc`
Tbd.	Could be an issue for enemy moves as well when there is city visibility from espionage. So, should perhaps apply the change to enemy moves too.
Disabled the "top civs" pop up. ("Pliny the Elder has completed his great work: ...")	
Rationale	Interferes with shown moves. Also more of a beginner's feature, somewhat obsoleted by the Statistics screen and usually misleading. I doubt anyone not reading this will notice that it's gone.
Config	`SHOW_TOP_CIVS` in `GlobalDefines_advc`
Tbd.	The map-centering effect (Calendar, Stonehenge) is also annoying, but rare enough to tolerate I guess. Moving it to the beginning of turn turned out to be nontrivial.
~~Related: Fixed a bug that caused AI non-combat units to oscillate between safe cities when at war. See change 001.~~ (Also fixed in K-Mod 1.45, now using the K-Mod fix.)	
~~"show friendly moves" can be toggled using Shift + M. If the option is toggled this way, the change won't be visible in the Options menu, and won't be saved upon leaving the game.~~ (Disabled through a switch in `GlobalDefines_advc`. Turned out I had never used this.)	

103	Spy unit can investigate cities	
AdvCiv	*BtS*	*Vanilla/Warlords*
A player can investigate a rival city if that player has a Spy unit in that city, and that unit hasn't moved this turn. (Can still investigate cities through passively accumulated espionage points as well.) Great Spy can also investigate.	Can only investigate rival cities by accumulating espionage points. That said, the "Sabotage Building" and "Sabotage Production" missions (and the cost of these missions) give away some information. Not even Great Spy can investigate.	A local spy unit allows city investigation regardless of whether it has moved. City religion can also grant visibility. No visibility from espionage points. No Great Spy unit.
Rationale	To make Spies more useful for players that don't invest heavily in espionage. Also, constructing wonders is more fun when you can find out who else is in the race. Players don't spend thousands of espionage points just to find out if someone is currently building a wonder; will rather resort to guesses based on mission costs for "Sabotage Production", which is a bit of a loophole. Perhaps investigation was a bit too easy in Vanilla/WL; I'm adding the restriction that the Spy mustn't have moved, which should make quite a difference when hopping from city to city to keep an eye on all of them. BtS increases the overall risk of Spies getting caught.	
Config	Can be reverted to BtS in `Civ4UnitInfos.xml`.	
Tbd.	Would be nice to have an "Investigate" button in the "Perform Espionage Mission" list. Clicking the button would simply open the city screen.	

	Should perhaps disable the per-city mission cost preview on the Espionage screen entirely in order to prevent abuse.

104	UWAI: See chapter Utility-Based War AI Most of the changes are in newly created classes. I've added a few auxiliary functions in pre-existing classes too. Technical documentation only inline. There are also some changes in unlikely places, which I've marked with the following sub-ids.
Config	By checking "Aggressive AI (K-Mod)" on the Custom Game screen, UWAI can be disabled. Can also disable it through XML; see instructions under Known Issues. UWAI settings in `AI_Variables_GlobalDefines.xml`.
104b	Code for measuring path lengths between cities. Also a now unused hack for measuring path lengths of units (see `CvUnit::measuringDistance`).
104c	AI avoids military victory strategies in order to spare friends

AdvCiv/ UWAI	*BBAI/ K-Mod*
When weighing its victory strategies, the AI considers whether a military victory (esp. conquest) will require an attack on a friend. If so, the AI will pursue different strategies instead.	The AI doesn't take friendships into account when choosing victory strategies.
If the AI still comes close to a military victory, it may ultimately attack friends, depending on the specific circumstances.	Once stage 4 out of 4 of a military strategy is reached, the AI ignores attitude when it comes to war targets.

Rationale	See the UWAI chapter. Victory strategies aren't within the scope of UWAI, but, in this case, the strategy weights need to be aligned with the DoW policy.
Config	Only effective if UWAI is enabled.
See also	115: AI commitment to victory strategies
104d	Added a function that evaluates holy cities, shrines and corp. HQ, replacing the (overlapping) code in the `targetCityVal` and `cityTradeVal` functions.
104e	Halved military power values of ships through the DLL. Reduced military power (not combat str.) of Maceman from 9 to 8; Samurai at 9 (no change) and Berserker at 9 (was 10); through XML.
Rationale	UWAI handles naval and land power separately, so the power of ships relative to land units doesn't matter. But the K-Mod AI uses a single power rating, and, considering that ships are only useful in certain situations, ships contribute too much power. Also, even if UWAI is enabled, some strategic AI choices are based on a single power rating, and the Statistics screen shows only one rating as well. High power of Maceman makes UWAI overestimate Maceman when predicting military build-up; appears as a better offensive unit than Grenadier. The bonus against melee isn't that useful for this type of unit at that point of the game (whereas 7 power for Crossbowman seems OK). UWAI (if enabled) increases the power values of all offensive units that can receive city raider promotions; this gives Maceman another boost.
104f	More narrow conditions for Dagger strategy

No Dagger while in a chosen war; Dagger disabled entirely when UWAI is enabled.	Having started a war doesn't affect Dagger.

Rationale	Staying in the Dagger strategy while at war doesn't make much of a difference for the K-Mod AI, but it gets in the way of my UWAI testing (UWAI running in the background while K-Mod decides). Not sure what the Dagger strategy was supposed to be good for; added in BtS and changed quite a bit in BBAI/K-Mod. Probably for building up units without having a war plan, and thus also without giving away war preparations through WHEOOHRN; then a sudden strike. UWAI solves this problem differently.
104g	Don't demand tribute from unreachable civs (implemented based on UWAI code)
104h	Moved the BtS and K-Mod code for negotiation of peace terms into a separate function, and made some minor functional changes too (that also take effect when UWAI is disabled).
104i	Changes to the way that the AI responds to peace offers. `MEMORY_STOPPED_TRADING_RECENT` is used for distinguishing a DoW on request of a third party or through a defensive pact (DP) from a normal DoW.
	When a DP leads to a DoW, then stopped-trading-recent memory is added for all inolved parties, not just those that join the war through the DP.
Rationale	Otherwise, the target of the original attack would be free to negotiate peace, while the allies that declared war because of the DP would be forced to continue the war.
104j	Change in a master AI's war plans affects war plans of its vassals
104k	Moved rounding of trade values into an auxiliary function (no functional change)
104l	Caching of war utility to keep the user interface fully responsive when checking if a civ is willing to talk or willing to trade certain items. No functional change outside UWAI, but had to put some code to switch caching on and off into `CvDLLWidgetData.cpp`.
104m	Handling of tribute demands redirected to UWAI; fewer random AI requests and faster decay of AI memory about human response to tribute demands (only if UWAI enabled). On Noble difficulty and higher, regardless of whether UWAI is enabled, the AI only makes tribute demands with a significant trade value; e.g. won't just ask for a food resource or some small sum of gold.
104n	Diplo votes
104o	Handling of sponsored wars and vassal treaties when UWAI enabled
104p	Target size for invasion stacks based on difficulty (even when UWAI is disabled).
Rationale	Except on high difficulty settings, the AI often took too long to get invasions started after finishing preparations.
104q	Changed some K-Mod uses of `WarPlanStateCounter` to `AtWarCounter`
104r	Handling of empire split
104s	Treat faraway land targets as only reachable by sea if UWAI enabled.
104t	Handling of team changes: Permanent Alliances and elimination of a team member
104x	Loading of AI-related parameters from `AI_Variables_GlobalDefines.xml`

105	AI relies less on `getAnyWarPlanCount`
AdvCiv	*BtS*
Replaced most calls of `getAnyWarPlanCount` and some of `getAtWarCount` with a new	

function `isFocusWar` that ignores wars that are probably not worth focusing on. Found values are unaffected by at-war status. (Other parts of the AI code already take care of overexpansion and Settlers not walking into war zones.)	The AI assigns lower utilities (found values) to settlement spots when at war, to the point that AI civs practically don't expand while at war.
Rationale	Just being at war doesn't imply that the AI needs to build up units or switch to wartime civics. It could be that the war enemy can't even reach the AI civ, or has just one city left, is hopelessly backwards etc. In particular, don't want human players to declare meaningless wars in order to hamper the economical development of an AI civ.
The AI makes no tribute demands when busy with a war. (Only relevant when UWAI disabled; with UWAI, such demands are possible.)	The AI disregards its ongoing wars when demanding tribute; only checks if its own military power is greater than the target's defensive power (i.e. including vassals and allies from Defensive Pacts).
Rationale	Looks like an oversight. Would be better to add up the target's power and that of the current war enemies, but that gets too complicated to implement.

106	Avoid screen getting flooded with messages
See also	004f disables celebrations
Tbd.	Almost all messages about random events are irrelevant, but the events themselves are awfully designed as well. I'd like to disable random events by default, and, rarely, fire an event from a handful of interesting (but balanced) events even if events are disabled.
AdvCiv	*BtS*
No message when autosaving	Autosaving message at end of human turn
Rationale	Players who rely on autosave tend to set narrow intervals via `CivilizationIV.ini`, which makes the frequent messages disruptive. Autosave is known to be reliable; no need to report success.
Config	`TXT_KEY_AUTOSAVING` in `Civ4GameText_advc`
Only GP births of known civs are reported. The city owner is stated if the city isn't revealed, e.g. "in the Incan Empire".	All GP births are reported; "in a faraway land" if the city is unrevealed.
Finished wonders are always reported (no change); the city is stated if revealed.	Message says "faraway" when the city isn't revealed. If the owner is known, it is listed on the Statistics Screen. The message never states the city, but highlights it on the map.
No change to the way religions and corps are reported.	When a religion or corp. is founded, if the holy/ HQ city is unrevealed but the city owner known, report only "faraway".

Rationale	Gotta kill some messages. This one is implausible (how do you learn about GPs on an undiscovered continent?), and doesn't have great strategic value. "In the Incan Empire" is extra information. Reporting "faraway" (as in BtS) is misleading in this case. Not reporting them at all would also be bad. Should either report all GP births of a civ or none. The crucial info is how many GPs a rival civ produces, and not so much which GPs specifically. Wonders: just to be consistent.	
AdvCiv		*BUG/ Civ4lerts*
No more BUG alerts about civs no longer willing to trade a resource.		The alert about resource trades triggers whenever the set of resources offered by a rival changes from one turn to the next.
Rationale	It's a helpful alert, but fires too often. Typically, the willing-to-trade part is more important. The player then either trades for the resource or decides not to. In the latter case, it's not immediately helpful to know that it's no longer available.	
Tbd.	The same reasoning can be applied to the tech trade alert, though techs seem to become unavailable less frequently. Unavailable techs and resources hint at inter-AI trades and/ or changes in AI attitude. The proper solution is to implement a new alert for AI attitude changes and one for inter-AI trades. Will probably still need the "no longer willing" alert because the AI could also have started building a wonder.	
Random events excluded from the replay log.		
Rationale	Most of them are unimportant, and they make replays difficult to follow.	
106b	Message limit	
AdvCiv		*BtS*

If more than 3 messages are waiting at the beginning of turn, don't display them on the main interface; open the Event Log instead. Exception: Messages about most major events are always displayed on the main interface. The following major events are *not* shown on the main interface when the Turn Log is opened: • tech discovered • civics changed • Golden Age begun • GP born in own civilization • city founded • city liberated • foreign city flipped • city captured/ razed • wonder built Also not shown, and now only a minor event: when a religion or corp spreads in a city, birth of a foreign GP. Also open the Event Log when there are 1 or 2 messages along with a diplo popup. In Hotseat, always open the Event Log when there is a new message.	No limit on the number of messages. The Event Log is only ever shown when the player opens it. Major events are kept in the Turn Log indefinitely, whereas minor events are cleared after 20 turns and info messages after 2 turns. The following events are major: War started/ ended, alliance formed, defensive pact signed, capitulation/ vassal agreement signed/ broken, tech discovered, first to discover Liberalism, circumnavigation, wonder/ team project built, city founded, civics or state religion changed, revolution started/ ended, Legendary culture reached, religion or corp founded, city religion/ corp spread or removed, city liberated/ flipped, game won, GW sustainability reached (K-Mod), vote source established (UN, AP), city captured/ razed, Golden Age begun/ ended, civ conquered, GP born/ GG killed, empire split, spaceship launched/ failed, nuke. The Event Log button becomes inaccessible when a diplo popup opens (hotkey also blocked). On-screen messages are cleared in between turns, including those that haven't been displayed yet. This means that a player who follows another human in the turn order misses most messages.
Rationale	The main interface really isn't suitable for displaying frequent messages. It's obtrusive; the display delays add up; messages can disappear too fast. My limit guarantees that after waiting for 3 messages, no further messages can arrive. When a diplo popup opens, any messages on the main interface become difficult to read, so it's important to provide access to the Event Log. The player should be able to learn what happened during the AI turns before making any decisions. Major events on the main interface: These can easily get buried and missed in the Turn Log because they occur already during opponent's turns. Especially when playing without sound. The ones that I've excluded are either not that important or there is some additional mechanism that alerts the player (e.g. tech splash screen when a tech is discovered). Religions are spread all the time; that's not a major event at all.
Config	`START_OF_TURN_MESSAGE_LIMIT` in `GlobalDefines_advc`
Tbd.	Could repair message delivery in Hotseat; opening the Event Log is only a workaround solution. Would have to store messages within the DLL when they are triggered, and call `CvDLLInterfaceIBase::addMessage` only at the start of the recipient's turn. Can also rewrite that function in the DLL if necessary; probably just wraps data into a `CvTalkingHeadMessage` object and calls `showMessage`.

All messages are cleared from the main interface at end of turn. Any messages still queued for display are flushed before that (i.e. cleared without having been on display).		Once displayed, messages only disappear when they've been on display for the proper amount of time (depends on message type). When a human player's turn ends, all messages still waiting to be shown to that player are displayed at once (delay skipped).
Rationale	When turns are ended in quick succession, in BtS, messages from different turns get displayed together, which can be confusing. Dropping messages without ever displaying them isn't much of a problem anymore because the Event Log tends to open periodically and the missed messages are in there.	
106c	No more alerts upon loading savegame	
AdvCiv		*BUG*
The BUGEventManager fires `BeginActivePlayerTurn` only right after the previous turn ends, not when loading a savegame. Consequently, alerts aren't checked (and aren't displayed) when loading a savegame. Alerts have the same display duration as normal events: 10 seconds.		`BeginActivePlayerTurn` fires after the end of the previous turn, and when loading a savegame. Alerts are checked after loading. Since Civ4lerts doesn't store data in savegames, the alerts assume a blank slate, and display a bunch of messages, e.g. for all technologies that anyone is willing to trade. Alerts are displayed for 20 seconds.
Rationale	Arguably a bug. `BeginActivePlayerTurn` shouldn't fire multiple times per turn, but that's what happens whenever a savegame is loaded. Listing all trades upon loading can't be considered a feature either. That info is presented in a better way by the Foreign Advisor.	
Tbd.	BUG alerts break when Python scripts are reloaded during a game. Error message: "Error in BeginActivePlayerTurn event handler." There is also other BUG code that breaks when reloading scripts, in particular, code relating to the field-of-view slider. Doesn't crash the game, but will have to exit and restart in order to receive BUG alerts again.	
106d	Civ4lerts and Scoreboard default settings changed	
AdvCiv		*K-Mod*
Enabled some alerts by default, namely Worst Enemy and all those from the second batch ("MoreCiv4lerts") except domination and map trade.		K-Mod disables all alerts by default (whereas standalone BUG enables them all).
Rationale	The ones I've enabled are essential for intermediate players, whereas domination and the first batch of alerts (city management and trade gold) are only essential for perfectionists.	
Config	Through the in-game BUG menu	
Changed the Advanced Leaderboard default layout so that open borders (B), espionage advantage (E), defensive pacts (D), trade network (N) and whether they have any vassals (V) aren't displayed.		

Rationale	Frees up space on the main interface, and I find it difficult to imagine that players can't remember whom they have these relations with. I've never even learned how the espionage icon is supposed to be helpful. The vassal indicator is redundant when "Group Vassals" is checked (as is the case by the K-Mod default).
Config	The in-game BUG menu contains a formatting string. See above for the letters I've removed (B, E, D, N, V).
See also	004v also makes changes to the scoreboard.
106e	Report all religion and corp changes

Show a message whenever a religion or corp spreads in a revealed city. When a corp spreads in a city that isn't revealed to the HQ owner, the city becomes revealed to the HQ owner.	Message only shown to city owner and to players that have the religion as their state religion or own the holy city (in the case of religion spread) or to players that own the HQ (corp spread). HQ owner may receive messages about unrevealed cities.
Rationale	As for reducing the number of messages, this is obviously counterproductive; can be important though.

107	Fewer AI defenders
See also	023 can add some defenders when there is a revolt chance. 017 builds fewer military units overall when there are already a lot. 022 Changes the computation of AI paranoia, which also affects garrison sizes.
Tbd.	Perhaps base the target number of floating defenders on the difficulty setting (cf. 250a). Currently, on e.g. Noble, inter-AI wars are usually inconclusive because the relatively few units that the AI manages to train are mostly used for defense. On Immortal and Deity, inter-AI wars are perhaps too quickly decided. Also, given the immense AI resources on Immortal and Deity, it might be smarter to train more floating defenders than on the lower difficulty settings. Then again, aggressiveness increasing with the difficulty settings is, in principle, a nice property. Some code written, but not used (archived).

AdvCiv	*BtS*
When at war and on the defensive, floating defenders are now assigned like under the Alert1 strategy. The AI is more willing to mount a counter-offensive (offensive Area AI), even when a war is no longer recent, and war success has been poor. (War success is still considered though.) The AI personality slightly factors into the choice between defensive and offensive Area AI. `LimitedWarPowerRatio` is used as input.	Floating defenders in defensive wars are assigned as under Alert2. Once an enemy DoW is no longer considered recent, the AI relies on its war success rating for selecting its stance (offensive or defensive Area AI).

Rationale	Need to counterattack more. Shouldn't rely much on war success even in long-ish wars; successes from an initial surprise attack can give a wrong impression (see also 130r under *Tbd.*). Just sitting there isn't the most effective tactic (unless the power ratio is highly unfavorable), and it's also boring to play against. Risky counteroffensives seem out of character for some leaders, and very much in character for others; hence the leader personality factor. Use `LimitedWarPowerRatio` because counteroffensives should have limited objectives.
See also	104p reduces the stack size required for launching an attack

AdvCiv	*BBAI*
An AI civ following the "Turtle" strategy stops building defenders when their number exceeds a threshold.	Turtling AI civs keep building defenders until they can make peace or the power ratio shifts in their favor.
Rationale	A turtling civ can't recover economically from building Archers for 50 turns.

AdvCiv	*BtS*
AI doesn't try to guard non-city tiles when a war starts looking hopeless.	Nothing to prevent guarding of resources or Forts. Not sure if an urgent need for defenders elsewhere can cause the AI to stop guarding non-city tiles.
Rationale	If they're strategic resources, it could actually be crucial to keep them, but I don't think that's generally feasible when the AI gets beaten badly. Generally more useful to guard the cities then.
Reduced impact of space victory stage 3 on city defenders.	Extra defenders in capital and all cities building spaceship parts.
Rationale	Space victory is a lengthy process, and stage 3 begins with the completion of Apollo. Doesn't usually mean that the AI just needs to survive in order to win.
When the AI computes the (spacial) closeness between two civs, cities on different continents are considered to be less close to each other.	Cities on different continents are generally considered to be closer to each other than those on the same continent. Closeness mostly affects the distribution of AI defenders, the Alert strategy, raze decisions and the price of sponsored war.
Rationale	Arguably an oversight by Soren Johnson (or whoever wrote the PlayerCloseness code). The intention was probably to use a wider search range for cities on other continents, not to treat them as being nearer.
See also	In some situations, the impact of land connection is further increased: 104o: WHEOOHRN when already fighting a war (currently disabled) 022: Alert strategy
More floating defenders on the highest three difficulty settings, fewer on low difficulty.	Difficulty affects how many units the AI manages to train (in particular through the AITrainPercent modifier), but the target defender counts are the same for all difficulty settings.

Rationale	There's very little war on low difficulty settings because the AI only manages to build enough units for defense. It's good that the low-difficulty AI is less aggressive, but it can't just sit there all game. Fewer defenders also make it easier for human players to wage war. Conversely (and more importantly), the high-level AI trains so many units that it can afford some more defenders.

108	Reduced starting plot normalization	
See also	027 is concerned with the selection of starting plots.	
AdvCiv		*BtS*
When placing extra bonus resources (`placeExtras`) in a singleplayer game, the game tries to make the worst starting plot at least 70% as good as the best (in terms of found value). No change for multiplayer.		Tries to make the lowest found value at least 80% of the best.
Transforms most, but not all, bad terrain (Tundra), bad features (Jungle) and mountain peaks around starting plots. Ice is always cleared. In multiplayer, all peaks are cleared, too, and almost all bad terrain and features. A freshwater source is still guaranteed (no change).		Ensures that all land plots around starting plots are decent plots.
Rationale	The player handicap makes the human starting plot match the desired difficulty; e.g. Settler puts the human civ into one of the best available starting plots, and Deity in one of the worst. Therefore, equal starting conditions aren't crucial in singleplayer. More unequal starts probably make games on Prince upward more challenging, which I don't mind. Low-difficulty games hopefully get a bit more dynamic in terms of warfare due to some AI civs having (much) worse starts than others. Removing all bad plots makes the starting region look unnatural. A few bad plots give a start more character and provide more variety. Reduced normalization also leads to weaker starting plots overall, which should reduce the importance of capitals a bit. Very powerful capitals reward early warfare too much, and make wars generally too much about taking the capital.	
Config	Several parameters in `GlobalDefines_advc`; can restore BtS normalization too. Selecting "Balanced" in the Custom Game screen only affects the map generation before normalization; it does not enable BtS normalization. I wish it did, but once the map has been generated, there is no way to tell if the Balanced option was set.	
See also	129 makes starts with multiple Gold or Gem resources less likely.	
The city cross around the starting plot is revealed when the game starts.		No plots are revealed other than those that the starting units can see.
In singleplayer games, initially hidden resources are disregarded when choosing starting plots. Hidden resources are no more likely to occur around the starting plot than anywhere else. (Less likely, in a way, because Horse, Copper and Iron can't be on riverside.)		As far as I can tell, yields from all hidden resources are fully factored into the found value when choosing starting plots. Only their strategic value is discounted. A poor starting plot can hint at a hidden resource in the surrounding city cross.

Rationale	Makes it more attractive to move the starting Settler. Don't want players to settle blindly and hope for the best (or regen) when a starting plot looks poor. When all city-cross tiles are revealed upfront, and hidden resources are unlikely, there isn't much to hope for. Can accept the starting plot for what it is or go find a better one. It can't be rationalized historically that a poor starting plot hints at hidden resources. It seems that BtS and K-Mod don't even take into account in which era a resource is going to be revealed, i.e. Coal would be valued about as highly as Copper. This needed to be fixed one way or another. The flip side is that AdvCiv can theoretically produce very strong starting plots because `addExtras` is unaware of hidden resources. That's something to keep an eye on. Could also simply remove any initially hidden resources near start locations.
Config	`START_SIGHT_RANGE` in `GlobalDefines_advc`
Tbd.	I've tried to let the AI to move its starting Settler, but the `CvUnitAI` is very bad at it, e.g. wants to escort the Settler, and moves erratically when no escort is available (Scout start). Fuyu and Afforess have written some code for Better BUG AI, but it only chooses from among known sites, i.e. doesn't cover exploration. Haven't merged it for that reason.

Resources added during normalization can't result in more than 3 seafood; more than 2 unlikely.	More than 3 coastal food ruled out, and more than 3 ocean food ruled out, but both taken together practically unlimited (up to 6).
Rationale	Cities with more than 2 seafood grow unrealistically fast; doesn't play well either. This happens too often.
AdvCiv	*K-Mod*
~~Only 3 "food points" guaranteed near each starting plot. One Plains Cow and one Flood Plains would do. Multiplayer: 4 food pts.~~	~~At least 5 food pts. guaranteed.~~ ~~(Each resource that can provide 4 or more food is worth 3 points, the others, i.e. Plains Cow, only 2 points. Flood Plains count as 1 each, but at most 2 in total.)~~
Rationale	~~K-Mod wants to rule out dry-ish starts with a Plains Cow as the only food resource. BtS allows such starts; I think even a Plains Cow and no Flood Plains is possible in BtS. That's indeed very dry. However, one or two Flood Plains and a Plains Cow are OK with me for singleplayer.~~ (Disabled this change in v0.88 – I hadn't realized that Grassland also counts as 1 food point; the K-Mod code is actually fine.)
Tbd.	When I get around to XML balance changes, I intend to reduce the food yield of improved Pig and Fish by one. Should make starts with overabundant food less common.

If the difficulty sets `StartingLocPercent` to 100 (Deity: 90), then the human players receive the worst starting plots.	Human players only ever receive the second worst starting plot.
Rationale	Could be a bug. Or the developers didn't trust their starting plot heuristic and worried about players getting unplayable starts. This shouldn't be an issue with K-Mod (rewrites the starting plot heuristic).

109	AI improvements for isolated starts

AdvCiv	*K-Mod*
AI civs that haven't met any rival by the second era focus more on science, and less on the flavor values set in LeaderHead XML until they meet a rival. Isolated AI civs are reluctant to pursue a culture victory.	Optics is prioritized when isolated, but not science in general.
Adopt the "Economy Focus" strategy when alone, or when no threatening civ is known.	AI civs that haven't met anyone adopt Economy Focus, but probably doesn't happen reliably when there are friendly or faraway neighbors. Economy Focus (a BBAI-introduced strategy) reduces the production of military units.
Rationale	All naval technologies have a science flavor, and faster research will reach Optics faster.
See also	130n delays penalties from different religion. 130p decouples enemy-trade penalties from the has-met counter. Both should make it easier to find partners abroad.

110	Changes to AI military build-up
AdvCiv	*K-Mod*
Increased the target commerce surplus for research in the early eras of the game. E.g. 65% in Classical, 45% in renaissance. (If the target isn't met, the AI is reluctant to build more units.) The AI can still build a lot of early units on high difficulty settings because of AI discounts on all upkeep costs, and because the target surplus can be lowered further when at war or preparing for war.	35% regardless of era.
Rationale	A low research slider position is more worrying in the early game.
Reduced the base yield weight for production to 225% (relative to Commerce) and food to 275%. Gradually decrease the weight of food during the second half of the game (to just 215% in the year 2050), unless aiming for a diplo victory (see 115b).	270% and 300% respectively.
Rationale	Food adjusted to the reduced use of Slavery (change 121). Still high, but that's OK – the AI is better at growing cities than at choosing sensible tech or city production. Would make sense to increase the production weight when Slavery is used less, but 270% was way too high, and resulted in post-Chemistry Workshop spam (without supporting civics) and Forts on worked Silk Forests. Huge outdated AI armies don't exactly make the game enjoyable either. In the lategame, it doesn't normally make sense to grow cities further. I'm still giving food a fairly high weight because the AI should only avoid growth, not actually shrink cities (leave that to human players who know what they're doing). There's also plenty of scattered AI code that affects AI city management when near victory conditions; I haven't carefully looked at this, but probably already prioritizes e.g. production for spaceship parts, and may even avoid growth.

111	Units in neutral tiles prevent pillaging

AdvCiv	*BtS*
Can't pillage on unowned tiles that contain a (non-Spy) unit of a different team.	No special restrictions for pillaging unowned tiles. Can, in particular, pillage roads in order to slow down another civ's units.

Rationale	Not an important change. Yanking out roads from under other civ's stacks is pretty bizarre, and occasionally exploitable. To be more consistent, I've disallowed any pillaging in the presence of foreign units.

112	AI changes for voluntary vassal agreements (VVA ; "peace vassalage")
Tbd.	The VVA code was already messy in K-Mod, and it's worse now. Should be rewritten based on a utility value that replaces the dozens of exclusive clauses.

AdvCiv	*K-Mod*
AI lowers its VVA attitude threshold (Friendly or Pleased for most leaders) only when feeling powerless (as in BtS) *and* acutely threatened, particularly when in a losing war against a third party.	AI lowers its attitude threshold when it is among those civs with the least military power.
A civ that has at least one Defensive Pact and is not at war with anyone refuses to sign a VVA. No leader is willing to sign a VVA when Cautious and not threatened. Leaders that have their threshold set to Cautious in XML are instead a bit more willing to lower their threshold when threatened.	Defensive Pacts don't matter for VVA decisions. Once a VVA is signed, Defensive Pacts of the vassal get canceled. E.g. Frederick signs a VVA at Cautious.

Rationale	VVA happen too quickly in K-Mod, probably also owing to increased military budgets. The idea that civs without prospects for winning the game should become vassals asap comes from Warlords though. Perhaps they're supposed to catch up under the protection of their master, and then break free again, but it rarely works this way. The AI should certainly prefer independent survival over becoming a vassal and helping another civ win.
See also	133 cancels tribute deals once vassalage ends 143 adds recently-canceled memory for vassal agreement

AdvCiv	*BtS*
"Grown-too-powerful" restriction removed.	AI leaders refuse to sign VVAs when the would-be master gets close to a military victory: "You've grown too powerful for us."

Rationale	As indicated by the weird explanation text, the restriction is difficult to rationalize. It isn't effective either; just prolongs the inevitable.

"Your land is too far away" rules out vassal agreements only until the Industrial era. If the prospective master is in the Industrial era or later, its power rating is decreased when not sharing a continent with the vassal, but a vassal agreement is possible.		The AI refuses to become the vassal of any civ that it doesn't share a continent with.
Rationale	Oversea vassals (not just colonies) were pretty common in the Imperial Age. Not sure if this is good for gameplay; worth a try.	
Master refuses to accept vassal who's population is much smaller unless aiming for Conquest victory or liking the vassal.		Only considers refusal when acceptance means war.
Rationale	Peace vassals are fickle and may lead to wars with third parties. Not worth the hassle unless they bring a considerable economical value.	
When deciding whether a vassal breaks free, the territory of the vassal is treated as at least 10 tiles. Thus, a vassal that has fewer than 15 tiles left when becoming a vassal can only break free by gaining land, not by losing land.		A capitulated vassal with, say, 12 tiles initially gets to break free after losing 6 tiles (from war or culture pressure). Voluntary vassals don't care if they lose tiles.
Rationale	Through change 143 (cancelation of voluntary vassal agreements), vassals with very little territory left can end up changing hands a lot.	
Civs that are at stage 3 or 4 of any victory strategy refuse to sign vassal agreements, and break free if they can: "We'd rather win the game". The leader of AP or UN also refuses/ breaks free.		Civs that are close to domination victory refuse to become vassals (such civs will normally also be way too powerful to accept, so this is pretty pointless). In K-Mod, civs refuse to accept vassals at stage 3 or 4 of Culture or Space victory ("Surely, you must be joking"); may also cancel the agreement. Diplo victory not covered.
Rationale	Don't want a civ to win the game while hiding behind a master, especially not a human master who can't cancel the agreement. Important to let the vassal refuse (not the master) because the master could be human.	
See also	115 prevents civs with too little production capacity from pursuing a space victory, which is important for this change: Advanced civs might otherwise refuse to ever capitulate once they have the Apollo Project. 143b prevents vassals from having nukes. 014 prevents capitulated vassals from pursuing victory strategies.	
An independent colony can break free if its power is at least 80% of its master's power.		Only attitude can cause an independent colony to break away. And since the +10 "granted us independence" bonus doesn't decay, this happens practically never.
Rationale	A War of Independence should at least be a possibility.	
See also	130r causes "granted us independence" memory to decay.	
An AI civ ready to become a vassal contacts the prospective master only with a per-turn probability. The probability is based on the scoreboard rank of the master – between 1 in 20 if the master is ranked in the middle of the scoreboard, and 1 in 40 if the master is at the top. Increased by 400% if at war with anyone.		The same contact-delay is used for vassal agreements as for permanent alliances, but this only affects offers to human players. There is only a 1 in 80 chance of implementing a permanent alliance, but no such probability for voluntary vassal agreements; they're checked each turn and directly implemented.

Rationale	It's possible that the Warlords developers had meant to use the permanent alliance probability also for vassal agreements and misplaced a closing curly brace. Be that as it may, civs are too quick to sign vassal agreements when their power ratio takes a dip, which doesn't only happen in defensive wars, but also when an AI focuses on its economy (AI strategies Economy Focus or Get Better Units) or after an unsuccessful aggressive war. The change only affects AI-AI vassal agreements. Could also implement it in a way that makes civs more reluctant to become vassals of human civs, but that's a bit more work, and I think it's still difficult enough for humans to obtain AI vassals because humans can't generally afford large enough armies to impress the AI. Probability based on rank should reduce snowball effects.

112b	AI changes to surrender decision	
See also	123d blocks an exploit where cities gifted to a war ally can lead to faster capitulation.	
AdvCiv		*K-Mod*
AI civ doesn't surrender unless there are numerous enemy units in its territory on an important landmass (or having been nuked). Also refuses to surrender If 30% or more of the civ's population are on a landmass with few enemy units.		Enemy positions matter for peace treaties, but surrender is only a matter of power and war success.
Response is "You'll have to take it from our cold, dead hands" if denied.		That response isn't used anymore at all. BtS used it for cities that the AI didn't want to trade.
Rationale	Let the enemy demonstrate that they can reach our important cities before capitulating.	
Don't surrender while there are units en route to the master's territory.		This is checked before signing peace treaties, but not when considering surrender.
If a war enemy is the worst enemy of an AI civ and the attitude toward that enemy is Furious, the enemy's power is treated as 10% lower than it actually is. I.e. the enemy needs slightly more power in order to achieve capitulation.		The worst enemy's power is treated as 25% lower regardless of attitude.
Rationale	Should perhaps disable this power adjustment entirely. It makes some sense flavorwise, but makes capitulation easier to achieve when the winning side already has a much larger army when the war starts; otherwise, it'll take time to get the upper hand, and "This war spoils our relationship" will typically lead to a Furious attitude. From a human pov, it's annoying if the AI won't capitulate when a war has already become tiresome.	
Tbd.	Attitude could play a bigger role when there is more than one powerful war enemy.	

When considering capitulation, the power modifier based on war success is applied to the vassal's power, meaning that war success matters not just for the vassal-master power ratio, but when comparing the vassal's power with the average power of other civs.	The master's power is modified based war success, and therefore only matters when comparing the vassal's power with that of the master.
A civ refuses to capitulate unless its power rating is at most 76% of the global average power rating.	The threshold is 80%.
The impact of war success on capitulation is reduced a bit overall. Can reduce the vassal's power by at most 45%.	Can increase the master's power by up to 100%.
Rationale	Perhaps the average power shouldn't matter at all for capitulation. Now matters less when the master's war success is high.

113	AI builds more Workers
AdvCiv	*BtS*
The City AI prioritizes Workers until the total number of needed Workers is reached.	Workers prioritized only when there are far too few of them; otherwise, any decent building takes precedence.
Increased the total estimated workload for Workers by 25%. Forests to be chopped are included in the estimate.	Workload is estimated based on unimproved worked tiles. Chopping opportunities aren't considered.
Rationale	The BtS/K-Mod AI tends to train 1 Worker per city, which is about right for an experienced human player, but the AI is far worse than such a player at scheduling its Workers, so 1/city isn't nearly enough. If Workers are everywhere, scheduling is much less of an issue. Also note that the AI generally isn't good at choosing city production. Can't go too wrong with a Worker (unless there are evidently too many already). Should be about 1.5/city now. (Also a matter of traits, leader personality, coastal cities ... so it varies a lot.) The 25% extra workload are for future jobs. The BtS computation accounts only for current (urgent) jobs, and thus lags behind the real demand. The biggest improvement, though, is that AI cities now actually build the needed Workers.
Config	`WORKER-RESERVE_PERCENT` in `GlobalDefines_advc`
Tbd.	Should train Workers ahead of time, based on Settlers ready or in city queues, available city sites and tech like Calendar or Railroad currently researched. Jungle should also somehow factor in. Fuyu has tried to get the AI to build more Workers as well. His code seems more sophisticated than mine. Should perhaps merge the parts in his `CvCityAI.cpp` marked with "Build more Workers" (also "Worker Counting"?).
See also	117: AI chopping; 121: Forts
AI cities receive more Workers for local jobs.	A rather large portion of Workers gets assigned to no city and builds "territory" roads.

Rationale	Territory roads aren't that useful; better to improve tiles around a city before they're actually worked. Once a citizen is assigned to an unimproved tile, the AI will send a Worker, but it may take some 10 turns until the tile is actually improved. Better to do it ahead of time.

114	Changes to AI attack courage	
114a	Breaking sea blockades	
AdvCiv		*BBAI*
AI willing to break a sea blockade using inferior ships. Will attack at near-0 odds if the defenders are sufficiently outnumbered.		AI keeps building e.g. Triremes, but never dares to attack even a single Privateer. (Not sure if it would attack with Caravels.)
Rationale	Known issue in BBAI, not fixed by K-Mod. I've also posted about this on CFC, but the code I posted there is now outdated; doesn't fully solve the problem.	
Tbd.	Would probably be smarter to stop building primitive ships, and wait for better tech. Also dubious that there is dedicated code for breaking blockades – why should the normal AI behavior for stack combat be inadequate for this?	
114b	Attacks on valuable units at poor odds	
AdvCiv		*K-Mod/ Lead From Behind*
Changed the attack courage computation so that the cost of the involved units is given less weight when the odds are onesided.		Some AI leaders and the barbarians occasionally calculate with optimistically increased attack odds. Based on these inflated odds, K-Mod does a kind of expected value computation: attacking a Tank with a Warrior at 5% odds is wise because the Tank is much more expensive than the Warrior. (Of course, the odds are much worse.)
Rationale	Warrior against Tank doesn't matter much, but K-Mod barbarians are also too happy to attack advanced units in fortified positions.	

115	AI less willing to commit to victory strategies	
AdvCiv		*K-Mod*
In a game with 7 civs, the AI enters stage 3 (of 4) of the domination victory strategy when meeting 55% of the requirements. More generally, the target percentage for stage 3 is 62 minus the number of civs, and 87 minus the number of civs for stage 4.		The thresholds are 50% for stage 3 and 80% for stage 4, and don't depend on the number of civs. However, the requirements themselves do depend on the number of civs (e.g. 64% with 7 civs, 51% with 16). Victory strategies with stages 1 to 4 were introduced by BBAI. At stage 4, victory is imminent. It's an AI-internal metric.
Rationale	The K-Mod AI goes for military victories too often (or early) for my taste. The BBAI approach of letting the AI play more rationally is fine, but let's not turn it into a wannabe HoF player. 50% means 24% of the world population and 32% of the land, i.e. about a "double share" in a standard game: 2 in 7 is 28.5%. This shouldn't quite be enough to trigger domination 3. 55% means that 35% of the land is needed for stage 3. That's right between 3 in 7 (42.8%) and 2 in 7. I'm factoring in the number of civs because it is easier to conquer more land when that land is divided among several weak opponents than when it is owned by a few powerful ones.	

See also	112: AI civs less willing to become vassals. 018: AI uses Crush strategy less. 019 makes the AI a bit less inclined to military strategies in Aggressive AI mode.
Added a condition that makes the AI less willing to go for Conquest victory if there are many rivals on other continents.	No such condition.
Escalated the conditions so that the conquest stage is essentially one less than in BBAI/K-Mod. Added requirements for stage 4: half of the initial rivals, rounded down, need to be defeated.	The half-rivals-defeated condition is checked for stage 4 (which becomes stage 3 in AdvCiv), but there are also alternative conditions for that stage.
Rationale	As above: military victories too commonly pursued. Also: It's problematic when an AI civ goes for a military victory before naval invasions become feasible, because it's too difficult for players on other continents to interfere in time.
Made the conditions for culture victory strategies more narrow.	
Rationale	Culture victory isn't the easiest route in general. At least it allows the AI to win without having to beat humans at war, and possibly before reaching the nuclear age, but I'd still say that space tends to be more effective for the AI, and culture-loving AIs can be unpleasant to play against (culture pressure, wonder grabbing). The AI should only go for it when there is a realistic chance of success. (But I'm by no means disabling AI culture strats entirely.) Also, UWAI and R&F assume that a civ is very close to victory when in stage 4 of any strategy; this hadn't always been the case with Culture 4.
(Only relevant if UWAI is disabled.) When in multiple wars at once, the AI ignores its military victory stage and applies the normal decision process to any war that is no longer recent. I.e. multiple wars are still possible, but the AI won't just refuse to talk.	AI in Conquest 4 or Domination 4 never ends a chosen war when war successes are favorable.
Rationale	It's OK that an AI close to a military victory likes to fight wars, but it doesn't have to fight everyone at once.
Space victory not pursued if total production clearly insufficient.	Once Apollo Project is built, stage 3 can be reached just through technological progress.
Rationale	To discourage small civs, say, with just three cities, from pursuing a space victory. If they want to have a chance, they'll need to expand instead.
115b	Stages for diplo victory revised
AdvCiv	*BBAI*
Based mostly on the current (voting) population of own team, vassals and friends. Personality and randomness still factor in; game options don't (unless diplo victory disabled).	Based on leader personality, randomness and, a little bit, on Aggressive AI and Always Peace game options.
Stages 3 and 4 can be run regardless of other victory stages.	Stages 3 and 4 are impossible if already in stage 3 or 4 of another victory condition.
AI prioritizes food a bit on stage 4 (grow votes).	

Rationale	This part of the victory-stage code hadn't been revised by karadoc and it didn't do anything intelligent. Checking for peaceful game options isn't good: diplo victories are usually half conquest, half diplomacy. Diplo victory isn't often a viable route for the AI. I've made the changes mostly because I had already written code for estimating voting populations for UWAI.	
Diplo victory stage 2 factors into decision to build AP and UN. AI avoids building AP/UN if another civ seems closer to diplo victory.		Only stage 1 considered for AP/UN. No avoidance. (NB: Building evaluation also affects AI tech paths, i.e. the AI is able to aim at Mass Media – if it can properly evaluate the UN.)
Tbd.	Doesn't look reliable; at best, it'll no longer build the UN when it's *obviously* a terrible blunder.	
AdvCiv		*BtS*
When near a religious victory, the AI is more inclined to pursue the "Missionary" strategy, and its vassals switch out of Theocracy.		"Missionary" is a BtS strategy that is adopted based on AI flavor and the number of civs with Open Borders and whether they've already converted. Victory doesn't play a role. The AI makes no effort to deal with Theocracy.
Rationale	Should at least allow the AI to win an AP victory when all human players are already members of the AP. Will otherwise have to use Holy Wars to bring down the humans.	
Tbd.	AP victory conditions need to be overhauled. It's silly that a single converted city makes all the difference in war and victory votes.	
The AI proposes the victory resolution when it gets the chance and a team member is at diplo victory stage 4. Voting AI abstains if it likes two candidates equally.		AI chooses uniformly at random from all the resolutions that it supports. Votes for the candidate with the lowest internal id; normally humans have lower ids than AI civs.
Tbd.	The AI still proposes random resolutions in all other cases, and this is often agonizing to watch.	
115c	Victory strategies in zero-sum games	
AI doesn't pursue Diplo victory when there's just one other team left; AI does pursue Conquest if there is just one other team to begin with.		Diplo2 possible with just one rival, but UN and AP require at least two other teams. Conquest1 requires at least one civ to be a vassal or eliminated; doesn't work if there are only two teams at game start.
Rationale	Both only really relevant for games against a single AI opponent.	

116	Changes to raze decisions
See also	250b moves the No City Razing option to the bottom of the Custom Game screen. 122 makes the AI raze cities in awful sites. 300 deals with razing by Barbarians.

AdvCiv	*K-Mod 1.44*
If the AI raze value plus a random number between 0 and 5 is above 0, the city is razed. 0 to 5 is very little; it's hardly random at all.	Raze value is used as the probability of razing a city, i.e. even if the value is just 1, the city might be razed (with probability 1%).
The AI leader's `RazeCityProb` adds at most 15 to the raze value. Settled Great People count as 5 against razing.	`RazeCityProb` adds up to 75 ro raze value. Settled GP count as 2 against.
Impact of distance and finances lowered; impact of distance adjusted to map size.	Cities past a distance threshold are usually razed.
Unlikely to raze when controlling fewer than 5 cities, i.e. in the early game.	Cities conquered in a very early rush are usually razed because of the distance. (Some improvements in K-Mod 1.45, but my changes are more comprehensive.)

Rationale	K-Mod razes too much and too randomly, and this is among the most common complaints about K-Mod. Leader personality has far too much impact: Genghis Khan has 75 RazeCityProb while some leaders have 0. A city would have to have e.g. 15 settled GP to make up for that difference (assuming each GP counts as 5; in K-Mod it's actually only 2), or 5 active wonders (each counts as 15).
Tbd.	Try to use code from the UWAI evaluation of conquered cities.

AdvCiv	*BtS*
AI factors cultural ownership into raze decisions. Reluctant to raze cities with own majority culture or with majority culture of a partner civ (i.e. attitude Pleased or higher).	Tile culture ignored. AI incurs diplo penalties by razing cities with cultural majority of a third party.

Rationale	Diplo penalty is usually not worth it. Can give the city away if it becomes too costly. (The AI knows how to do that).

AdvCiv	*BBAI*
When an AI civ conquers a city that, if reconquered, may soon lead to a culture victory of the previous owner, the conquering civ razes the city if reconquest seems plausible (based on power ratios and nearby units).	The dangerous city is razed in any case.

Rationale	The BBAI comment actually said to raze unless we "overpower" them, but no power condition was there.

117	AI chops more Forests	
AdvCiv		*K-Mod*
AI is always somewhat willing to chop depending on available Workers and competing Worker tasks. More specifically, assigns a priority of 0.5 * P in situations where the K-Mod AI is unwilling to chop, and 1.5 * P otherwise. When computing the workers needed at a city, chopping opportunities are taken into account.		Only chops while building something urgent, or a building in a small city. Then assigns a priority P that is proportional to the chopping yield. Chopping seems to happen only opportunistically, i.e. when a Worker is assigned to a city in order to build improvements, it may (afterwards) be instructed to chop if there happen to be Forests.
Rationale	K-Mod tries to discourage extensive chopping, but I don't think this can work without reducing or delaying chopping yields further (beyond what patch 1.61 did). As it stands, the K-Mod AI is missing out on early chopping yields. See also this discussion on CFC. In particular, there are few reasons not to cut down Forests along rivers and on hills. A hill Lumbermill has the same yields as a mine, and a river Lumbermill can't compete with Watermill and Farm. As a result of my changes, AI Lumbermills on hills/ at rivers don't seem to occur anymore at all. The other Forests remain largely intact.		
Tbd.	The AI should arguably chop even more. I intend to nerf chopping instead, probably by restricting the yield to apply only to buildings and ships. I don't mind the current incentive to remove all hill/river Forests.		
See also	113 also includes chopping opportunities in the global estimate for Worker tasks.		
AI chops Forests outside of city radi. Restrictions: • Only when there is nothing else to do. • Not when automated and chopping is disallowed in options. • Not if there is already anger from global warming. Possible future cities, distance and the correct timing of the chop aren't considered.		The AI never chops Forests on tiles that no city can work on.
Rationale	My conditions are simplistic and rather conservative. At least the AI now fells unworked Forests within its own borders at some point.	
Tbd.	The code seems to say that the AI always builds a route before chopping a Forest. I haven't verified this, and I'm not sure if it's reasonable. Considering to set 0 yield from chopping outside the BFC; then this change will be obsolete.	
See also	119 prohibits chopping on unowned tiles, i.e. the AI doesn't have to worry about those tiles.	
Feature defense is not taken into account when chopping.		In K-Mod 1.45 (Git commit), the AI is more inclined to chop Forests from the inner city ring.
Rationale	012 (no defense on enemy-owned Forests) takes care of this.	

118	AI changes regarding peacekeeping votes
AdvCiv	*K-Mod*
AI proposes and votes for peace if it likes both sides and neither side is clearly winning or losing. "Like" means that the attitude is *strictly greater* than `DeclareWarThemRefuse-AttitudeThreshold`.	AI only seeks peace if it likes the losing side, or dislikes the winning side. "Like" means attitude greater than or *equal to* `DeclareWarThemRefuseAttitudeThreshold`.
Rationale	A minor thing that vexed me in one game. The AI should stop inconclusive wars between its partners. The second part is probably a bug in K-Mod. A comment says, "if [we] like them enough to not declare war on them", and this isn't what the code does.
See also	UWAI (104n) partly handles peace vote decisions, but 118 still applies.

119	Can't chop Forest, Jungle outside borders
Worker builds that remove features can only be built in plots owned by the Worker's team.	Features can be removed from unowned plots and even from plots owned by a war enemy.
Rationale	Forests being chopped for marginal gains by idle Workers isn't realistic. In part, the problem lies with Workers working for free, but large-scale deforestation without nearby human settlement is strange in itself. Moreover, the AI doesn't chop outside of its borders, and it's easier to change the rules than to change the AI. Part of an overall effort to reduce and delay deforestation (without inhibiting the AI).
See also	117: AI chopping on owned tiles that aren't workable.

120	Usability and AI improvements for espionage
Rationale	Espionage in BtS is beyond redemption. Focus on the few parts that somewhat work, and try to make the rest easier to ignore.
AdvCiv	*K-Mod*
Default espionage weight set to 0.	1 in K-Mod, was 0 in BtS.
Rationale	Important in the (frequent) situation where a player sets some espionage weights before meeting all rivals. When meeting another rival, a default weight of 0 means that no points are assigned to that rival until the player readjusts the weights in the espionage screen. 1 could mean that a few points are assigned or a lot, depending on the weights set previously.
AI less worried (50%) about war opponents having a leg up in espionage.	
Rationale	It's better to focus on research or entertainment when at war. Espionage is for cold-war situations.
120b	AI Spies less malicious
AI uses "malicious" espionage only when Cautious or Annoyed, depending on the leader's no-war threshold. (If no war at Pleased, then	Attitude threshold not leader-specific. With Aggressive AI, malicious unless Friendly, otherwise malicious unless at least Pleased.

malicious at Annoyed; if no war at Friendly, then malicious at Cautious.) Aggressive AI has no impact on AI malice. (AI may also be malicious when planning war or against a civ that is close to victory; no change.)		
Rationale	The "take that" missions are rarely beneficial for the AI. I like them for flavor, but, flavor-wise, malicious espionage only makes sense against enemies. Aggressive AI still has an indirect effect because war plans enable malice, and Aggressive AI leads to more AI war plans.	
120c	Hide the espionage slider when it's at 0	
AdvCiv		*BtS*
Espionage slider not shown on the main interface when it's at 0. Added the slider to the espionage screen.		Once Writing is discovered, the espionage slider is shown on the main interface, city screen and Financial Advisor.
Rationale	More room on the main interface. Many players hardly ever touch the espionage slider.	

121	Misc AI changes to Worker builds and citizen assignment	
AdvCiv		*BtS/ K-Mod*
For deciding whether to build a Fort or a cheaper improvement to connect unworkable resources, the AI uses a heuristic that considers the following circumstances: • How busy Workers currently are overall; • whether the tile has natural defenses; and • if a Fort would function as a canal.		The Worker AI frequently builds Forts on resources that aren't (yet) workable. Forts are alway preferred on these tiles.
AI always prefers any improvement with a positive yield over Forts on workable tiles, and replaces the Fort when a tile with a Fort becomes workable (once a Worker finds time to do it; not necessarily high priority).		Once Fort tiles become workable, the AI is hesitant to replace Forts with yield improvements. Also likes to build Farms and Cottages on revealed but yet unusable resources, and doesn't replace them with improvements that connect the resource later on.
The second copy of a resource is valued at 33% of the first, diminishing with further copies. The total number of surplus resources also factors in. (Fixed a possible bug that may have prevented improvements that connect a resource – like Forts – from being replaced – even by an improvement that also connects the resource). Probably not a bug after all. I think my change only gives higher priority to replacing Forts.		Especially doesn't connect resources when the civ already has the resource. A second copy is valued only at 20% of the first. (Unless consumed by a corporation.)

Rationale	I've posted some screenshots about the K-Mod problems here. Forts cost a lot of Worker turns and often have to be replaced later on, so the AI should be hesitant to build them. Possibly a bug in BtS: The AI picks the most expensive improvement; was perhaps intended to be the cheapest (hard to say). My heuristic using natural tile defense leads to a reasonable number of Forts in reasonable locations. Not really smart, but looks good on the surface. Forts can theoretically be better than yield improvements even on workable tiles. A Silk Fort preserves the underlying forest, which is worth 1 production vs. the 3 commerce from a Plantation. 3 commerce is generally preferrable to 1 production, and I don't think the AI can figure out when 1 production is better. Better stick to the obvious improvements. 20% for a tradable copy of a resource is a bit low; led to resources not being hooked up. The increase to 33% was enough to tip the scales. Again, connecting the resources is the obvious choice; better most of the time.
Tbd.	I'm still seeing Forts on workable Silk. I intend to add one commerce to Silk Plantation and Fur Camp anyway, will hopefully no longer happen then. Could also look into Fuyu's Better BUG AI code marked with "Forts Connect Resources but should never be built"; seems to address the same problem as my code. The AI only ever builds Forts as canals on unworkable resource tiles, i.e. under rare circumstances. I haven't actually seen an AI canal yet.
See also	117 also deals with Worker builds (chopping). 017 makes the AI draft lfewer units.

AdvCiv	*K-Mod*
AI more reluctant to use Slavery. AI prioritizes food more when choosing Worker builds and when assigning citizens.	The K-Mod AI whips a lot; the BtS AI rarely.

Rationale	The AI can't judge well which city production is useful or urgent, whereas a larger population tends to lead to faster research, and that's always good. Short-term production is good for expert players, but the AI should better focus on long-term development. Team NP of the Civ4Reimagined mod have (independently) arrived at the same conclusion: "AI doesn't use slavery as extensively as before which results in bigger cities and stronger AI overall." (source) The AdvCiv AI still whips more than the BtS AI.
See also	110 shifts yield priorities to match the decreased use of Slavery.
Tbd.	I intend to remove the sacrifice-population-to-hurry ability entirely.
120d	AI response to poisoned water and unrest

The effects of poisoned water and formented unrest don't affect the AI population target, meaning that the AI tends to prioritize food more after a spy attack (in order to keep the current population despite food lost due to anger and bad health).	The effects of spy attacks are treated just like other causes of bad health and anger when setting a population target, meaning that the AI lets its population shrink after a spy attack, or may even de-prioritize food.
See also	160 slows down starvation

Tbd.	The AI should be more upset about poisoned water and formented unrest than about other spy missions. Could implement that, but spies get identified too rarely (25%; `ESPIONAGE_SPY_REVEAL_IDENTITY_PERCENT`) for it to matter. Perhaps give these missions a 50% chance of revealing spy identity even when the spy isn't caught?

122	Changes to city trades
AdvCiv	*BtS*
When a city is traded, e.g. as reparations, the tile culture of the old owner is decreased in the city tiles and in the city cross (21 tiles), except for tiles assigned to other cities of the old owner. The tile culture of the new owner is increased by the same amount that the old owner's culture is decreased. The amount of converted culture is equal to 50% of the old owner's culture or 100% of the new owner's culture, whichever is smaller. I.e. the new owner's culture can at most triple, and the old owner's culture can at most halve. In order to be able to receive a city through trade, a civ needs to have at least 10 percent tile culture there. No change to Liberation rules.	The old owner's culture is set to 0 in the city and the inner circle. The outer circle remains unchanged. The new owner doesn't gain culture. All cities can be traded between humans. The AI accepts all cities from humans where it has at least 1% culture, and otherwise refuses only if the city is 10 or more tiles away from the nearest AI city, or when in financial trouble (which rarely occurs). Outside of peace negotiations, the AI doesn't pay for cities, which is why cities don't change hands between AI civs at peacetime. Vassals can only receive cities through Liberation; see next blue box. The conditions for Liberation are complicated.
Rationale	The instant removal (or as it may appear: conversion) of culture is jarring. That said, the mutual agreement should have some appeasing effect on the population, so I'm halving the culture. Excluding the outer ring can lead to strange borderlines with foreign enclaves. The culture is converted to make the city suffer less from culture pressure, to account for the consensual change in ownership (as opposed to violent conquest), to avoid strengthening the influence of third parties, and because culture shouldn't just vanish. The restriction on city trades should make it harder to gift the AI worthless cities. It's also implausible that a city could be given over to a nation that has no history there.
Config	`CITY_TRADE_CULTURE_THRESH` in `GlobalDefines_advc.txt`
A master civ can gift any cities to its vassal where the vassal has more culture than the master. The vassal may reject the city; will then appear red on the Trade Screen. A vassal still can't offer cities to its master (or any other civ); no change.	Can only *liberate* cities to vassals. If a vassal isn't the civ that would receive a city upon liberation, then the vassal can't receive the city at all.
Rationale	I suspect that the restriction was put in place to prevent masters from demanding their vassals' cities, and that the inverse direction had been assumed to be covered by liberation. Not true in the case of a city that is culturally contested between a vassal and a third civ. There are perhaps some problems in general with AI civs accepting cities that aren't worth their maintenance, but that's not a good reason to prohibit vassals specifically from receiving cities. Giving cities to vassals means less human city management; should be encouraged

	(and allowed, to begin with). The culture clause is just flavor; perhaps a needless complication. I suppose the master population wouldn't want to be ruled by the vassal.
Can liberate a city even if there is an enemy sea unit or non-combat unit visible from the city.	There must not be any unit hostile to the prospective city owner visible from the city. Otherwise, the city can still be traded, but it doesn't count as a liberation (no diplo bonus).
Rationale	The visible-enemy restriction is reasonable – if the new owner has to fight for the city, it's not really liberated –, but units that can't attack the city shouldn't block liberation.
Only revealed cities can be traded for. "... make a trade proposal" option hidden when there are no eligible trade items.	Can receive previously unknown cities as part of a peace deal. AI civs accept unknown cities from human civs as gifts. Proposal can lead to an empty Trade Screen.
Rationale	A minor change while I'm at it. Not plausible that the AI is (supposedly) able to decide whether to accept a city that it has no knowledge of. Moreover, unrevealed cities are, as a principle, secret in K-Mod, and the Trade screen can leak that info. An empty trade screen is a bit confusing, and became a more common ocurrence in the early game after I excluded unrevealed cities.
Tbd.	"What do you think of ..." - "Yes?" "Let's discuss something else" is also confusing (when there is no third civ to talk about), but funny enough to leave it alone.
The AI recognizes awful city sites, doesn't accept such cities in trade and razes them after conquest.	If a city is close enough and has enough culture, the AI accepts it, and doesn't normally raze it.
Rationale	The BtS behavior can be exploited by gifting the AI useless cities, and the AI will even be thankful for it (fair trade diplo bonus). See strategy advise here (CFC). The strategy still works though, the city site just mustn't be *extremely* bad.

123	Blocked exploits
Tbd.	Not sure if Cease Fire is a problem in K-Mod. The AI never seems to agree to it, which is fine, but I can't find the responsible code. To be addressed: Fail gold (especially from National Wonders/ Units)
See also	Meatgrinder exploit: 139. Worker stealing (010) is a bit of an exploit too I guess; and flat maps for lower distance maintenance (140). Gifting GP for diplo victory: 141. Neutral units shielding cities from nukes: dlph.7. Gifting the AI useless cities: 122. Gifting nukes: 143b. Extra gold in Advanced Start with Expansive trait: dlph.11. K-Mod prevents overflow shenanigans (or at least reins them in) by allowing multiple units to be produced within the same turn.
123a	Can't gift Missionaries to bypass Theocracy
AdvCiv	*BtS*

Can't gift a Missionary to a civ in Theocracy unless the Missionary matches their state religion. Can't gift Caravels to a civ without an OB agreement.	Can bypass the Theocracy restriction by gifting Missionaries. The AI will normally use them too. Can gift Missionaries inside Caravels in order to spread a religion without OB.
Rationale	Arguably an exploit because the Theocracy restriction is pretty pointless this way. And keeping borders closed should keep Missionaries out, period.
Credits	DarkLunaPhantom fixed the Theocracy part independently. I hadn't thought of cargo units (other than Caravels), so I've adopted some of DLPh's fix.
See also	dlph.4
123b	Blocked AI paths
AdvCiv	*K-Mod/ BtS*
The pathfinder should have no more problems with hostile units along the way.	Reportedly, the BtS AI is generally unable to plot around enemy units; in K-Mod, I can only recreate this for barbarians vs. units blocking the entire inner ring of a city.
Tbd.	Passing `MOVE_ATTACK_STACK` to `AI_cityAttack` might be a cleaner fix, but I'm not sure about side effects.
123c	Chains of cargo units
Land units can only be loaded as cargo if they have at least 1 move left. No change to air units; can still be loaded right after rebasing.	Loading and unloading don't require moves (although Loading consumes all moves). Can exploit this to move land units across arbitrary distances over water within a single turn by using a chain of dispersed cargo units.
123d	Reduce war success when trading away a city while at war
When a city is traded away, and the old owner is at war with any earlier owners of the traded city, the war success of the old owner against these earlier owners is reduced by 25.	A player can conquer a city (+25 war success against the enemy), gift it to a war ally (no change to war success), wait for the enemy to conquer the city again (+25 war success against the player's ally), and repeat. The war enemy will then assume that the war against the player is going very badly.
Rationale	Not so easy to exploit, but occasionally leads to quick capitulation. Reducing the war success against *all* earlier owners can be overkill, but this is difficult to avoid.
123e	Can no longer plunder gold from barbarian cities
Credits	Civ 4 Reimagined 1.2

124	Restrictions on trade
AdvCiv	*BtS*
Trade connections only along revealed plots, i.e. in order to establish a trade route, the owner of the first city needs to explore the second city and the roads/rivers/coast leading there.	Plots owned by another civ don't need to be revealed. I.e. by revealing a path of road, river and coastal tiles up to any foreign tile connected to the foreign capital, trade routes are established

Resource trades require a connection to any foreign city that is connected to the capital; the capital itself doesn't have to be revealed. I.e. pretty much no change. No trade routes with cities in occupation, and no trade routes with cities whose owners are in anarchy.	with all foreign cities connected to the foreign capital. Resource trades require a connection to the foreign capital.
Rationale	The BtS concept isn't that unrealistic. If one side knows half of the way and the other side the other half, trade can be conducted in the middle. Soren Johnson explained this in a Twitch video, naming trade between Han China and Rome as example. I think it's better for gameplay when the other city has to be revealed because this rewards repeated exploration of rival territory, and the game tends to be more fun when you keep updated on rival activities. Also makes Scouts more useful (though still underpowered). The BtS rules are also inconsistent with K-Mod's treatment of unrevealed cities as secret; the trade routes listed on the BtS city screen give the cities away. The occupation/ anarchy rule is just for added plausibility. I've considered excluding blockaded and plundered cities as well, but such cities could still trade across land, i.e. unless the whole landmass is blocked, in which case trade routes are already severed.
Tbd.	Should tiles owned by a rival block trade unless there is an OB agreement with that rival? Currently (as in BtS), rival tiles only block trade when at war. Iran's control over the Strait of Hormuz is a similar real-world situation; the strait remained open despite the 1995 sanctions. Would like to change the way that cities are matched. The current algorithm creates long-distance trade routes between large cities, but these cities aren't usually the borderland trade hubs that would realistically profit from trade passing through. Boils down to the question if trade routes should be represented from end to end or hop by hop.
For resource trades, only one side needs to be able to reach the other.	Trade connections are always symmetrical, so this isn't an issue.
Rationale	Want a civ that establishes a trade connection to be able to trade resources right away (as in BtS), instead of having to wait for the other civ to e.g. also research Saling. This gets a little confusing when trade passes through territory of a third civ (C) that has OB with one of the trade party (B), but not the other (A). Resource trades are then allowed and benefit both A and B; B continues to have trade routes with A, but A loses its trade routes with B. Fair enough, I think; this way, the closed borders between A and C don't harm B. Can imagine that the caravans or ships of B handle resource trade in both directions.
Trade along rivers doesn't require any tech; back to how it worked prior to BtS. Trade along unowned coasts still requires Sailing. Help text says "Enables trade on Coasts outside own borders".	Trade along *owned* rivers works from the beginning, along unowned rivers only with Sailing. Sailing help text just says "enables trade on Rivers"/ "...Coasts".
Rationale	Not sure why this change was made in BtS; possibly to make Sailing more attractive, but that doesn't work because rivers (unlike coasts) are rarely an important part of trade networks in BtS. The distinction between owned and unowned rivers is pedantic, and confuses players (people ask about this now and then on CFC). Rivers now work

	just like roads when it comes to trade.
Tbd.	Want rivers to speed up movement as in Alpha Centauri. Fishing could enable this. Fishing needs a buff more than Sailing.

AI only willing to sign Open Borders with another civ once it has revealed a land tile owned by that civ, or if the AI attitude is one level above the normal OB threshold, i.e. at Pleased in most cases. Otherwise: "We would have nothing to gain."	OB based on a fixed leader-specific attitude threshold.
Will sign OB at attitude one level below the normal OB threshold when sharing a war, but, again, only if there is a revealed owned tile.	AI signs OB regardless of attitude when sharing a war.
Rationale	Signing OB on the first meeting has always struck me as strange.
Tbd.	With Paper, one can still get the AI to sign OB right away through map trading. AI should check if it can actually reach any foreign tile before signing OB.

The AI makes it a high priority to build at least one naval explorer once it knows Sailing.	The AI prioritizes exploration only until meeting all civs.
AI considers Galley to be suitable for exploration.	Unit AI types for Galley are only Transport and Attack. Before Caravels, only Workboat and Trireme have the Explore AI type.
Rationale	Due to the trade route rule change, the AI needs to explore coasts more reliably. Should use Galleys too because Workboats get picked off by barbarians at some point and Triremes come too late.
See also	905 increases the speed of Galleys; this makes them more suitable as explorers.

Trade can pass through hostile plots if these plots are affected by a naval blockade by a party that is not hostile to the trading civ. In particular, the trading civ itself could blockade the plots. (To be clear, blockades don't allow trade *with* a hostile party.) The AI does not use blockades in order to enable trade.	Trade can never pass through hostile plots and blockades can only prohibit trade.
~~Water tiles with a friendly unit can be worked despite being blockaded.~~ Disabled again. It's a bit more sensible, but too unimportant to bother.	Blockade prevents tiles from being worked despite the presence of units protecting the tile. Those units will have to engage the blockading unit to make the tile workable.
Rationale	Occasionally, a declaration of war severs important maritime trade connections between cities of one of the war parties or with some third party. This should not happen to a civ that has naval superiority. Would be way too much work to get the AI to use blockades this way. Should the mere presence of a unit in a tile cause that tile to be blockaded? How do you operate, say, a winery in a tile that is occupied by enemy military? Could argue that wine remains available from a stockpile for one turn, and after that turn the enemy has had an opportunity to pillage the tile. Would be nice to have the option of blocking a resource for several turns without pillaging, but I worry that resources would get disrupted too frequently for just one turn, causing AI governors to reassign citizens. Anyway, `CvPlot::isTradeNetwork` would be the place to implement such a change.
~~A civ can't trade with a second civ through tiles owned by a third civ that doesn't have OB with the first civ.~~	Foreign tiles only block trade if at war; OB aren't required for trade to pass through.

One wouldn't expect war and closed borders to make a difference. However, distinguishing between the second and third civ is too difficult to implement, and the rules mustn't block resource trades between two civs without OB. (An exception for resource trades is also too difficult to implement.)	

125	Culture from trade routes disabled
AdvCiv	*K-Mod*
Trade routes generate only raw commerce. ~~Trade routes only generate culture if the city tile already has some culture (more than 0 points) of the trade partner.~~ (Decided to disable it entirely instead.)	Trade routes generate foreign tile culture in addition to raw commerce.
Rationale	The only real upside of trade culture is flavor, and I don't think this justifies the added complexity. The confusing part is that trade culture could also be added to city culture (but it isn't). Tile culture from far-away trade partners may be a disadvantage in local border disputes; difficult to say. Unimportant culture in plot help text is another problem. Very small percentages aren't shown, but this means plot culture sums up to just, say, 97% sometimes, which is confusing. (99% is OK – everyone's used to that.) Another issue: The Nationality bar on the city screen can show only culture of up to four different civs, and this can't be changed within the SDK.
Config	`USE_KMOD_TRADE_CULTURE` in `GlobalDefines_advc`

126	Increased impact of handicap on games starting in later eras
AdvCiv	*BtS*
Added one free tech for each era after Ancient (except Future) to each difficulty setting that grants free technology to the AI. These free techs are only granted when starting in the respective era. Similarly, the human player receives additional free techs on Chieftain and Settler. On Settler to Chieftain and Monarch to Immortal, the new free techs are Mathematics, Machinery, Printing Press, Steampower and Plastics. In addition to those, AI Deity and human Settler receive Ironworking (only AI), Alphabet (only human), Feudalism, Gunpowder, Steel and Refrigeration.	When starting in a later era, every civ receives at least all Ancient techs. Neither human nor AI receive free techs beyond those.
On difficulty settings that grant free units to the AI, more units are granted when starting in a later era: another defensive unit for each era beyond Ancient, another Worker for every 2 eras and another Scout or Explorer for every 3 eras.	Every civ receives additional free units in later eras. AI civs also receive free units granted by the difficulty setting. All free units are chosen based on the start era, e.g. Riflemen as defensive units when starting in the Industrial era.
Rationale	Games starting in later eras tend to be much easier to win than normal games, surely, in no small part, because the AI doesn't get a proper head start. No tech advantage, and the extra free units are relatively few compared with the total number of free units, which may even allow a human player to conquer a high-level AI right away.
Config	The free tech is configured in `Civ4HandicapInfo.xml`.
See also	301 prevents barbarians from using Copper and Horse until these resources are connected by some city. This used to be a problem with Classical starts – barbarians would have Axemen and Horse Archers right away, whereas the (AI) civs needed some 50 turns to establish access to copper or horse.
Tbd.	The free techs aren't carefully chosen. At some point, I want to change the era of some techs; can reconsider the freebies after that. Later-era starts probably still have balance issues that make them too easy or too difficult to win; I've never even finished a test game starting in a later era. Would be nice to make at least Classical and Medieval starts playable; these aren't *that* different from normal games, but could be different enough to be refreshing.

127	Changes to AI Auto Play
Tbd.	Options One City Challenge and Always War should apply while in Auto Play. Lots of `isOption(GAMEOPTION_...)&&isHuman()` checks to be replaced with new functions like `CvPlayer::isOneCityChallenge` and `CvPlayer::isAlwaysWar` that check `isHuman()|| isHumanDisabled()`.

AdvCiv	*AI Auto Play mod*
While Auto Play is enabled, the proxy AI civs (i.e. originally human-controlled) adopt the AI handicap. E.g., in a singleplayer game on Emperor difficulty, the human civ normally incurs 100% inflation, and the AI civs 90% times 80% = 72%. The 90% comes from the AI handicap (Noble), and the 80% from the AI adjustment of the game handicap (Emperor). On Auto Play, the proxy AI civ also incurs 72% inflation.	Auto Play doesn't change player handicaps; however, proxy AI civs do benefit from AI bonuses defined by the game handicap. In the example, the proxy AI civ incurs 100% times 80% = 80% inflation. Both factors come from Emperor.
Rationale	For simulating all-AI games, proxy AI civs should play by the exact same rules as the normal AI civs. AI Auto Play could also be used for fast-forwarding a normal singleplayer game e.g. when a human victory looks inevitable. In this case, the human AI civ should play by the same rules as a normal human. That's not what the original AI Auto Play does (see example above), and implementing it like that actually looks difficult. For development purposes, it's far more useful to treat proxy AI civs like normal AI civs.
Tbd.	In scenarios with unequal AI handicap settings (e.g. Earth1000AD), the proxy handicap should be set to the default handicap configured in the WBSave for that civ. Not sure if that info is somehow accessible. Currently, the proxy handicap is set to the average of the AI handicaps.
The proxy AI ignores player options, in particular "Workers leave improvements/ forests". (Probably also fixed in K-Mod 1.45, but I'm keeping my fix to be on the safe side.) Minimized popups (from the "minimize-popups" option) are killed when Auto Play starts.	Proxy AI civs don't replace improvements and don't chop Forests if the respective options are set. Minimized popups remain on the screen for some time.
Rationale	Probably just something jdog had overlooked.
Auto Play ends at the end of a round, i.e. normally at the end of a barbarian turn. That means, the human civ is treated as an AI civ during the AI turns. In particular, they can't send diplo messages to the human civ, so there can't be diplo popups when human control resumes.	Auto Play ends at the end of a proxy-AI turn. During the subsequent round of AI turns, the human civ is already treated as human. If the human civ is not in slot 0, e.g. in a scenario, it is also already treated as human during the AI turns in lower slots.

Rationale	It's counterintuitive that e.g. running Auto Play for a single turn only skips over the human turn, but not the AI turns. Diplo messages upon resuming are problematic because they force the human player to make decisions. Makes it impossible to simulate an all-AI game in chunks of e.g. 50 turns without any human influence. More generally, running Auto Play in multiple short chunks produces markedly different results than a single long run; not good. Caveat: While there can't be diplo popups anymore right after Auto Play ends, popups are unusually frequent on the next turn. This is because the last-contacted timers of the AI civs keep decreasing during Auto Play. Put differently: The AI has much to say if you haven't spoken in a while.
Config	It's a Python change (`AIAutoPlay.py`)
Tbd.	Simulation in chunks may still not be 100% the same as a single run. For a fair all-AI game on Noble difficulty, it should now suffice to activate Auto Play on turn 0; for other difficulties, the WorldBuilder is needed for giving the human civ the same initial freebies as the AI civs. Could automate this (special treatment for Auto Play on turn 0), but it seems not quite worth the effort.

128	AI cheats less obviously with visibility
AdvCiv	*BtS*
An AI unit can't target units on invisible tiles unless those units are within a randomized subrange of the search range around the AI unit. Units in visible tiles (e.g. visible by a different AI unit) can be targeted within the whole search range; no change.	The Unit AI treats all tiles within a unit's search range as visible.
Rationale	This (well known) AI cheat becomes very obvious when AI ships pursue human privateers or intercept human cargo. (The search range is a multiple of the number of movement points, and ships have lots of movement points.) Can't just exclude all invisible tiles because this would leave the AI completely unable to pursue units. I also doubt that AI patrols could search for enemy cargo ships effectively. With my change, the AI sometimes finds targets on invisible tiles, and sometimes doesn't. This looks similar enough to human guessing and deduction, which also isn't always successful.

129	Changes to resource placement during map generation
AdvCiv	*BtS*
Place fewer copies of resources that have a lot of eligible tiles, and thus would normally be placed abundantly. E.g. a bit less seafood on maps with lots of coastline, and sparser resources overall on Huge maps (but still far more in total than on Large maps).	The number of copies of a given resource is proportional to the number of tiles where the resource could be placed.
Rationale	Make unusual maps a little less unusual and more playable. Not totally sure it's a good idea.
Config	`SUBLINEAR_BONUS_QUANTITIES` in `GlobalDefines_advc`
The map generator avoids placing several resources of a kind adjacent to each other, in particular when placing a cluster of resources on a 3x3 square.	It seems that a cluster can theoretically fill an entire 3x3 square. The number of copies to be placed on the map in total puts a cap on this, but not on large maps.
Added a separate resource class for Gold, Silver and Gems. Clusters of these resources are now kept at least 4 tiles apart. Can still overlap within a city's radius, but not in a way that would allow the city to work every resource.	Nothing to ensure that clusters are placed apart.
Can certainly still get more than 2 Gold/Silver/Gems within a city's radius, but 4 or more should be quite rare now, even on large maps (more testing will tell).	The map generator can produce large clusters of precious metals/stones that make for very powerful (starting) city plots. 5 such resources aren't that uncommon.
Rationale	Starting plots with more than 2 Gems or Gold tend to be overpowered. Could also be fixed when assigning starting plots or during normalization; however, the cluster placement algorithm also scaled badly with map size, so it needed work anyway.
See also	108 also weakens starting plots.
Map scripts try to place at least 0.88 Silver resources per player, and only 0.78 Gold resources.	1 Gold per player and 0.67 Silver.
Gold can appear on Snow, Desert and unforested Plains, river possible, whereas Silver can appear on forested Grassland and on Tundra regardless of Forest, but not along rivers.	Gold only on Desert and unforested Plains, and Silver on Snow and unforested Tundra. Both can appear next to rivers.

Rationale	Gold was arguably more rare throughout most of history. More importantly, Gold is very powerful, and fewer occurrences should improve the game balance a bit. Allow Silver to appear on forested Grassland to make it more common. Also, restricting Silver to extreme latitudes is, as far as I can tell, completely unrealistic; should probably appear on just the same tiles as Gold. The intention was probably to make Gold and Silver more distinct. I'm trying to keep them distinct, but make it more historically informed. The most famous gold rushes happened in the Australian desert, Alaska and maybe "on the banks of Sacramento", as a shanty says. Silver can't be or isn't commonly panned from rivers. The densely forested Central European mountain ranges have seen silver rushes in the Early Modern era (Berggeschrey). Grassland Forest also fits with Colorado and British Columbia. Ancient Egyptian gold deposits and silver in Attica and Baetica also fit. Gems can only appear on Jungle Grassland (though the Jungle can get cleared near a starting plot); thus distinct from Silver.
Credits	Inspired by Civ 4 Reimagined 1.2, which also makes Silver more common than Gold.

When placing a cluster of resources, the probability of placing an additional resource decreases exponentially with each resource already placed. The potential target plots are processed in a randomized order.	The targets are processed in clockwise order, and each one gets the same probability (25 or 50%, depending on the resource) until the upper limit is reached.
Rationale	Make large clusters less likely, especially on maps that have large areas of uniform terrain because such areas are especially likely to receive large resource clusters (e.g. Ivory in a large area of Plains).

130	Changes to AI diplo modifiers (DDiplo)	
See also	112 deals with vassal agreements; 141: No diplo effect from gifted GP	
AdvCiv		*BtS*
130a	Sustained peace	
"Years of peace" only start to count when an AI civ is met. The turns needed per relations bonus decrease from 60 initially to 30 in the middle of the game (normally AD 1700) and then stay at 30.		Years of peace are counted from the beginning of the game. The relations bonus is one for every 60 turns (and at most 2).
Rationale	Being ignorant of each other's existence shouldn't "strengthen relations", and civs that have just met shouldn't have strengthened relations. That said, don't want to make it too difficult for civs that start isolated to find partners on other continents. The decreasing threshold should also help keeping "years of peace" relevant after war in the late game – when the game may end in 100 turns, it's almost irrelevant whether relations are going to improve 60 turns from now.	
130b	Peace weight	
Halved the impact of peace weight on (inter-AI) relations. Now results in a diplo modifier between -2 and +2 (included in "First Impression").		Diplo modifier from peace weight between -4 and +4. (The peace weight of an AI leader is apparently a measure of that leader's love of peace. It's partly randomized at game start. Leaders with similar peace weight like each other, and leaders with dissimilar peace weight dislike each other.)
Rationale	I think peace weights are intended to prevent warlike leaders from fighting inconclusive wars amongst each other while the peaceable leaders get ahead economically. Fair enough, but it's overdosed, sometimes leading peaceful civs to form practically inseperable bonds. The excessive peace weight modifiers make diplomacy overall too predictable from the beginning.	
Tbd.	Warmonger respect, another hidden modifier, seems OK; only in between +0 and +2. When there is a large majority of either warlike or peaceable AI leaders in a game, the small minority doesn't stand much of a chance. Can easily happen when AI leaders are chosen at random. It's less of a problem with the change above, but I'm still considering to adjust the hidden modifiers based on which leaders are in the game. Could adjust the modifiers versus all AI leaders that are too popular or too unpopular overall. Don't want every game to have perfectly balanced diplo though ...	

130c	Rank-based modifiers
AdvCiv	*BtS*
The AI dislikes civs that are ranked higher on the leader board, but not those ranked far higher. Civs in the lower half of the leaderboard no longer have +1 relations with each other. However, certain leaders still grant a relations bonus to civs ranked beneath them (no change).	Civs on the bottom dislike those on top; the greater the rank difference, the greater the hate. The second doesn't dislike the first, but the last does.
No rank-based modifiers in the first game era.	Modifiers change a lot in the Ancient era because ranks change a lot.
The AI assumes that civs not yet encountered are ranked on the very bottom (or top) of the leaderboard; i.e. these civs don't affect relations.	The AI magically knows the ranks of unknown civs. Humans can sometimes use inter-AI diplo values to deduce the ranks of unknown civs.
Example: Assume that the human player is ranked 7th at the start of the Classical era, and gradually climbs to rank 1 over the course of the game. AI Peter starts on rank 4 and stays there until overtaken by the player. Let's say he meets all his rivals during the Ancient era. Peter's modifier towards the player then starts at +1, changes to 0 when the player reaches rank 5, to -1 when Peter is overtaken, -2 when the player reaches rank 3, -1 again at rank 2, and 0 as the player takes rank 1; see the table below.	+1 until the player reaches rank 3, then 0, and -1 when the player takes rank 1. I suspect that the initial +1 is due to a bug and should be +2 until the player reaches rank 6.
Rationale	Presumably, a (slight) tendency of the AI to gang up on the leader of the field was intended. Not unreasonable, but it doesn't work: Civs that are far behind can't do much to impede the leading civs. They just hurt themselves by sulking. It's not necessarily wise for civs in the lower half to stick together either. Cooperation is just one way to improve, war another.
Tbd.	Should probably be based on score ratio instead of rank difference.
Willem dislikes civs that are ahead of him and likes civs that are behind him, just like all the other leaders.	Willem is the only leader that dislikes civs that are behind him, and likes those that are ahead.
Rationale	Probably an mix-up by the BtS developers.

Rank player vs. Peter	7-4	6-4	5-4	4-5	3-5	2-5	1-5
Modifier AdvCiv	+1	+1	0	-1	-2	-1	0
Modifier BtS intended(?)	+2	+1	+1	+1	0	-1	-1
Modifier BtS bugged(?)	+1	+1	+1	+1	0	0	-1

Example 130c

130d	A master can't be its own vassal's worst enemy, and capitulated vassals can't be anyone's worst enemy
Rationale	Most of the consequences of worst-enmity don't apply to the master anyway, in particular, the vassal will always trade with the master. That means, a vassal with its master as worst enemy effectively has no worst enemy at all. Perhaps OK, but certainly don't want a vassal to promote trade embargos against its master. UWAI ignores relations with capitulated vassals; to be consistent with this, capitulated vassals should not be worst enemies. Capitulated civs are already marginalized; their enemies should be content with this. Can't ask civs in a vassal-master relationship to stop trading with each other.
130e	Worst enemy updated upon relations change

AdvCiv	*BtS*
Whenever the relations value of an AI civ changes, that civ's worst enemy is immediately updated.	Worst enemy is only updated at the end of an AI team's turn, i.e. never during a human turn. Attitude is updated immediately though, so, e.g. after making peace with a human civ, if the AI attitude changes from Annoyed to Pleased, the AI will still consider the human its worst enemy for the rest of the human turn.

Rationale	Attitude and worst enmity should be consistent during human turns.

130f	Trade embargo changes
See also	130m: AI requests an embargo when at war and too Annoyed to ask for military aid.
Tbd.	Would be nice to let the Foreign Advisor show the time-to-cancel for deals between other civs. Would have to happen in `CvGameTextMgr::getDealString`. A dozen AI leaders have stricter attitude thresholds for embargos than for sponsored war (Alex, Brennus, Hammurabi, Mansa Musa, Mehmed, peter, Roosevelt, Saladin, Suleiman, Suryvarman, Wang, Yaqob; maybe more when `THEM_REFUSE_ATTITUDE` is counted as well). E.g. when Mansa Musa is Pleased or Cautious, he can be persuaded to begin a war, but says "We don't like you enough" when it comes to embargoes. He likes to trade, and I guess war is seen as a trade in this context (hired for war) and embargo as sth. that severs trade; but of course an embargo is also a kind of trade and a hired war also severs trade ... These leaders should perhaps be willing to stop trading when willing to go to war, but only for a high price.

AdvCiv	*BtS*
Apart from vassal and peace treaties, a trade embargo cancels all deals, including those recently signed.	Embargo doesn't affect deals with a positive number of turns left to cancel.

Rationale	It's confusing when some deals aren't canceled, especially between AI civs because players can't see which inter-AI deals are recent. This contributes to embargos being largely irrelevant, and allows players to undercut AI embargo requests by renewing resource trades every 10 turns.

Can't propose a trade embargo if currently trading with the target. Once enacted, the civ that proposed the embargo is affected by it as well, i.e. the target won't talk to the instigator for some 30 turns, though there is no diplo penalty for having "stopped trading with us", only the penalty for negotiating a trade embargo. Exception: A master can always tell its capitulated vassals to stop trading; this does not disrupt the trades of the master. Moreover, the capitulated vassal agrees to the embargo without asking for compensation. The master still receives a diplo penalty from the embargo target though ("negotiated a trade embargo").	Except for the diplo penalty (negotiated a trade embargo), the embargo does not affect the civ that proposes it. The vassal asks for compensation.
Rationale	Trading with a civ after negotiating an embargo seems implausibly hypocritical. The precondition for proposing an embargo (having no current deals with the target) is needed because, otherwise, embargo proposals could be employed to terminate uncancellable trades at will. This would be problematic in the case of per-turn war reparations. Regarding the exception for capitulated vassals: Colonies being allowed to trade only with the mainland was a common practice in mercantilism. I'm keeping the diplo penalty because I don't want players to routinely enact embargoes after accepting capitulation; that would be a bit tedious.
Tbd.	Should perhaps make another exception: "As part of a peace deal, the losing side can agree to an embargo against a third party even if the winning side is currently trading with the third party, and the embargo does not cause the winning side to stop trading with the third party. The only negative consequence for the winning side is a diplo penalty from the third party." Might be too complicated or difficult to remember though, and could clog the trade screen.
When asked to stop trading, the AI assigns greater trade value to OB while at war. Exception: trade vaue not increased when the civ that asks for the embargo is at war with everyone that the contacted civ is at war with.	OB doubles the trade value of the embargo, regardless of war.
Rationale	OB are potentially more useful at war. Canceled OB can prevent the AI from reaching its target cities. Unlikely to be a problem when the civ who's asking is a war ally.
Tbd.	A proper evaluation of an OB agreement while at war would be too much work to implement. But the AI should generally be very reluctant (possibly refuse) to sever OB while at war and also while preparing war. The latter part is problematic because it could expose AI war preparations.
Trade value charged by the AI for an embargo reduced by 25% if Pleased towards the (human) civ that asks for the embargo, by 50% if Friendly.	No impact of attitude toward the civ that pays; only the attitude toward the embargo target matters.
Rationale	Embargoes seemed slightly overcosted overall (now that the preconditions are stricter), and both attitude values should matter. At Annoyed attitude, the AI refuses embargo trades anyway; therefore no point in a cost increase when attitude is low.
See also	104o uses the embargo trade value as a lower bound for the war trade value (sponsored war).

When a player proposes a trade embargo as part of a peace treaty, the AI doesn't refuse on account of attitude. Attitude (toward the war enemy and toward the target of the embargo) still factors into the trade value that the AI assigns to the embargo.		Normally refuses: "We don't like you enough" or "we couldn't betray our close friends".
Rationale	Makes sense to aks the losing side in a war to stop trading e.g. with remaining war enemies of the winning side, and the losing side should be open to this. Similarly, the BtS AI doesn't check attitude when asked to change its religion as part of a peace deal.	
See also	Similar issue with war trades as part of a peace treaty; see 100. Similar rationale for 132 (change civics as part of a peace treaty).	
Refuse-to-talk duration after embargo is 25 turns on average.		30 turns
Rationale	Seemed a bit long what with all the other changes that make diplomacy more dynamic.	
130g	Relations penalty for rejected demand lifted during war	
When an AI civ has been at war for at least 10 turns, and it's a war the AI civ started, it forgets about tribute demands rejected before the war. Memory about demands is also erased when a civ signs a vassal agreement. The vassal forgets that its demands were rejected (but other civs continue to remember demands that the vassal rejected).		Memory about rejected demands only decays over time, and quite slowly: on average by 1 every 150 turns. Vassals can't make demands, but they remember rebukes that happened before signing the vassal agreement.
Rationale	To make reconciliation after war easier. (Also, tribute demands are perhaps more common with UWAI.) The interpretation is that the rebuke has been avenged through war. (If the war was unsuccessful, then the AI, apparently, had been wrong to make demands.) Erasing the rebuke memory directly upon declaring war could obscure the fact that the rebuke contributed to the DoW; the rebuke wouldn't be visible anymore on the Foreign Advisor screen. Hence the 10 turn delay.	
130h	No war-on-friend penalty for attacking vassals	
See also	130y deals with reduced declared-war-on-us penalties from vassals	
When assigning war-on-friend penalties, master civs ignore their vassals, and vassal civs ignore their master and the master's other vassals. Bringing in a war ally does not lead to a penalty from vassals of the target (no change). No war-on-friend penalty from anyone for attacking a capitulated vassal.		When a master civ is attacked, the aggressor gets a diplo penalty for declaring war on the master and – if the master likes its vassals – a penalty for attacking the vassals. Similarly, the vassals resent the attack on their master, and each vassal may resent the attack on the other vassals (of the same master). Can get a penalty both for the master and its capitulated vassal.
Rationale	The "You declared war on us!" penalty suffices. Should make it a bit easier to have normal relations with a vassal after helping it break free. War on capitulated vassal: Relations toward a capitulated vassal should basically never matter; see change 130v.	

No penalty if the AI civ has war-on-friend memory about the attacked civ and the attacked civ has recently attacked a liked civ (i.e. the liked civ has war plan "attacked" or "attacked recent").		
Rationale	If the AI is unhappy about a civ under attack, it shouldn't be unhappy about a third civ attacking the aggressor (even if the AI still likes the aggressor).	
Tbd.	Not nice that this depends on information that the player can't see (AI war plan type).	

130i	Memory about OB decays	
AdvCiv		*BtS*
Memory about having Open Borders (OB) decays when borders are no longer open, i.e. the number of turns with OB is counted backwards. The OB memory has an upper limit of 60.		OB memory never decreases. When borders are closed, the relations bonus is suspended until they are open again. The relations bonus is +1 for every 25 turns. Although the bonus is capped at 2, the OB memory keeps increasing after 50 turns with OB.
Rationale	Mostly for consistency, apart from shared war (130m), all diplo memory decays. Regarding the upper limit: otherwise OB that have lasted for, say, 250 turns would never decay to the point of reducing the relations bonus.	
130j	Friendly AI more resentful about bad actions, Annoyed AI happier about good actions	
Tbd.	Should Pleased AI civs also be touchy?	
When an action displeases the AI, it adds 1 to corresponding memory if it's already Annoyed or Furious, 3 if it's Friendly and 2 otherwise. When an action pleases the AI, it adds 1 if already Friendly, 3 if Annoyed or worse and 2 otherwise. This results e.g. in -4 relations for a DoW on a Friendly civ, and only -2 if they're Annoyed. This faster increase and decrease of memory is evened out by 100% faster decay than in BtS for all memory types, and the impact of each remembered action is halved. Since each action normally corresponds to a memory value of 2, it's unlikely for an action to be completely forgotten after a few turns, or to be remembered fully for a long time. "You razed our cities/ a holy city" and "You nuked us" work differently; see 130q. (But not "You nuked our friend".)		The AI stores separate memory about each civ and for each type of action, e.g. DoW or an accepted tribute request. When a diplo action occurs, the respective memory is increased by 1. The current AI attitude has no impact on this. (Although the AI e.g. doesn't make tribute demands at Pleased.) The decay speed depends on the memory type and leader personality. E.g Alexander remembers accepted tribute for 50 turns on average. That said, he could also forget about it within just 5 turns or still remember it after 115 turns (both ca. 10% probability).

Rationale	To make relations more dynamic. Also more plausible that a civ leader would be more indignant about a DoW by a friend than by an enemy. The decreased randomness is a welcome side effect. It doesn't make sense to base the diplo penalty for razing and nuking on attitude because these penalties only occur when already at war, and, then, the enemy attitude is usually Annoyed or worse. One could, alternatively, treat raze and nuke like the other diplo actions, but increase their base penalties; however, this would also affect razed cities with culture of non-war parties (which aren't necessarily Annoyed), and the BtS base penalty of -2.5 is already severe in this case.

130k	Some randomness added to AI diplo counters
Counters relevant for diplo increase and decrease probabilistically by either 0, 1 or 2 per turn.	The AI keeps track of the number of turns spent in a certain relationship with another civ: war/peace, shared/opposed religion, shared civics, resource trade, defensive pact, OB, shared war. E.g. the defensive pact counter is increased by 1 on every turn that the two civs have a defensive pact, and decreased by 1 otherwise.
Rationale	While memory decay (130j) is too unpredictable in BtS, the counters are too predictable. E.g. the OB "brought our peoples together" bonus kicks in after exactly 60 turns.
Tbd.	Need to see in tests how this affects diplo in the early game. Wouldn't want some civ to get attacked by everyone just because of unlucky at-peace and OB counting. I think early relations are dominated by "first impressions" though.

130l	Accepting an AI request reduces memory about a past rebuke and vice versa
AdvCiv	*BtS*
(disabled by default since v0.85) When an AI diplo request is approved by another civ, memory about previously denied requests of the same type is reduced by 1. Likewise, a denied request reduces memory about previously granted requests. Since each request normally adds 2 occurrences to memory (see 130j), subtracting 1 does not always have a visible effect. The following request types are affected by this change: help, tribute, change religion, change civics, join war, stop trading. Requests of differing types do not affect each other; e.g. granting tribute does not erase memory about denied help.	Accepted and denied requests are remembered separately, and entirely so.
Rationale	Another means to turn bad relations around, and vice versa. Fairly low-key, I think. Multiple AI requests in a row don't happen often, and only 1 memory is subtracted. After some testing, I find that I never pay attention to this, and the other mechanisms for improving relations seem sufficient. Disabled in order to make the mod a little less complex.

Config	Can enable this change again through `ENABLE_130L` in `GlobalDefines_advc.xml`.

130m	Shared-war diplo bonus based on war success
AdvCiv	*BtS*
+1 relations for currently sharing a war (no change), more than that only if the one side has had losses in the war (i.e. is at least in some need of assistance) and the other side has also had losses or has inflicted losses on the shared enemy (both count equally). The exact formula is complicated; see `AI_getShareWarAttitude` in `CvPlayerAI.cpp`. The total relations bonus is capped based on leader personality (no change). Moreover, the bonus can't go higher than 2 unless the teams have shared a war for at least 8 turns; another 8 turns are required for every further point. Success (and losses) in the shared war are remembered by the AI beyond the end of the war, but decay by 1.5% per turn (even while the war still lasts). The relations bonus for a remembered shared war is suspended if the former ally isn't helping in a current war. The shared-war counter decays by 0.1 per turn (on average) when no war is being shared.	The AI counts the turns spent together at war (shared-war counter), and for every 8 turns, increases relations by 1 up to a limit that depends on the AI leader. This counter never decreases, meaning that the relations bonus remains for the entire game. It is only suspended while the former war allies are at war with each other. The shared-war counter also mattery for Permanent Alliances. The AI only agrees to those after at least 40 turns of shared war.
Rationale	The everlasting relations bonus was reported as a potential bug for the Unofficial Patch 3.13, but didn't get patched, and I agree that the BtS behavior is probably deliberate. That said, a permanent relations bonus is clearly too big a reward for just staying at war. My change should ensure that you need to fight alongside the AI in (somewhat) good faith in order to get the relations bonus. I don't think players need to know the specifics of the war success formula; I hope it works pretty intuitively.
No shared war bonus if either war ally is a capitulated vassal. No defensive pact bonus for capitulated vassals.	Shared wars can bring a master and its capitulated vassals closer together. All vassal agreements are treated as defensive pacts when it comes to relations bonuses.
Rationale	Capitulated vassals are dragged to war by their masters. They should generally be unhappy about that. At best, the shared war experience can make up for this unhappiness.
AI less likely to ask for military aid if the war is still recent; same frequency overall. If Annoyed towards the player, the AI asks for an embargo instead of joint war. Past wars by the human don't matter. Also less inclined to ask for war against a civ that the player recently made peace with.	AI civs on whom a human civ has declared war in the past don't ask that human civ for military aid, but the current attitude isn't an obstacle. Can't ask if there's peace treaty, i.e. for 10 turns; beyond that, recent peace doesn't matter.

Rationale	A joint war is asked too much from a civ that the AI considers to be an adversary. (Or they could ask, but they shouldn't be mad when denied.) Embargo requests should generally be more common when the AI is at war. If the player has recently been at war with the target, then, apparently, the player is unwilling or unable to defeat the target. Also don't want the AI to drag players into the same war repeatedly.

Fighting against units inside another civ's borders is extra effective at increasing the shared-war memory. Of course, these units need to be hostile to the tile owner. Losing a unit in such a fight counts as much as defeating a hostile unit. Barbarians count as hostile in this context, i.e. it's possible to get a "mutual military struggle" bonus without even sharing a war, just by fighting barbarians inside the other civ's borders. Fighting barbarians elsewhere doesn't help though, and the bonus won't exceed +1 unless there is or was previously a shared war. Units with hidden identity (i.e. Privateers) also count (but not if the Privateer belongs to the plot owner).	War success has no impact on the shared-war diplo, no matter where it occurs.
Rationale	If someone engages enemy units in the AI's territory, that someone is really being helpful, and not just competing for loot; the AI should appreciate that. Regarding barbarians, I sometimes find that my, say, scouting Chariot could help an AI civ against barbarian invaders, but BtS gives me no incentive to do so. The change should make these situations more interesting.

130n	Religions that the AI has only recently encountered cause a lower diplo penalty
AdvCiv	*BtS*
No diplo penalty for different religion from AI civs that don't know a single city with that religion. Once they do encounter the religion in a city (from exploration, map trade or because the religion spreads), it takes 8 turns for the diplo penalty to switch on.	The diplo penalty applies almost fully (up to -3) upon meeting a civ with a different state religion. After 5 turns, it gets 1 worse.
Rationale	To help initially isolated, religious AI civs to catch up through tech trade once they meet their rivals. In BtS, everyone tends to be Annoyed towards the newcomer. Should also lessen religious animosity in the early game, but won't delay it for long. Also doesn't make sense to me that a civ leader instantly hates a religion when he/she first hears about it.
130o	Changes to made-demand memory
See also	130v prevents vassals from acceding to tribute demands from rivals. 144: refusal of gift request.

When a human player declares war on an AI civ (primary DoW; not through DP), and that AI civ remembers having paid tribute to the player, the AI civ and all non-vassal AI civs that it has met set their recent-demand memory about the player to 8, which (due to change 130j) means that they won't consider any requests for help or demands for tribute by the player for (on average, on Normal speed) 80 turns.	Accepting tribute results in a 10-turn peace treaty. After that, there is no particular penalty for declaring war despite tribute.
If the AI denies a demand for tribute, the human player does not receive a diplo penalty. Only granted tribute results in "You made an arrogant demand", and this memory decays after 30 turns on average. I.e. the only negative consequence of a denied demand is that the recent-demand memory increases.	"You made an arrogant demand" regardless of whether tribute was granted; never goes away.
Accepting tribute still result in a peace treaty.	
An AI civ that is attacked despite having paid tribute also increases its declared-war-on-us memory as if it was Friendly toward the attacker, which normally results in a -4 penalty.	-3 regardless of circumstances.
When an AI civ declares war (primary DoW) or signs a vassal agreement, it sets all its arrogant-demand memory to 0.	

Rationale	The BtS mechanism incentivizes players to demand tribute from civs about 10 turns before attacking them anyway. Not at all how tribute should intuitively work, not how it works when the AI asks tribute from a human player, and not an interesting decision. Could go about improving this in many ways. My approach is supposed to be low-key and low-effort. I removed the penalty for failed demands because players need to be able to tell if a civ has actually paid; if it hasn't, it's OK to attack. Moreover, a penalty for a failed demand encourages reloading. Not sure if the penalty (no requests for 80 turns) is painful, but at least it makes it impossible to routinely receive tribute before going to war. Not ideal that the safety period is tied to memory decay, and thus randomized. Wouldn't make sense to apply this change to AI civs that declare war after receiving tribute from humans; AI civs never request or demand anything from each other, so increasing AI-to-AI recent-demand memory would have no effect. An earlier implementation kept the "arrogant demand" penalty for unsuccesful tribute demands, and added a new type of diplo memory ("exacted tribute") to distinguish the two outcomes.
Config	The 80 turns are customizable in `GlobalDefines_advc.xml`.

Tbd.	Arrogant demand should be remembered for a non-randomized period of time. Also, 30 turns is too long; try 25. Would be nice to show info/ a reminder about this change on the diplo screen, before or after the player makes a demand; however, the text with which the AI responds to a demand is also used for vassal tribute (which doesn't cause "arrogant demand" memory) and "We demand that you give us this in tribute" mustn't take up more than one line because it's always shown while the player arranges trades. Could show a message I guess (outside the diplo screen) ... Would like rejected gift requests to add only 1 to recent-demand memory; lower stakes that way. Would have to move code from CvPlayer::handleDiploEvent into CvPlayerAI::AI_considerOffer for this.	
Gandhi gets as upset as most other AI leaders (i.e. -1 relations) when he pays tribute.		Gandhi is the only leader who doesn't mind tribute demands.
Rationale	Otherwise, the new mechanism couldn't apply to Gandhi, which would be strange: why do the other AI civs not care when Gandhi is attacked after paying tribute? Gandhi has still enough other quirks; he may well be the leader with the most extreme personality overall.	
When the AI disregards a request for a gift or a tribute demand because it still remembers a recent request or demand (both based on recent-demand memory), recent-demand memory is only increased by one, meaning it'll take half as long as in BtS until the next request/ demand is considered. Making requests and demands can't increase the recent-demand memory beyond 2.		Each request adds fully to the recent-request memory, meaning that, if the AI still remembers one recent request when a new request is made, it takes 40 turns on average until another request is considered. Also, each tribute demand (regardless of success) further worsens relations, up to a maximum of 10 demands. I.e. one can worsen relations almost arbitrarily within a single turn.
Rationale	Thanks to change 130j, there's now a lighter punishment available for aggressive begging. 40 turns is awfully long.	
If UWAI is enabled: The AI remembers for 10 turns on average (plus the duration of the peace treaty) whether a human has recently accepted a demand. While the peace treaty from the demand lasts, the AI doesn't plan war against the human. After the peace treaty, so long as the demand is remembered as recent, the AI treats the human as if its attitude was at least Pleased (as far as war planning is concerned).		Only remembers "You gave us tribute" (for 50 turns on average), but not whether the tribute was granted recently. The BtS AI never plans war during a peace treaty, but the K-Mod AI does, and the K-Mod AI can declare war shortly after the peace treaty ends.
Rationale	Since humans are now encouraged not to attack shortly after receiving tribute, it seems like a double standard when the AI does it.	

130p	Fair-trade bonus and rival-trade penalty reworked	
AdvCiv		*BtS*

Each time a trade is made, a score based on the normalized gold value and the current game score of both parties is recorded. The accumulated score decays by 1% each turn (Normal speed). The effect on relations is proportional to the remembered score, and increased a bit if the two civs have only recently first met.	Raw gold values are recorded without adjustment for game speed or game progress, and don't decay. When computing relations, the total recorded gold value is divided by the has-met counter, i.e. the number of turns the two civs have known each other.
Rationale	The BtS formula works OK for Normal speed in the first third of the game, but becomes too sensitive later in the game (because trade values increase faster than the has-met counter), and on slower game speed settings. It also produces weird results for civs met in the middle of the game; a small gift can be enough for a +4 bonus or -4 penalty, and modifiers can decrease rapidly as the has-met counter increases. I'm taking a more explicit approach by recording normalized trade scores and applying exponential decay each turn (instead of implicit decay through increasing trade values and has-met counters). Game score seems well suited for computing trade scores because game scores tend to increase at a similar pace as trade values. Despite the decay, trade scores still tend to be higher between civs that have known each other for a long time than between civs that have recently met. It does, therefore, make sense to factor in the has-met counter, but the effect is now much smaller than in BtS.
Tbd.	Make this more sensitive when tech trading isn't allowed.
Open Borders with a worst enemy contribute significantly to the relations penalty. The impact is based on the number of turns that the two civs have had OB. None if the borders aren't currently open. OB (and Defensive Pact) have no impact on the fair trade bonus, and don't contribute to trade memory. The AI refuses to sign a DP if a DP was recently canceled (explicitly canceled or through a war declared by one of the signatories).	Ongoing deals factor into the trade memory for both fair trade and enemy trade, but, for OB (and DP), the deal value is so small that the impact is negligible. Resource trades have a non-negligible (though small) impact. All ongoing deals can cause the AI to demand a trade embargo. The AI refuses to sign recently canceled OB, but, for DP, there is no such restriction.
Rationale	OB can be very helpful for the enemy civ, may even be crucial at wartime, so I don't think the potential -1 from refusing a trade embargo is a sufficient penalty. I prefer to keep OB and DP out of the trade memory, so that cancelation of those deals immediately reduces the enemy trade penalty. This can't be abused (in singleplayer) by suspending OB and DP just for one turn because of the AI's refusal to sign OB and DP if recently canceled. DP needed this kind of restriction anyway; too easy to flick DP on and off in BtS.
See also	130t factors attitude and worst enemy into anger about rival DP. dlph.3 keeps DP intact after a foreign DoW. 130z adds DP-canceled memory upon making peace. 550a gives civs that have fallen behind better deals by adjusting trade values. This adjustment factors half into the trade score relevant for relations.

Tbd.	May have to dial this up once there is tech diffusion from OB. Should perhaps only refuse to reinstate OB/ DP if the other side cancels them. Not quite easy to implement as cancelation memory is added in `CvDeal::endTrade`; would have to move that to `CvPlayerAI::AI_doDiplo`. Peace treaties should perhaps also add to the enemy trade penalty. Can currently ask for a gift or tribute to avoid getting asked to join a war.
"Our defensive pact proves ..." applies only when currently in a DP.	Doesn't check if currently in a DP. The relations bonus is based on the number of turns spent in a DP. That number counts backwards when not in a DP.
Rationale	More intuitive this way, and consistent with how the OB relations bonus works.
Reduced impact of OB and resource trades if the worst enemy has OB with many civs.	
Rationale	An AI civ can't afford to be mad at everyone. This is less of a problem for tech trades because one civ can only do so much tech trading.
Decreased the impact of gifts vs. trades a little.	The AI tracks both gifts and traded items. Gifts are hated three times worse than traded items.
Rationale	I guess the idea is that trades aren't so bad because the worst enemy has to give something away too. But trading is dominated by tech trades, and giving away tech doesn't really hurt the worst enemy; it's very much win-win.
Reduced impact on rival trade if the AI relations towards the enemy and the enemy's trade partner are similarly bad. When the worst enemy of an AI civ changes, that civ reduces its rival-trade memory about trades with its (former) worst enemy by one third.	When an AI civ dislikes two civs equally, and one of these enemies trades with the other, the distinction of "worst enemy" can oscillate between the two. Even if the AI reconciles with its worst enemy, it continues to be mad at civs that previously traded with its former enemy.
Rationale	Both changes are aimed at preventing situations where a civ that trades with the worst enemy becomes itself the worst enemy. This can seem erratic. That said, even when the worst enemy changes, "you've trade**d** with our worst enemies" remains true. I've considered halving the memory, but that could drop a -3 penalty to -1 due to rounding, which seems a bit much.
When picking the worst enemy, civs with whom the AI is at peace are only considered when the AI isn't at war with anyone. Exception: Dogpile wars (e.g. on request of another civ) have no impact on worst enemy.	Worst enemy chosen only based on attitude.
Rationale	Trades with a war enemy are much more likely to harm the AI than trades with some cold-war foe.
See also	001e fixes a bug that causes the AI to make a stop-trading demand against a civ that has just stopped being its worst enemy.

130q	Nuke and raze memory based on city size
See also	130j exempts raze and nuke memory from being affected by attitude; 650 deals with other changes to nuclear war (minor so far).
AdvCiv	*BtS*

When a city is nuked, the AI owner remembers this as 1 to 3 bad actions depending on the importance of the city. Nukes that don't affect a city are counted as 1. If the nuke is counted as 1, partners of the nuked civ don't get upset ("you nuked our friends"). Razed cities count as 2 bad actions in the case of a significant city, otherwise 1.	Each nuke counts as 1 bad action (which is equivalent to 2 bad actions given change 130j), even if it only hits a ship in the middle of the ocean, and nukes always trigger "you nuked our friends". Each razed city counts equally (unless it has 0 city culture and a dead civ has the highest city culture; see change 099).
Rationale	It should make a difference whether a city is hit at all, and whether it's, say, the capital, or some backwater. Raze anger generally seems a bit high, or just ineffective at discouraging razing. For now, lower the anger a bit overall by exempting minor cities.
Tbd.	The raze mechanism needs to change so that it takes multiple turns (or multiple units). The raze popup should say how great the anger will be.
The AI isn't upset about a nuked friend if the owner of the nuke is or used to be a friend that has itself been nuked at least as badly.	The AI only checks whether it's at least Cautious towards the victim.
Rationale	Don't hate both sides of a nuclear war if it's just tit for tat.
AdvCiv	*K-Mod*
AI doesn't disband nukes when in financial trouble unless no units other than cargo units remain.	As far as I can tell, nukes are disbanded before most any unit. BtS tried to save expensive units, which is fine in the case of nukes, but K-Mod focuses on XP, which is generally better, but fails for nules.

130r	All AI diplo memory decays; see the table in the DDiplo chapter
See also	130y further decreases declared-war memory 130o deals with memory about tribute demands
AdvCiv	*BtS*
Super-linear (power law) decay: The more incidents of a kind the AI remembers, the faster it tends to forget each of them.	Decay is linear in the number of turns that have passed.
Rationale	There should always be a route to reconciliation (though it doesn't always have to be worth pursuing).
All decay probabilities are adjusted to game speed using the same (moderate) modifier as for Golden Ages: 100% slower decay on Marathon, 25% slower on Epic, 20% faster on Quick	The various AI memory values are decremented each turn, each with its own probability. The probabilities are the unaffected by the game speed setting.

Rationale	The contact delays are unaffected by game speed, which means that the AI does e.g. ask for help more often in a Marathon game than in an Epic game; however, there aren't normally twice as many requests on Marathon than on Epic because certain other conditions need to be true for each specific request, and other remembered events, such as declared wars (now subject to decay as well), aren't controlled by contact delays, and don't happen that much more frequently on slower settings. So, a middle ground is needed.
Tbd.	Perhaps the contact delays should be increased a bit on the slower settings. It would make sense to tie help requests to research speed, but, for hired war or requests to stop trading, this would be too slow; so, again based on the Golden Age modifier, I guess ...

Transformed the independence bonus into a memory-based bonus to let it decay. It's treated as 10 memory decaying at a rate of -1 every 30 turns on average (Normal speed).	A liberated colony is forever +10 grateful to its old homeland.
Rationale	Just to be consistent with the "everything decays" paradigm.
War success decays by 3% each turn; that's a reduction to 75% after 10 turns.	War success doesn't decay; only reset to 0 when a war ends.
Rationale	In long wars, initial successes tend to have too much weight.
Tbd.	Initial successes should perhaps be ignored entirely, or decay very quickly because they're often owed to surprise and thus not a good estimate for the future course of the war. Resetting war success at the end of a war isn't smart because war could break out again only 10 turns later, but I think a lot of code assumes that war success is 0 when at peace, so this might be difficult to change.
See also	UWAI remembers the overall outcome of a war before war success is reset.
No decay of declared-war while the war lasts. Same goes for war-on-friend memory while at war with a partner.	No decay of either memory type ever.
Rationale	More plausible that forgiveness can't happen while the transgression is ongoing. Also, war-on-us memory was decaying too fast without this restriction., and the AI was often willing to sign OB right after the war ended.
Recently-canceled memory (about OB, DP and VVA) can only decay half (from 2 down to 1) while at war.	No recently-canceled memory about DP and VVA. AI often willing to sign OB right after a war ends.
See also	130p introduces recently-canceled memory for DP and 143 for VVA. 130j counts memory at a finer granularity, which is why canceling a deal sets recently-canceled memory to 2.

130s	Accepting to join a war gives +1 relations
AdvCiv	*BtS*

When a human player accepts an AI request for war aid, this is remembered as "You agreed to come to our aid in wartime." for 100 turns on average (on Normal speed). The bonus is suspended when the human civ isn't sharing any war with the AI civ and the AI civ is fighting at least one war.	The relations effect, including the explanation text, is implemented, but disabled in Leaderhead XML. The duration is set to 150 turns on average.
Rationale	The thankless help requests bother some players; military assistance shouldn't be treated as a matter of course – that's what defensive pacts are for. Perhaps the original developers felt that the shared-war bonus is enough reward for a declaration of war, but now that the shared-war bonus is harder to get (change 130m), it should be OK to reward the granted request specifically. 150 turns seems a bit much though.
Config	Can be disabled in `GlobalDefines_advc.xml`. (Or in `Civ4LeaderHeadInfos.xml`, but there, the change would have to be made for each leader individually.)
See also	130m should make the timing of help requests more predictable. 104i (UWAI) makes the target of a joint war refuse to talk as in BtS, thus preventing the hired civ from making peace immediately. 145 also suspends a diplo bonus when the human is no longer in compliance.

130t	Diplo penalty for Defensive Pact based on relations towards third party
See also	130p makes the AI refuse a DP if recently canceled, and exempts DP from enemy trade and fair trade diplo.

AdvCiv	*BtS*
The relations penalty from an AI civ X towards a civ Y for having a defensive pact with a rival Z of X is based on the attitude of X towards Z. There is no penalty if the attitude is one higher than the `DeclareWarThem` threshold, or when X also has a DP with Z, or when X is too weak to attack Z regardless of the DP. The `DeclareWarThem` threshold is at Annoyed for e.g. Darius, at Cautious for e.g. Hannibal and at Pleased for e.g. Julius Caesar. (And at Friendly for Catherine, but this is no different from Pleased in this case because I'm using the threshold plus 1, and Friendly is the highest possible attitude.)	No penalty if X has a DP with Y; attitude doesn't matter.

Rationale	BtS doesn't properly factor DP into enemy trade diplo, and I think it's better to have all the negative DP diplo in one place anyway. A DP of Y with both X and Z shouldn't satisfy X and Z unless they like each other. In this constellation, Y threatens war on X if X should attack Z, which should offend X. Y also promises to protect X; but this is covered by the DP bonus (no change to that). As for the threshold, I've considered using the `DefensivePactRefuse` threshold from the Leaderhead XML, which is Cautious for some leaders, but a leader that is quick to sign DP shouldn't necessarily be forgiving about rival DP. (The opposite could be true: these leaders think that DP are important, and are therefore worried about rival DP.) Warmongers tend to have high `DeclareWarThem` thresholds (easy to convince to declare war). These leaders should be bothered most by DPs.
AI refuses to sign DP without OB: "Surely, you must be joking."	
Rationale	How are you going to defend us without entering our borders??
Anger about rival peace vassals works the same way as anger about defensive pacts.	see 130w
Rationale	Voluntary vassal agreements are much like defensive pacts.
See also	About capitulated vassals, see 130w.

130u	Proxy AI treated as Cautious
AdvCiv	*BtS*
The AI running in the background, ready to take over for a human player, is Cautious towards everyone no matter what happens.	The proxy AI computes its attitude just as if it were in control.
Rationale	Should only make a difference when a player drops out in multiplayer. With my change, the proxy AI e.g. doesn't take note of trades with the human's worst enemy (doesn't have one) until the AI takeover. This is more fair to the remaining players because they can't see who the worst enemy of the AI is until it takes control.
Tbd.	There are probably some places in the code where a proxy AI remembers something based on AI leader attributes that shouldn't apply to a human. Less problematic than the attitude-based behavior.
See also	130v lets capitulated vassals mimic their masters' attitude. In the case of a human master, this attitude is Cautious.

130v	Masters are held responsible for their vassals; vassals as zombies

See also	K-Mod disables vassal-master attitude sharing; UWAI disregards capitulated vassals as war targets; 130d makes capitulated vassals ineligible as worst enemies. 130t bases the "vassals to your empire" penalty on attitude in the case of peace vassals, and 130w penalizes expansionism through vassals and conquests. 130y and 130h reduce war-based diplo penalties for vassals, taking into account that vassals don't have a choice in starting wars. 099c prevents master cities from flipping to vassal, and 025 reduces the culture spread of capitulated vassals. 143b prevents capitulated vassals from building nukes. 014 makes capitulated vassals ineligible for team votes, stops them from pursuing victory and from building great wonders. 112b changes conditions for capitulation. 130f lets capitulated vassals agree to embargoes for free. CFC discussion about the relationship between capitulated vassals and their masters: Link.
Tbd.	Would prefer temporary capitulations to the zombie approach, but this would be a lot of work to implement. As it is now, capitulated vassals should perhaps only be allowed to trade tech with their masters. Or just prevent them from brokering to other civs. That said, the AI currently keeps its vassals (capitulated ones too) at arm's length tech-wise; that might have to be changed if vassals can't trade or broker.

AdvCiv	*BtS*
If a capitulated vassal • razes a (holy) city; • trades with someone or someone's enemy; • has OB with someone's enemy; or • nukes someone (but not just someone's friend) half of the resulting relations modifier is applied to the vassal, and half to the master. Relations penalties about shared borders are also shared between vassal and master. In team games, the penalties apply to the leader of the master team.	Actions of a vassal don't reflect on the master, but civs are generally upset about "rivals" being vassals to the master's "empire", and vassals are possible war targets. Prior to K-Mod, the AI attitude towards the master was generally lowered based on the attitude towards the vassal.

Rationale	My thinking is that there shouldn't be grudges against capitulated vassals because they're basically dead already. This opens up a loophole: A human master could let vassals do the dirty work (razing), or use them as buffers against shared-border anger. The change about nukes is obsolete because 143b now prevents capitulated vassals from having nukes. BtS attitude averaging would fix this issue, but also punishes the master for e.g. the vassal's religion and any bad deeds prior to the vassal agreement.

Vassals are always Friendly towards their master, and capitulated vassals share the master's attitude toward rivals, but their attitude can be at best Cautious. AI civs project their attitude towards a civ onto the capitulated vassals of that civ.	Voluntary vassals are Friendly towards their master except when deciding whether to break free. The attitude of and towards capitulated vassals is computed normally, but rarely matters.
This does not apply when a vassal is deciding whether to break free. Masters are Pleased towards their capitulated vassals, and capitulated vassals are Pleased toward fellow vassals with the same master.	Sometimes a (capitulated) vassal has a much more positive attitude towards another civ than its master, and will trade away technologies that the master wouldn't trade.
Vassals never grant gifts to rivals and never ask rivals for gifts.	When a vassal grants a gift to a rival or receives one, a peace treaty is signed between the master and the rival. Thus a civ with multiple vassals can sometimes be kept at peace indefinitely.
Capitulated vassals are slightly reluctant to found cities, especially on other continents.	Capitulated vassals with few cities left tend to found cities in marginal spots because the additional expenses (esp. for number of cities and civics) are small. The additional maintenance for the master isn't taken into account.
Rationale	Given my other changes, the attitude of and towards capitulated vassals really doesn't matter anymore, and showing them, as is often the case, Annoyed towards their master is merely misleading. I'm still showing the actual relations value (e.g. "Friendly (-2)") and modifiers because they do matter again if a vassal breaks free. If vassals are supposed to be zombies, they shouldn't be relevant for tech trading, and they generally shouldn't undermine the master's foreign policy. Until v0.85, I had capitulated vassals share the master's attitude toward other civs, but this made it too easy for a human player to dictate civics and siphon gold from vassals with AI masters; now they're at best Cautious toward rivals.

130w	Penalty for expansionism: "We oppose your ruthless expansionism"

Up to -4 based on the number of owned cities with foreign majority culture (depending on the difference between highest culture and owner's culture), the total number of cities, and the personality of the AI leader (peace weight minus warmonger respect). The penalty is reduced if the AI civ's military can't compete with that of the expansionist civ. The AI is (much) more sensitive about cities it previously owned. Other than that, so long as just about a third of a civ's cities are foreign, none of the other civs will mind. Up to -5 for the number of capitulated vassals, typically about -1 per vassal, but it depends on the number of cities owned by the vassal, the initial number of civs, and (as above) AI personality and power ratio. This penalty is added to the one for voluntary vassals (130t), and they're displayed together as "We are worried about our rivals being vassals to your empire".	If a civ has at least one vassal, the "vassals to your empire" penalty is based on the military power of the master and all its vassals. Other than that, there are rank-based penalties (130c).

Rationale	Not fair to give a penalty based on military power only to civs that control a vassal. A civ that just conquers all cities isn't less threatening. Since I don't want to remove the vassal penalty, I'm adding a counterpart that penalizes conquered cities. Penalizing military power isn't good because that hardly affects human civs. The personality-based term means that e.g. Genghis Khan won't get upset about expansionism, which is consistent with his own behavior and his first-impressions bonus with other warmongers. Also don't want all leaders to increase the penalty synchronously because, then, conquering a single city could have a big negative impact on relations overall; the personality factor makes sure that the overall effect changes smoothly. The power ratio is factored in because it doesn't help if small civs stop trading with the expansionists – this mostly hurts the small civs. As razing doesn't remove tile culture, this penalty can't be circumvented by razing (and razing carries its own diplo penalties too).
See also	Without 099, this change wouldn't really work because cities conquered from eliminated civs wouldn't count.

130x	Normalized diplo from shared/different religion and civics
See also	130n delays the diplo penalty from "heathen" religion
AdvCiv	*BtS*

The maximal relations bonuses from shared religion and civics are reduced if many known civs have this religion or civic. The maximal penalty for having a different religion is reduced if many known civs have a different religion.	The AI counts the turns that religion and civics have been shared or have differed. The relations modifier is based on that turn count, but limited by a leader-specific bound. That bound is between +2 and +6 for civics (+6 only for Stalin, Mao and Gandhi), between +2 and +7 for shared religion (+7 only for Asoka and Zara Yaqob) and between 0 and -2 for differing religion. Unaffected by the bound: +1 for shared religion/civic and -1 for differing religion regardless of the number of turns. The civ with the holy city adds another +/-1 for religion.
Rationale	The high diplo bonuses from early civics, especially Hereditary Rule, are too easy to get, and diplomacy gets boring when everyone's in the same religion. The change seems also realistic: if everyone shares a trait, it gets taken for granted, and lack of external enemies leads to infighting. And it's unwise to eschew everyone when they all have "heathen" religions.
Tbd.	Diplo bonuses for religious civics should be reduced (or disabled) if the state religion doesn't match. Shouldn't get a net relations bonus for sharing, say, Organized Religion with Suryavarman despite running a different religion.

130y	Lower diplo penalties for wars involving vassals, DP or seeing little action
AdvCiv	*BtS*
When making peace, the declared-war relations penalty is reduced (but not below -2) if the other side has made little war success (less than about the equivalent of capturing a city). The penalty is further reduced if either side is a capitulated vassal. A capitulated vassal also reduces its declared-war penalties when it regains its independence. If a vassal is freed because its master has capitulated to a third civ, the third civ automatically makes peace with the vassal, but without a peace treaty. If the third civ doesn't have much war success against the freed vassal, and the free vassal had been a capitulated vassal, the third civs gains +2 "You've granted us independence" from the freed vassal.	The declared-war penalty is solely based on the number of declarations of war; only the (unimportant) hidden "this war is going badly" penalty is based on war success. When declaring war on a master civ, war against the vassal civs is implied, and the aggressor gets the full (never decaying) -3 "You declared war on us" from each vassal, even if the war takes place entirely in the master's territory, and ends up freeing a capitulated vassal. Likewise, when a master declares war, its vassals suffer a -3 relations penalty. When a civ capitulates, the vassals of that civ are freed. They remain at war with the master of their former master, and the former master declares war on the former vassal.
Rationale	Shouldn't hold civs fully accountable for declarations of war if these declarations were enforced by the vassal system, especially not for capitulated vassals. The change should make it easier to free vassals and have a cooperative relationship with them henceforth. I'm factoring in war success because vassals should not be happy about being liberated when that involves killing most of their units or taking away their cities. The reduced penalty for non-vassals practically only applies to wars where neither side sent any units or an invader changed its mind in the face of tough defenses. Not plausible for such wars to have long running repercussions.
See also	130h disables war-on-friend penalties for attacking master/vassal alliances; sha reduces "war spoils our relations" penalty if there is little war success.
A DoW caused by honoring a DP leads to only a -2 relations penalty from the civ that triggered the DP. (No change to "war on friend" penalties.)	Full relations penalty (-3).
Rationale	Diplo penalties for fulfilling a DP seem justifiable, or at least not wrong enough to change radically. I'm just reducing the penalty a bit. With change 130j, the "war on us" penalty could otherwise be as high as -4. -2 aligns with the "expected nothing better" rationale for 130j.
Tbd.	Should probably not assign war-on-friend penalties when war is triggered by a defensive pact, and perhaps not for wars declared by capitulated vassals either.

130z	AI refuses to sign OB, DP after a war
AdvCiv	*K-Mod*
When a war ends, the AI sets its recently-canceled memory about canceled Open Borders and Defensive Pact to at least 1. Due to change 130j, that memory takes 5 turns on average to disappear; then, the AI becomes willing to consider OB and DP again. No memory is added if the AI attitude toward the former war enemy is one above the threshold for signing OB/ DP. (Unlikely to happen in the case of DP.) Also no cancelation memory after capitulation.	Recently-canceled memory is set when a war starts, and can expire while the war is fought. It's possible that the AI signs OB or DP (no recently-canceled memory about that at all) on the turn that peace is made.
Rationale	Reconciliation is good, but OB directly after peace is too quick.
See also	130p introduces recently-canceled memory for DP

131	Misc. changes to AI evaluation of units, buildings, techs, civics and religions
AI more likely to build a high-utility building instead of an arbitrary XP or gold building.	
AI tech evaluation: Reduced the value assigned to units whose resource requirements aren't met. E.g. to make the AI less inclined to research Horseback Riding when it doesn't have horses.	K-Mod: Already reduced; I'm reducing it more.
AI switches religion probabilistically based on the ratio of the current religion's utility to the new religion's utility. Increased attraction to AP.	Current state religion is counted as having between +33% and +50% utility to create inertia and avoid revolutions. However, once another religion reaches higher utility despite this bonus, the AI switches immediately, leading to occasional back and forth switches as cities are conquered and lost again.

132	More options when changing another civ's civics and religion
AdvCiv	*BtS*
Can (a) bring vassals and war enemies (peace negotiation), or (b) any civ through a Spy, to switch to any economy and religion civic except the initial ones, and to any non-minority religion (same threshold as for "not enough of our people follow that faith"). The petitioned side charges twice as much trade value if the petitioner is not running the target civic or religion.	Can only ask anyone to switch to own civics (except the initial ones) and own religion (unless minority).

Rationale	"Preach only what you practice" is sensible, but only when negotiating as peers. E.g. it makes sense to demand a switch to Pacifism as part of a peace treaty, or to ask a vassal to switch out of Mercantilism or Theocracy so that the master's corporations and religions can spread. Also more interesting (and entertaining) options this way. A higher cost for switching to an unused civic makes sense in case a) because the other side will suspect bad intentions, and (somewhat) in case b) because the Spy owner lacks knowledge about the target civic/ religion. Why not allow all civics? Don't want that many options on the diplo screen. Also seems far-fetched to switch someone to, say, Vassalage in the Modern era, when no civ in the game has been in Vassalage for 500 years. Assume civs to be somewhat flexible in their religion civics and economics. These are also the columns with the isolationist civics Mercantilism, State Property and Theocracy.
132b	

AI vassals are reluctant to switch civics if their master is human.	Vassal/master status doesn't affect civic choices. The diplo bonus from sharing a religion with the master factors into the religion choice of the vassal.
Rationale	Humans tend to ask vassals to adopt certain civics; switching back and forth doesn't help either side.
132c	Switching to a state religion requires at least one city with that religion; doesn't suffice if another team member has a city.
Rationale	No special need for team members to align their state religions. Minority religion is also determined based on per-civ city counts, and not per-team.

133	AI cancels more deals
AdvCiv	*BBAI*
AI cancels tribute deals ("it's time for your tribute") once a vassal agreement ends.	Tribute deals remain in place until (if ever) the AI reaches so much military power that it wouldn't have agreed to the deals in the first place.
Rationale	The problem of lingering tribute may have been introduced by BBAI, which replaced BtS/Warlords custom code for deal cancelation with calls to `AI_considerOffer`. K-Mod has mostly repaired this (deals from non-vassal tribute demands and gifts do get canceled), but missed a spot.
Tbd.	Fair non-tribute deals where the AI gives away its only resource of a kind still aren't canceled. Would also be nice if the AI canceled deals that no longer make sense for the player – e.g. cancel deal for Rice when the player settles on a Rice resource. Both fairly complicated to implement (I've tried).
AdvCiv	*BtS*
When a vassal agreement ends, all remaining deals between vassal and master can be canceled by either side (turns-to-cancel set to 0).	Deals with a minimum duration can't be canceled until the 10 turns are over, regardless of the vassal agreement. This includes resource gifts to the vassal.

Rationale	A minor issue. They shouldn't be forced to continue free resource deliveries. For players, it can be confusing to see free resource trades continue between two AI civs that no longer have a vassal agreement.

AI cancels Open Borders, Defensive Pact and Permanent Alliance when AI attitude drops below the thresholds for signing the respective agreements. Cancelation is delayed with a per-turn probability except when the other side has become the AI civ's worst enemy.	AI cancels these agreements immediately when the other side becomes its worst enemy. Otherwise, AI attitude doesn't lead to cancelation (though other considerations may). E.g. borders can remain open indefinitely despite Annoyed attitude.

Rationale	I think the original idea was that deals get canceled when their attitude threshold isn't met anymore; they just didn't get the implementation right. The delay is supposed to give the other side time to amend relations before canceling OB. (Once OB are canceled, it's difficult to get them back because the "brought us closer together" diplo bonus is lost.)

134	Changes to AI-to-human offers
See also	136b also fits here (map trades offered by the AI)
134a	AI offers peace (only if UWAI disabled, and never offers to pay for peace)

AdvCiv	*BtS*
AI proposes peace, but doesn't offer to pay for it. When compiling reparations, the AI considers its own end-war value 20% greater. The discount is lost when the player counter-proposes.	The AI never contacts a human player to offer peace (or capitulation).

Rationale	Peace offers apparently worked in Vanilla; not sure when they broke. The discount is there to make the AI offer worth considering. K-Mod has introduced a similar discount for other AI offers. A good idea; without this incentive, the AI might as well not contact human civs at all.
Tbd.	I had to work around a bug in the BtS executable that suppresses diplo popups from war enemies. My workaround relies on the exact order of calls at the beginning of human turns, and on the order of call parameters of the `atWar` function. Messy. Some modders had planned to reimplement the Trade screen (for various reasons); this would fix the problem in a cleaner manner, but nothing became of it. CFC threads: #1, #2 My workaround breaks if the AI offers to pay for peace or to capitulate. Perhaps this can somehow be fixed inside the DLL, but, after struggling with this for a whole day, I've given up. Disabled this change if UWAI is enabled because UWAI uses a different order of calls; don't want to adjust the workaround while the UWAI code may change again. Probably better to remove change 134a altogether and rather send a message to the human player, asking for a call-back.
134b	No discount if recently begged

AdvCiv	*K-Mod*

~~The AI offers no discounts to civs that have recently asked for a gift.~~ I'm afraid it's usually more profitable to ask for gifts all the time than to wait for discounts. If so, this change would mostly disable discounts, which isn't what I want. (I want to disincentivize periodic gift requests.)	The AI doesn't grant gift requests by civs that have recently asked for a gift, but discounts aren't affected by gift requests.
Rationale	An attempt to disincentivize gift requests by the clock. Some players set alerts for this every 25 turns; see e.g. this CFC thread.

135	Changes to Hotseat
See also	106b always opens the Event Log when there is a new message in Hotseat
AdvCiv	*BtS*
135a	Resource bubbles
If a player activates resource bubbles, they remain active until a player deactivates them.	When in Hotseat, resource bubbles are deactivated at the end of each human turn. Other map layers (e.g. yield display) are not reset.
Rationale	The BtS behavior is extremely annoying if all players want to play with resource bubbles. Otherwise, the players could still agree not to activate them, or one player flicks them on and the next flicks them off.
Tbd.	The proper solution would be to remember each player's active layers at end of turn, and restore them at the beginning of the next turn. Same for player options, which are currently shared by all players. Ideally, layers and options would also be stored in savegames, but that's not really necessary.
See also	004m increases the default zoom distance (also reset each turn in Hotseat).
135b	`MoreCiv4lerts` in Hotseat
AdvCiv	*BUG*
Added per-player memory to the BUG alerts in the `MoreCiv4lerts` package. (The most useful ones, like tech trades, are in that package.)	`MoreCiv4lerts` fire every turn in Hotseat; unusable.
Rationale	The first package of alerts seems to have been implemented with multiplayer in mind, but not the "More" ones.
Tbd.	Don't know if the alerts also work for networked multiplayer. BUG options are shared between all Hotseat players, i.e. players need to agree which alerts to enable.
See also	106c also fixes issues with Civ4lerts.
135c	Debug mode accessible in Hotseat
~~Can use WorldBuilder button to toggle debug mode if admin password set to "debug" in Staging Room.~~ Removed again because I was only able to reveal the bare map, which isn't useful. Proper debugging for Hotseat would've been nice, but the developers really went out of their way to make this painful to implement.	Ctrl-Z normally toggles debug mode, but not in multiplayer.

136	Changes to map trades

136a	Circumnavigation checked at end of turn	
AdvCiv		*BBAI*
The game checks at the end of each civ's turn if that civ has circumnavigated the globe. Thus, if, through a map trade, two civs meet the circumnavigation conditions on the same turn, only that civ is rewarded on whose turn the map trade is completed. In a human-AI map trade, the human always wins because trades involving humans are always completed on a human turn. So long as no one has achieved circumnavigation, the AI refuses to trade its map if it can train Caravels. ("We have our reasons.") If it can't train Caravels, but the other side can, the AI charges twice as much for its map.		Circumnavigation is checked at the beginning of turn. If two civs are eligible through a map trade, the civ on whose turn the trade is completed misses out (always the human when it's a human-AI trade). That civ even misses out if it has completed circumnavigation through unit movement earlier on the same turn (before making the map trade). Whether an AI is willing to trade it's map depends entirely on the leader's attitude threshold.
Rationale	The BtS rule leads to the trap sketched on the upper right. Checking at end of turn instead puts the AI at a bit of a disadvantage because human-AI trades can't be completed on an AI turn. That said, the AI suggests map trades to human civs relatively rarely, and never with an intention of completing circumnavigation, so the change doesn't really hurt the AI. The trade refusal should make it harder for a human to steal circumnavigation from an AI that is already close.	
136b	AI doesn't pester human with unattractive map trades	
The AI proposes no trades to a human civ where the human side receives only the AI map, and the human value of that map is 5 gold or less. Changed the rounding of AI trade values to multiples of 5. Makes the implementation of the above change a bit easier.		The AI occasionally asks human civs to exchange maps, even if the AI map has no value to the human. Trade values are rounded to a multiple of 10.
Rationale	These offers are pointless distractions.	
Config	The rounding change is implemented in `GlobalDefines_advc`.	

137	Map recommendations
AdvCiv	*BtS*
On the Custom Game screen, the drop-down menu for the sea level includes recommended changes to the number of players. ("+x% players recommended.") Added a similar recommendation to the description text of the Terra map.	When the world size is changed, some player slots are automatically opened or closed in order to match the recommended number of players. No such thing happens when the sea level is changed. The Terra description contains a warning about the map being especially large, but it doesn't say whether the player number should be adjusted to this. Description texts are only shown under Play Now, not on the Custom Game screen.

Rationale	Having the proper number of civs is imo pretty important, and sea level has a big impact on this. The recommendations, if followed, should lead to about the same number of cities per civ as with Normal sea level. I think Terra plays best if the old world is rather crowded with civs. The standard player numbers don't suffice for this. Recommendations weren't my first choice. Some things I've tried: I wanted slots to be opened and closed automatically when the sea level changes. This can't be done because the Custom Screen isn't part of the SDK. When slots are opened/closed in response to a world size change, it's possible (through a hack) to also factor in sea level, but then the sea level needs to be configured before the world size, which isn't what player normally do. For Terra, I couldn't even add a warning to the Custom Game screen. The displayed map name ("Terra") is the name of the map script file, and changing this file name (to e.g. "Terra - extra players recommended") would result in a second map, listed in addition to Terra. I've tried adding a dummy drop-down menu with a single choice, but apparently at least 2 choices need to be given. Such a menu would also be easy to miss because the default menus (which all maps have) are displayed first. Changing the Terra map dimensions so that Standard Terra is interpreted as Large would result in about 1 player too many.

Changed the default player number for Standard-size maps to 8 (+1), Large maps to 11 (+2) and for Huge maps to 16 (+5). This results in ratios (width * height) / n (where n is the default player number; i.e. tiles per player) of 34.1 for Standard; 37.8 for Large and 40.0 for Huge.	Defaults are Normal - 7, Large - 9 and Huge - 11. Tiles per player: 30 for Duel; 34.7 for Tiny; 32 for Small; 39 for Standard; 46.2 for Large; 58.2 for Huge.
Increased tech cost modifiers for Large and Huge.	Duel size has 100% tech cost, from there it's +10% for each size level.

Rationale	It's probably intended that larger maps leave more room for expansion, but the differences shouldn't be *that* big. To me, settling lots of unclaimed land is a drag. (As for which is more challenging, protracted confrontation probably helps the AI on high difficulty settings. That said, a higher number of civs increases the chances of some civ getting especially lucky with its starting position, and usually, the strongest adversary presents the main challenge.) The low player number on Huge may also have been for performance reasons; less of a problem with current hardware. As for Standard, 8 players gives everyone room for about 7 cities; too much I think. 9 players make it difficult to build National Wonders without conquering additional cities. I still think 9 plays better than 8, but 8 is closer to what players are used to from BtS, and can always pick a Small map with Low sea level – no problem with National Wonders there. Sparse maps are also bad for trying out UWAI; conflict gets delayed too much.

AdvCiv	*K-Mod*
Included copies of `Fractal.py` and `Continents.py` from BtS with AdvCiv just so that they get listed first on the Custom Game screen.	"Not too big, not too small", the single map added by K-Mod, is listed first, the rest alphabetically.
Rationale	The two standard maps in Vanilla/ BtS. "Not too big/small" is OK, but shouldn't take that spot.

138	Religion assignment when starting in later eras

AdvCiv	*BtS*
When starting in an era other than Ancient, the automatically founded religions are assigned based on handicap, Spiritual trait and favorite religion. More specifically, on difficulty settings above Noble, the game prefers to assign religions to AI civs, and on lower difficulty to human civs; always prefers Spiritual leaders and AI leaders whose favorite religion is among those to be founded. The top priority is still to give each civ the same number of religions. The above change only applies when that is impossible.	After assigning the same number of religions to everyone, the remainder is assigned to a random subset of civs. In particular, favorite religions don't play a role (except possibly with the choose-religions option).
Rationale	Religions are hardly shared in games starting in in the Medieval era or later because almost everyone founds a religion. Assigning the religions to civs that like to spread them (Spiritual, favorite religion) should lead to more block-building like in normal games (Ancient start). Also want to make it more predictable for human players whether they'll get a religion if there aren't enough to go around: On Emperor difficulty or higher, probably not. Otherwise, choosing a Spiritual leader should guarantee a religion.

139	AI evacuation of cities
AdvCiv	*BtS*
When a city is very likely to be lost before the next turn, the AI may evacuate some of its combat units from the city. Units that don't receive defensive modifiers usually leave, and dedicated defensive units usually stay. For other units, the tile defense and remaining city defense can make a difference. Won't try to evacuate if the path to safety looks too dangerous. The AI is less willing to abandon major cities than unimportant ones.	The AI only evacuates noncombatants; may even reinforce hopeless cities.
Rationale	Evacuating units without defensive bonuses and badly injured units seems like a clear improvement. Units with high defensive bonuses can be expected to cause losses to the attacker even when badly outnumbered; might, in particular, take out the attacker's siege units. It's important that a Stack of Doom can't scare away all defenders from several cities, and settle for peace when the evacuated defenders gather for a last stand. Sounds fairly realistic, but, given the other dynamics of the game, would make conquests too cheap. Fixes the "meatgrinder" exploit, which was still on the BBAI to-do list when the mod was discontinued.
Tbd.	I'm not evacuating ships because there is K-Mod code for that. That said, the K-Mod code doesn't work reliably, so perhaps I should let ships use my code as well?
Config	`AI_EVACUATION_THRESH` in `GlobalDefines_advc`
See also	107 (more offensive Area AI) chould help reclaim evacuated cities.

Reduced AI trade value for evacuating cities.	The tactical situation does not factor into the AI trade value of a city.
Rationale	The AI should be more willing to give a city away when it thinks that it can't hold onto it, and the recipient (which may or may not be the civ about to conquer the city) should be less willing to pay for such a city.

140	Changes to city maintenance
AdvCiv	*BtS*
Changed the map size formula (`maxPlotDistance`) that distance and colony maintenance are based on, using a rather complicated term including map dimensions, world-wrap (flat/ cylindrical/ toroidal), default number of civs, sea level and actual number of civs. I.e. the more land is available per civ, the lower the distance maintenance per city. Sample numbers for the new formula: Small, cylindrical, low sea, 7 civs: 52 Small, flat, low sea, 7 civs: 57 Normal, cyl., 7 civs: 58 Large, cyl., 10 civs: 71 Large, cyl., 6 civs: 92 Distance maintenance is now also a bit higher on large maps and lower on small ones. The change also affects mission costs of Spies.	`maxPlotDistance` is e.g. 55 on Small cylindrical, 72 on Normal cyl., 89 on Large cyl. and 82 on Small flat. That is, the world-wrap type greatly affects distance maintenance.
Rationale	Map diameter shouldn't be so decisive. Empires tend to be circular even on oblong maps or maps without world-wrap. What leads to high distance maintenance is mostly a high number of cities, and if a map has lots of space for each civ, civs shouldn't be punished for filling that space. Flat maps are known as a trick for reducing distance maintenance; on high difficulty settings, AI civs pay much less for city maintenance than human civs, and thus the AI civs benefit less from additional maintenance reduction.
See also	137 changes the default number of civs per map size
The maintenance distance (from nearest government center) is now capped at around 25 on Normal settings; lower cap on smaller maps (`lower maxPlotDistance`), higher cap on larger maps (`higher maxPlotDistance`).	There is an XML parameter `MAX_DISTANCE_CITY_MAINTENANCE`, but this only serves as a weight on maintenance costs; there is no actual limit on the distance or the cost.
Rationale	If a city is very far away from a government center, it shouldn't matter how far away exactly. The BtS cost punishes (very) remote colonies too much.
Config	The distance cap is coupled with `MAX_DISTANCE_CITY_MAINTENANCE` (in `GlobalDefines.xml`); changing that value will also change the cap.

141	No diplo bonus from gifting GP
AdvCiv	*K-Mod*

Gifting a Great Person (GP) to an AI civ does not affect relations with that AI civ. Like in BtS, only units with positive production cost can boost relations when gifted.	+1 relations for each gifted GP.
Rationale	Too easy to exploit for a diplo victory.
Tbd.	Gifted military units should only boost relations when the AI has an immediate need for military aid. The relations bonus should probably also be capped; seems exploitable.

142	Master gets a happiness bonus only from the first peace vassal
AdvCiv	*BtS*
The master of a vassal civ receives a happiness bonus only from voluntary vassals, and only the first one counts, i.e. at most +1.	Each vassal, capitulated or not, provides +1 happiness in all cities of the master.
Rationale	In large games, the stacking happiness bonus, combined with the free luxury resources from vassals, can let master civs ignore happiness altogether. I also don't like that the bonus applies even if just one city is left; this provides an incentive to keep tiny vassals around, which lead to some oddities in global diplomacy (despite my efforts to fix such issues). Also, oppression of capitulated vassals is hardly a point of pride. Should perhaps remove the bonus entirely, but for voluntary vassals "We influence other civilizations" makes some sense, and these vassals are harder to get. The anger at the vassal side seems sensible (though unimportant) and can't stack. Change 130 and related changes (see under 130v) remove several disadvantages of vassal agreements for the master, so, as far as game balance goes, I don't think a happiness bonus is needed at all.

143	Recently-canceled memory for vassal agreements
If a vassal loses 35% of its territory, it cancels the VVA with a per-turn probability of 15%. Cancels immediately when losing 45%.	Only capitulated vassals revolt when losing territory (50%).
Rationale	The vassal can then make peace independently (possibly by capitulating), while the master is justly punished for not having protected its vassal. The third party (possibly human) is faced with a strategic decision: focus attacks on the vassal or the master? In BtS, only attacks on the master can break up the VVA (by lowering the master's power rating).
Config	`VASSAL_DENY_OWN_LOSSES_FACTOR` in `GlobalDefines_advc`

When a vassal cancels a vassal agreement for no particular reason (i.e. vassal feels safe or powerful enough on its own), the (AI) master remembers this for, on average, 20 turns, and refuses to sign a voluntary vassal agreement (VVA) during that time. When the agreement is canceled because the master hasn't protected the vassal, including the case where a capitulated vassal breaks free after losing too much territory, the vassal remembers this for 30 turns (on average), and refuses another VVA. (Whether the master or the vassal remembers is only relevant when the master is human.)	No memory about canceled vassal agreements. When a capitulated vassal breaks free, it often signs a VVA with the same master on the same turn. When a voluntary vassal is near the power threshold for a VVA, the agreement can flicker on and off every few turns.
Rationale	The flickering isn't only goofy, it also means that war preparations against a former vassal can easily get interrupted by a new VVA, which is frustrating. Also, some mechanism is needed to keep a vassal independent for a while when the master has failed to protected it.
143b	Cancelation and nukes
Cancel also after being nuked repeatedly. The threshold is randomized; usually, the vassal doesn't break away until more than half of its cities have been hit. Doesn't cancel if master has SDI and vassal does not.	Only lost territory counts (and only for capitulated vassals).
Master's SDI protects vassal.	SDI is a team project, but doesn't protect vassal teams.
Vassal cancels VVA if it has any nukes unless master has SDI and vassal doesn't: "doing fine on our own".	Vassal's nukes factor into its power rating, but a single nuke doesn't usually make a difference.
Capitulated vassals don't build nukes. When a team capitulates, all it's nukes are scrapped.	Vassals don't hold back on anything.
Nukes can't be gifted (between any civs).	Can gift nukes to circumvent the diplo penalties.
Rationale	SDI is supposed to be an array of space-based lasers. Should be able to intercept any nukes that the SDI owner wants to intercept. Vassals that are powerful enough to build nukes should stand on their own.
See also	130v makes the master responsible for nukes fired by a capitulated vassal (obsolete now that vassals can't have nukes). 112 cancels VVA when near victory and stops capitulated vassals from pursuing victory.
Tbd.	A cancelation condition based on present population vs. population when signed might be better.

144	Refusal of gift request (part of the DDiplo changes)
AdvCiv	*BtS*

Without considering any specifics, the AI refuses gift requests with a leader-specific probability. That probability is based on `ContactRand`: `CONTACT_GIVE_HELP` and between 5% (Gandhi) and 32% (Sitting Bull, Montezuma). I'm capping the probability at 50% for Tokugawa, otherwise he'd always refuse. Requests are always refused while preparing war against the player (no change).	The only randomized aspect of the AI response to a gift request is the decay of recent-demand memory: The request is refused if the AI still remembers an earlier request (or tribute demand). So, the first request is handled without randomness, and if a previous request is far enough in the past, it's very likely forgotten (the expected time to forget is 20 turns). `CONTACT_GIVE_HELP` determines only how frequently an AI leader offers a gift to human civs that have fallen behind.
Rationale	Shouldn't be able to use requests to determine reliably if the AI is preparing war. It's semi-decidable now – if a request is granted, then the AI certainly isn't plotting. That said, they might start on the very next turn ... In BtS, `CONTACT_GIVE_HELP` is irrelevant for advanced players; it's nice to give this an actual use.
Memory about requests and rejected demands is not decreased while there is a peace treaty between the two civs. Gift requests are rejected during a peace treaty.	Can decrease on any turn. AI may grant gifts when there is already a peace treaty.
Rationale	To increase the time in between granted requests. A bit too easy in BtS to keep a Pleased AI from planning war: can reliably sign a peace treaty about every 25 turns, which leaves just 15 turns in between, which can sometimes be bridged by asking the AI to attack a third party (which results in a peace treaty; see change 146). My change makes this tactic unsustainable. Could argue that "begging for peace" shouldn't ever be a tactic. I like that it makes Pleased attitude relevant even for warlike leaders. Think of it as a Reinsurance Treaty. I don't like that this is something only humans can use. (Could alternatively merge DarkLunaPhantom's one-sided peace treaties.)
AdvCiv	*K-Mod*
AI refuses gift request if planning war against the player, and refuses with a high probability if war utility is positive (but not yet planning war).	Only refuses if already planning war against the player. (In BtS, the AI doesn't take the resulting peace treaty into account at all; grants request regardless of war plans.)
See also	130v prevents vassals from granting gifts to rivals. 130o deals with memory about tribute demands.

145	No diplo bonus from accepted favorite civic/ religion if no longer in that civic/ religion
AdvCiv	*BtS*
The diplo bonus from having accepted an AI civ's favorite civic or religion is suspended if the human civ isn't presently in that civic or religion, or if the AI civ is no longer in the civic or religion. Likewise, the penalty for refusing the fav. civic/ religion is suspended if the human civ is now in that civic/ religion, or if the AI civ has switched out of it.	The bonus lasts for an expected 100 turns, regardless of whether the player keeps the civic/ religion. Can switch out after 5 turns.

Rationale	Switching right back is a bit cheap, especially with the Spiritual trait.
See also	Part of the DDiplo changes.

146	Hired (sponsored) war results in a peace treaty
AdvCiv	*BtS*
When a civ agrees to declare war on another civ at the request of a third civ, the civ declaring war and the third civ automatically sign a 10-turn peace treaty.	No peace treaty; can ask someone to start a war, and immediately attack that someone.
Rationale	A bit of a loophole in BtS. Also want to be sure that the AI doesn't attack a human that has just paid it to attack someone else; not a problem in BtS because the AI only fights one war at a time, but could be a problem with UWAI.
See also	Part of the DDiplo changes. Change 100 is also about sponsored wars (mostly UI changes). When there is already a peace treaty between the sponsor and the civ declaring war, 032 causes that peace treaty to be prolonged.

147	Changes to border tensions
AdvCiv	*BtS*
The number of lost tiles counted per city can be at most 6 or equal to the city's population, whichever is higher.	No such per-city limit. A size-1 city enclosed by foreign borders can contribute 20 lost tiles. The number of lost tiles is then divided by the total number of owned tiles and multiplied by a personality factor to compute the diplo penalty from border tensions.
Rationale	Shouldn't get -4 relations from a single city choked city; this can easily happen in BtS, even in the late game. I generally don't like that high culture can lead to diplo penalties.
Tbd.	A tile should always be owned by the owner of the city that can work the tile when there is only one such city. I.e. I'd like to remove the choke-cities-with-culture mechanism entirely.
See also	004g changes the explanation text from "close borders" to "shared borders".

148,149	*Still unassinged; same for most ids above 150*

150	Additions to the replay log
See also	100 adds sponsored wars and brokered peace to the replay log. 106 excludes random events.
AdvCiv	*BtS*
150a	Switch to no state religion

Replay indicates when a civ renounces its state religion, i.e. switches to no state religion.		Religion changes are logged, as are civics changes to Free Religion.
Rationale	Can also switch to no religion without adopting Free Religion, and that's worth logging.	
150b	Results of diplo votes	
Replay includes successful UN and Apostolic Palace proposals.		Replay only shows the vote tally for and against, without naming the proposal.

160	Food after starvation	
AdvCiv		*BtS*
After a city with a Granary loses population from starvation, the food store of the Granary is emptied into the city's food store. The Granary's capacity is only 40% of the city's capacity.		Whenever food is added to the city's store, the same amount of food is added to the Granary's store. The maximal capacity of the Granary is 50% of the city's store (whose capacity is 10 + 2 * population). After growth, the Granary's store is added to the city's store, but the store of the Granary isn't emptied. The Granary provides no food after starvation.
Rationale	The Granary already provided some protection against starvation by providing a cushion after growth and helping regrow lost population. However, the cushion is just 15 food in a size-10 city. If such a city has balanced health and can't get extra food by reassigning citizens (the AI often doesn't have unworked Farms), a poisoned water supply will consume the 15 food in two turns, and then kill 6 population. My change essentially doubles the cushion, meaning that only 3 population would be killed, which seems much more reasonable. It's not a big issue for human players, but in the Industrial era, the AI can become very vulnerable to poisoned water. It's strange that the Granary isn't emptied when a city grows, but normally irrelevant (it would be refilled by the time the city grows again), and actually convenient for my anti-starvation mechanism; don't need a separate food store this way. Since the Granary is already considered to be the most powerful building in the game, I didn't want to make it even better; and I had planned to reduce the amount of stored food at some point anyway.	
Config	The capacity change is an XML change (`CIV4BuildingInfos.xml`).	
Tbd.	Nerf Slavery and Drafting; this will make Granary far less powerful.	

200	Reverted K-Mod changes; see chapter on K-Mod	
201	Play "you have discovered ..." sound in multiplayer	
AdvCiv/ BtS		*K-Mod*
Play a "you have discovered" sound when a tech is discovered by another team member.		Always play the tech quote.
Rationale	A bit of a pity never to use the "you have discovered" audio. Should also be slightly more informative to use different sounds for own discoveries and those of team members.	
Tbd.	Not tested.	

210	Additional Civ4lerts
See also	135b makes MoreCiv4lerts work in Hotseat 106d changes the default settings for BUG alerts
Tbd.	Help text currently only in English and German.
I'm not adding a second Alert tab to the BUG menu for the new alerts – the BUG menu is already huge. Instead, I'm removing BUG alerts to make room; some aren't really useful in a mod like AdvCiv, others are made obsolete by the new alerts.	
Tbd.	"<team1> has signed|canceled Open Borders with <team2>." "You have gained|lost access to a source of <bonus> (now <n> sources)." "<civ1> is now|no longer exporting <bonus> to <civ2>." "The peace treaty between <team1> and <team2> has ended." "Can now|no longer access demographics about <civ>." "<leader1> is now [e.g.]furious toward y (was annoyed)." "<team1> has discovered <tech> [(trade from <team2>)]." and possibly: "<wonder> (<owner>) is has been obsoleted by <tech>." "<civ> has constructed a <building> in <city>." (see comment under 001d) "<civ1> can|can no longer be convinced to stop trading with <civ2>." "5 turns have passed since the last revolution; it's again possible to change civics." "You/<civ> have/has overtaken <civ>/you in military power." "The military power of <civ> has increased substantially over the last 10 turns." "The effect of our counterespionage mission against <civ> has ended." (A message about enemy counterespionage ending would be difficult because we only learn that "enemy spies appear to be extra vigilant to our espionage efforts", but not whose spies, and the durations can overlap.)
210a	War plans (= war trade/hired war/sponsored war/joint war)

AdvCiv	*BUG/ K-Mod*
Triggers when an AI civ becomes willing or unwilling to declare war on another civ at the player's request. Shown in the "Trade" column of the BUG Alerts tab; enabled by default. Removed the "Victory" alerts to make room.	No alert about this, but BUG shows a fist icon on the scoreboard when a civ is unwilling to declare war on account of "having too much on [their] hands". K-Mod does not show this icon (not even as an option).
Rationale	The K-Mod approach (no UI support at all for joint wars) certainly isn't ideal, and bothers some players greatly. The fist icon is a bit obscure, takes up room on the main interface, and the player has to have an eye on it every turn; an alert is much better. The victory alerts seem useful only in HoF games.
The AI refuses war trades when already in a war and the new target is not at war with the sponsor and farther away than the closest current war enemy: "We have enough on our hands right now."	AI refuses war trades when it is in any war, regardless of other circumstances. (This is still the case when UWAI is disabled.)

Rationale	Need to reduce the amount of messages produced by this alert. War against an additional target rarely makes sense; the hired AI civ isn't going to send units.
See also	UWAI uses a different procedure than BtS/ K-Mod to decide whether to entertain joint-war offers (but this alerts works in any case).
210b	Revolts

Triggers when revolt probability changes from 0 to greater than 0 in a city, or vice versa, and also when occupation (from conquest or revolt) ends in a city unless the city also needs orders. Shown in the "City" column, taking the spot if the BUG "Pacification/ Pending" alert.	The only way to learn about changes in revolt probability is to check the city screen each turn. The Pacification alert triggers when occupation ends in a city; the pending version when occupation is about to end. Without the alert, there is no notification about ending occupation, although a conquered city will ask for production orders when occupation ends (unless the new owner has already put something in the queue).

Rationale	Now that revolts play a more prominent role (see 099c), an alert is direly needed. The Pacification alert seems fairly unimportant to me, but I've still included it with the new alert. Though not the "pending" option; I don't see why one would want that. No pacification alert when the city also needs orders; seems superfluous then.
Tbd.	Known issue: If the game warns about a positive revolt chance, and the player moves units into the city that reduce the chance to 0, then saves and reloads before ending the turn, a message about the revolt chance being 0 isn't shown. Don't want to show it right when the units move in (could move in and out, leading to multiple messages). Would have to store savegame data to fix this.

250	Changes to handicaps
See also	104p sets the target size for AI invasion stacks based on difficulty
250a	King handicap (see also chapter Start Points as Handicap)

New difficulty setting "King" with big initial AI advantage (free Worker, free Pottery, humans get the worst starting plots), and moderate ongoing AI advantages (akin to Monarch).	Initial AI advantage and ongoing advantages go hand in hand for the 9 BtS difficulty settings.
Uncoupled difficulty rating from handicap id. A difficulty rating from 0 to 100 is now assigned explicitly through a new XML tag. Settler to Immortal at difficulty 0, 10, 20, ..., 70; Deity at 90 and King at 65.	Handicap ids from 0 (Settler) to 8 (Deity) are used as a measure of difficulty, e.g. when computing player scores at the end of a game. This method breaks when handicap settings are added. If added at the end of `Civ4HandicapInfo.xml`, it's treated as more difficult than Deity; if added in the middle, all the handicaps below increase in difficulty.

Rationale	for Pottery: Free tech from the first row (e.g. Hunting or Agriculture) puts those AI civs at a disadvantage that start with these techs anyway. Pottery should also put the AI on a path to long-term development (Granaries, Cottages), rather than using its initial advantage to choke the human players.
See also	108 allows the game to give the worst starting plot to a human civ
250b	SPaH; see also chapter Start Points as Handicap.

Tbd.	Allow players to enter arbitrary point distributions, in particular ones that assign start points to human players. Obstacles: • Can't add a drop-down menu for this to the Custom Game screen; if it's done in-game, it will have to happen after game start. For multiplayer, it's not clear who should enter the points; and they'd have to be explicitly synchronized. • I've tried an XML file, but that doesn't work well for multiplayer – not clear to the players if they should all use the same XML file, or if XML data of the host will be synchronized with the others. I'd rather avoid using XML for custom game settings. Caveat: Code added in `CvPlayer.cpp` assumes that only AI civs can have Advanced Start when SPaH is enabled.
The new SPaH option takes the spot of No City Razing (NCR) on the Custom Game screen; NCR moves to the bottom.	
Rationale	Had intended to replace the Advanced Start option with SPaH and indicate normal Advanced Start by entering a value greater than 0 into the Base Start Points box. This isn't possible because the box is grayed out by the BtS executable. Hence an additional option couldn't be avoided.
See also	250c changes the default start points in the Custom Game screen, and increases the start turn based on the number of start points.
Tbd.	Not sure if the default start points are appropriate for later-era starts.
SPaH suppresses the adjustment of AI start points based on the difficulty setting. Civs receive no free wins against barbarians and no free initial production when SPaH is enabled.	On Prince difficulty and lower all civs are guaranteed to win their first combat against a barbarian unit (regardless of Advanced Start). On all difficulty settings, the AI receives some free production (akin to a chopped Forest) in its capital.
Rationale	When playing with SPaH, any free initial items and any AI head start in terms of initial items should be covered by the start points configured for the AI. The free win is also a kind of free item. More importantly, advanced players might want to combine a mdeium difficulty setting like Prince with a big AI head start, and those players might find the free win cheesy.
See also	250c disables free AI tech from difficulty setting when using (any) Advanced Start option.

SPaH gives the human civs normal starts with e.g. a Settler and Warrior/ Scout in the Ancient era, and Advanced Starts to the AI. If less than 10000 start points are entered, all AI civs get the same number of points (flat distribution). Otherwise, if a 5- or 6-digit number is entered, the AI civs receive unequal amounts of points. The first 4 digits determine the max number of points. This is assigned to the AI civ in the bottommost slot. The last two digits are interpreted as a percentage of the max. The resulting min number is for the AI civ in the topmost slot. The others receive values in between min and max, linearly distributed and slightly randomized. The AI start points can be reviewed on the Settings tab of the Victory Screen.	There is no SPaH option; all civs, human and AI, receive the same number of start points.
Tbd.	The unequal distribution is linear between max and min, but also based on pairs that tend to have similar point values. Originally, this was supposed to make the assignment of start plots easier. The human civ and the bottommost AI civ were used as anchors, and the other civs were evenly distributed in between. This doesn't generalize well for multiplayer, so I've abandoned it. Given the current start-plot assignment algorithm, it would be conceptually simpler to use a linear distribution without pairs.
Config	The randomization of start points is configurable in `GlobalDefines_advc`.
SPaH is factored into game-end score. More specifically, the difficulty factor, normally between 0 and 90 (see 250a), is increased based on the start point distribution. For example, a Noble game has normally a difficulty of 30; with 1000 start points for every AI civ, that difficulty is increased by 20, which results in the same score as a Monarch game without SPaH.	Game-end score doesn't account for Advanced Start.
Rationale	The end-score function has numerous issues, but I think players still care about it a little bit as a rough indicator of how well they did. So, the formula doesn't have to be perfect, but, if start points work as a handicap, they should be accounted for somehow. I haven't thought about scoring in multiplayer games – not important enough to worry about.
250c	Changes to (regular) Advanced Start
No free initial items in Advanced Start except for the technologies of previous eras when starting in the Classical era or later and civ-specific tech.	No free units, but free technologies from the difficulty setting are granted in addition to start points.
Rationale	It's a bit inconsistent to treat free (AI) tech differently from free units. Obviously, free tech from earlier eras needs to be granted, so my solution isn't entirely consistent either.

Charge 1.5 start points per production (units, buildings, cities). 1 start point per 1 culture. Revealing a tile costs 2 start points. Can't reveal Ocean tiles that aren't adjacent to Coast. Start point cost for routes and improvements reduced to 67%. Tech costs 1 start point per research point (no change).	The ratio is 1 for 1. 1 culture costs 2.5 start points. Costs 5 start points. Can reveal any tile that is adjacent to a previously revealed tile. E.g. a Mine costs 24 start points.
Rationale	Units seemed extremely cheap compared with tech. It's not that dangerous because units can only be placed in cities, and each city has a limit of two military units; still, makes lots of Workers and Settlers a too obvious choice. 1 start point essentially corresponds to 1 gold, so 1.5 per 1 production is still a bargain. Should perhaps be 2 for 1 – not sure if there's a good reason to make techs relatively unattractive during Advanced Start. Similarly, 1 culture per 1 start point is still pretty expensive; seems better to buy Settlers and found later than to pay some 50 points extra for revealing the surroundings of a potential city site. A Mine for 24 is very expensive when a Worker costs only 60. Now Workers are at 90 and Mines at 16. Dangerous wrt. immediate military build-up? With cheaper visibility, it could make sense to reveal a diagonal across the entire map under the BtS rules. That would spoil all all the surprises, so I'm prohibiting the oceans from being revealed.
Config	Costs for culture, revealed tiles and Worker builds in `GlobalDefines_advc`
Start points shown in Custom Game screen are only auto-adjusted to start era. All start point costs are reduced based on game speed.	Shown points are adjusted to game era, game speed (silently) and world size. The impact of world size is minor; the multiplier is between 80% and 120%.
Rationale	A large world isn't necessarily less crowded than a small one. The BtS auto-adjustment is generally problematic because it overwrites any start point value that the player may have already entered. Also gets in the way of 250b – don't want the player handicap to increase with the world size. The silent game speed adjustment can be a bit confusing – the player ends up with a start point budget that differs from the value shown by the Custom Game screen. I think it's a bit more elegant to change the costs instead. Makes no functional difference (well, a little because of rounding).
No impact of difficulty setting on the human start points.	Extra start points for human civs on low difficulty settings (150% on Settler), reduced start points on high difficulty (75% on Deity).
AI start point bonuses increased to Prince 125% Monarch 145% Emperor 175% Immortal 210% Deity 270%	Set to 110% 120% 135% 150% 170% but weren't applied because of a bug.

Rationale	Want to reduce the number of modifiers that affect start points. Instead of giving human civs fewer points on higher difficulties and AI civs more, I'm giving the AI civs a lot more. This is also to account for the free AI tech that is no longer granted in Advanced Start. Moreover, the general consensus is that the high difficulties are easier to beat with Advanced Start, perhaps, in part, because the AI doesn't spend its start points wisely. So, I'm also trying to make Advanced Start more challenging. Human civs now also get more start points than in BtS on Prince and upwards. This is countered by the increased point costs of units, buildings and cities.

Dawn-of-Man Screen always shown. The "since time immemorial" text and initial techs are only shown when starting in the Ancient era. While in Advanced Start, scoreboard help text shows the player's leader.	Dawn-of-Man only shown for normal start: not Advanced and in the Ancient era. While in Advanced Start, can only infer leader from text color or by using keyboard shortcuts to access Advisor Screens or Civ Description (Alt+D).

Rationale	Player needs to know his/her civ and leader upfront, especially if it's set to Random. The initial techs are meaningless when starting in a later era.

The start turn is based on the number of start points, more specifically, the maximum and the mean of the start point distribution. Only applies when starting in the Ancient era (and only when the mean plus maximum, divided by 2, is greater than 500). Example: If everyone receives 750 points (max=mean=750) on Normal speed, Emperor difficulty, then the start turn is 20, i.e. 1880 B.C.	The start turn only depends on the start era.

Rationale	Should match the real time line better, and, in the case of SPaH, gives the impression that some of the AI civs have been on the map since 4000 BC, whereas the human civs are late arrivals.
Config	`INCREASE_START_TURN` in `GlobalDefines_advc`

251	Start turn and AI tech costs based on difficulty

AdvCiv	*BtS*
AI tech costs are reduced on the lowest three difficulty settings, and increased on the highest three. I've adjusted the human tech cost modifiers for these six difficulty settings so that the ratio between human and AI tech costs remains approximately as in BtS.	AI tech costs are not affected by difficulty. Human tech costs are reduced to 60 (Settler) to 90% (Warlord) on difficulties below Noble, and increased to 110 (Prince) to 130% (Deity) on difficulties above Noble.

Rationale	The overall progress had been too fast on difficulties above Monarch and too slow on difficulties below Noble. It's an aesthetic issue (AI tech matching game date), but also a matter of pace: How much time there is for warfare until another tech is discovered. I don't think, say, Warlord and Immortal should have fundamentally different pace (that's what the game speed setting is for). karadoc seems to have thought so too; in K-Mod 1.45, he tied inflation to the global technological progress. I don't like this solution; see the discussion here. Civ 4 Reimagined appears to do something similar to my change ("tech costs for all players scale with handicap setting"; Bitbucket link).
Config	`Civ4HandicapInfos.xml`. To undo the change, one can set (for each difficulty) `AIResearchPercent` to 100 there, and reset `ResearchPercent` to the respective original value.
Tbd.	Perhaps `AIPerEraModifier` should apply to `AIResearchPercent`; then AI research would become faster as the game progresses. Already the case for AI expenses for civics and units, so maybe that's enough (as far as commerce is concerned). I worry that the total effect of the progressive bonuses would become too noticeable. If I do make the change, higher AIResearchPercent should be set, so that the overall AI research speed stays the same. Even without AI research getting faster with each era, the Deity AI gets ahead of the real time line by the Industrial era. I think a further increase of tech costs (already 150% for the human player and 125& for the AI) would make buildings and units too cheap in comparison. Would have to change the mapping from turn number to year instead. Won't do that because I don't care that much about Deity; with a few more (fundamental) balance changes, Immortal should become hard enough for everyone. On a related note about the per-era modifiers: It's not ideal that the bonuses are triggered (entirely) by the tech era of the AI civ that receives the bonus; it means that the AI civ that is first to reach a new era is also the first to benefit from the bonus. Could be the main reason why the tech of AI civs differs so much in Deity games. Using the game era would also be problematic because of possible human manipulation, and any average would be distorted by vassals/ small civs.
See also	910 adjusts the per-era tech modifiers (which apply to everyone, not just the AI).

The start turn is advanced by 10 (on Normal speed) for every free Worker Settler (beyond the first) that the AI receives. This only applies when playing without Advanced Start (for start turn in Advanced Start, see 250c above).	Start turn only affected by start era, not by difficulty.
Config	`INCREASE_START_TURN` in `GlobalDefines_advc`

300 et sq.	Overhaul of barbarians; see chapter Better Barbarians. I've structured the changes a bit through sub-ids, but I doubt they could all be merged separately.
Config	A few parameters in `GlobalDefines_advc`
300	The fundamentals: gradually increasing activity, ships placed per shelf, food yields matter, fogbusting nerf, game speed scaling, city placement bugfix, New World barbs, no cooperation between barbarian cities, misc. AI improvements vs. barbarians

AdvCiv	*BtS* (K-Mod makes hardly any changes to barbarians)

Barb activity reaches its peak when 67% a continent are owned by civs (or barb cities). The difficulty setting determines on which turn barbarians first appear. Quite early on high difficulty settings, e.g. turn 15 on Immortal. They initially appear only in small numbers though, and don't immediately attack cities.	Barb activity peaks shortly after they first appear, typically around turn 50. Barbs can't appear until there are 1.5 cities per civ. Thus, the early start turns set for high difficulty settings through XML have practically no effect.
Rationale	Since barbs start slowly, the 1.5-cities rules isn't needed anymore.
When playing with Raging Barbarians (RB), the barb start turn is shown on the Settings tab of the Victory Screen.	The game never tells the player on which turn barbs start appearing.
Rationale	Without RB, it's not crucial to know when barbarians start appearing because there's still enough time to build up a military once they do, but with RB, it's better to be aware of the barb start turn; especially when starting in a later era or using SPaH because, then, the game doesn't start on turn 0, and it's difficult to tell how many turns have passed.
When computing the target number of barb land units and cities per continent, tiles with 0 food yield are disregarded. Coastal water tiles count half. Barb units can't appear on tiles with 0 food yield. On tiles with a yield sum of 1, in particular Jungle and Tundra, barbs are less likely to appear than on tiles with higher yields. I'm computing the yield sum twice, once including and once excluding features, and take the minimum. This way, all Tundra except Tundra Hill Forest and River Tundra gets fewer barbs. Civ units only prevent barbs from appearing on visible tiles.	All land tiles count equally, and water tiles count only for sea units. Yields have no impact on barb unit placement. Barbs can't appear in a 5x5-tile square surrounding each civ unit ("fogbusting" range). Visibility practically doesn't matter.
Rationale	Want barbs to work as a corrective for starting positions that have much room for expansion. To this end, fogbusting needs to be nerfed, and decent tiles need to be distinguished from bad tiles. It's also rather implausible that large numbers of barbarians would appear in the polar region or desert. The early civilizations were frequently raided by pastoralists from marginal lands (but not desertic), which is why I'm not distinguishing between e.g. Plains, Grassland and Flood Plains.
Barb creation rate adjusted to game speed. The target number of barbs per continent (upper bound) remains independent of game speed. Barbs start appearing roughly in the same year for all speed settings.	Creation rate and target number are independent of game speed. Barbs start appearing later on slower settings.
Rationale	On Epic and Marathon, it takes civs longer to train units, but barbs are (re-)placed just as quickly as on Normal and Quick. The original developers may have intended to even this out through a later start year. This doesn't work well – BtS barbs are a lot harder to deal with on Marathon than on Normal speed, and I don't see why they should be.

Tbd.	Should perhaps also adjust barbarian activity on maps with densely or sparsely placed civs. If I do, it will no longer be possible to configure games with extra tough barbarians through the Custom Game screen – players would have to use XML for this.	
Barb cities slightly less likely to occur on landmasses where barb cities were destroyed previously.		Barb cities can appear again and again on landmasses that civs don't want to settle.
Tbd.	A similar mechanism could rein in XP farming; e.g. keep count of the number of barbs ever created per landmass, and, very gradually, decrease the creation rate based on that.	
The creation rate of barb cities increases slightly with the game era.		Static creation rate configured in XML.
No barb units are created on continents without civ cities (nor in the surrounding waters), but barb cities appear earlier on such continents and more densely than in BtS. If a continent (or shelf) becomes very densely populated with barb units, the game starts culling them. The greater the density, the higher the per-turn probability of removing a unit. The barb AI never disbands units for financial reasons.		Plenty of barb units are created on continents without cities because these continents have 100% unowned tiles. While barb units are created independently for each continent, cities are placed globally, and the game prefers to place them on continents with civ cities. The game only removes animals, never proper barbs. The barb AI can disband units. Not sure how frequently that happens; perhaps not at all.
Rationale	Want terra incognita to look more like in Colonization, i.e. with lots of barb cities, but not so many units. The cities actually produce too many units, hence the scrapping mechanism; it's also a general safeguard against implausibly large barb stacks. Could interpret the removed units as a result of barb infighting. Disbanding based on finances isn't good because it may leave high concentrations in some areas, and because barbs aren't supposed to have an overarching economy.	
Tbd.	Barbs can currently be removed from tiles visible to a player, which is a bit jarring. Should show a message then, e.g. "A barbarian Galley has been destroyed as a result of infighting." Perhaps implement this through a random event. Can't simply exclude visible tiles from removal: In one game, barb Galleys kept spawning around an uninhabited continent and targeted an inhabited continent with assaults. In such a case, naval stacks of arbitrary size can form on visible tiles.	
Barb units are never upgraded.		Upgrades are possible using commerce from barb cities, but seem to happen rarely because resource requirements are checked when upgrading; cf.
Rationale	Don't want a barb economy. Outdated units are still killed eventually, either in combat or removed by the scrapping mechanism above. A mixed bunch of barb units is more flavorful than a uniformly upgraded army; I imagine that barbs acquire sophisticated weapons from the civs (through trade), but also continue making their traditional weapons. It can happen that civs keep trained and spawned barbs on a continent in check, thus preventing scrapping, but don't attack (all) the barb cities. Then, early-game garrisons will remain unupgraded indefinitely, which starts looking weird once the barbs reach Gunpowder. Too rare to worry about.	

Fixed two BtS bugs that lead to barb cities being placed either in completely arbitrary locations (like a snow island without seafood), or in ideal locations (as far as the AI is able to figure those out).		
See also	Thread on CFC	
The aggressiveness of barb units escalates independently for each continent based on the number of local civ cities. Barbs avoid approaching civ cities on continents with more barb cities than civ cities, even when playing with RB.		There are essentially three levels of barb aggressiveness: Initially, barbs avoid civ cities, then they attack them opportunistically, and eventually they seek cities out. This escalation is based on the *total* number of civ cities, and affects all continents alike. With RB, the barbs usually seek out cities right away. Without RB, only the number of civ cities is decisive, not the ratio of civ cities to barb cities.
Rationale	To remove implausible repercussions of civ development on one continent for the barb behavior on another continent. New World barbs shouldn't immediately attack colonies. Now only turn aggressive when half the continent is colonized.	
Barb Workers don't connect cities with roads, chop fewer Forests and prioritize production.		Barb Workers build road networks between barb cities and builds lots of Cottages.
Rationale	A road network makes it look like a barb empire, but it's supposed to look like independent cities. Cottages are nice for pillaging, but don't make much sense for the barbs. Chopping: Don't want players to discover a deforested New World.	
See also	DarkLunaPhantom has made a similar change (Git commit 1, 2, 3); haven't merged it because I still want barbs to build *some* Cottages.	
If RB is enabled, AI civs assign fewer units to guard cities unless threatened militarily by another civ. New AI routine for guarding high-yield improvements against barbs.		The AI defends its cities against raging barbs, but doesn't defend crucial improvements. Often allows barbs to move onto Mines or onto improvements across a river, negating the 25% combat bonus that the AI gets against barbs on all difficulty levels.
Rationale	Also frees up units for guarding future city sites, which is similar enough to human fogbusting.	
Tbd.	Doesn't help much. Early on, when it matters most, the AI still needs most of its defenders to protect its cities, and doesn't reliably indentify the most precarious improvements. Would be better to move from the city onto a threatened improvement only when a barb unit approaches. Need to be careful not to expose AI cities to human attacks.	
AI civs are more willing to target barb cities on other landmasses when there is nothing else to do or when it doesn't take much effort.		AI civs hardly ever conquer barb cities on landmasses where they don't have their capital.
Tbd.	Needs more testing; probably still not satisfactory.	
AdvCiv		*K-Mod/BtS*

Barbarians raze cities based on the difference between the city owner's era (1 for Ancient, 2 Classical ...) and the city's population. The difference is multiplied with `RazeCityProb` =10%, the base probability for barbarian razing. I.e., barbs only raze Ancient and Classical cities when they have to (size < 2), and can raze size-2 in the Medieval era and up to size-3 in Renaissance. I'm capping the era number at Renaissance.	The 10% probability applies regardless of population, but closeness to other barbarian cities can reduce the probability. BtS used the same procedure for barbs as for AI civs, just with 10% increased probability. There were some fairness clauses to prevent razing in the early game.
Rationale	Closeness shouldn't matter; different barb cities aren't supposed to cooperate. Want razing only for flavor reasons; balance-wise, losing a city to barbs temporarily is already big setback.
Config	`RazeCityProb` is in `Civ4LeaderHeadInfos.xml`.
Barb ships are created for each continental shelf, i.e. the ring of coastal tiles surrounding each land mass (or enclosed in the case of inland seas).	Barbs ships are created for each water body; usually, there is only one large water body.
301	Early Spearman fix, no spawning of units older than the previous era
The game creates barb units with resource requirements only once the barbs have the tech that allows that resource to be traded. This only affects Spearman; now req. Bronze Working.	The tech for building the proper improvement suffices, i.e. Mining for Spearman.
Moreover, barb units requiring a resource can only appear on continents where at least one civ has access to that resource (or where a barb city has access to it).	The same barb units appear on all continents, and the game only checks if the barbs could work the necessary resources, not if they're actually available anywhere.
Rationale	Early barb Spearmen were probably not intended by the BtS developers. Late barb Spears should make early Chariots a valid strategy against RB. Barbarian access to resources that don't exist on a continent is highly implausible. It's also a game balance problem when starting in the Classial or Medieval era. In BtS, the barbs then immediately get horse, bronze and iron units while it usually takes the AI civs some 50 turns to hook up a military resource.
The game only creates barb units from the barbs' current tech era or the previous era, i.e. no Warriors, Spearmen and Archers in the Medieval era.	The unit to be created is chosen uniformly at random from among the allowed units, including those from all earlier eras. Obsoletion isn't checked.
Rationale	Ancient barb units become a pointless distraction at some point.
Tbd.	Would be better to exclude only obsolete units, but this awkward to implement because it's normally checked for individual cities. Perhaps I could at least count Spearman as a Classical unit (despite Hunting being the enabling tech).
302	Tech diffusion only from civs sharing an area with barbarians

Barbs get research only from civs they share a landmass with. The specific conditions (for a shared landmass) change as the game progresses. For the first 100 turns, any barb land unit on a landmass with a civ city suffices (or a ship on the surrounding coast), later on, a single barb city isn't necessarily enough. See `CvTeam.cpp` for details. The intention is that research of new world barbs stops once they're driven out of the old world.	Barbs receive research based on the ratio of civs alive that have a given tech to the total number of civs alive.
Rationale	Want the research of New World barbs to stop once they're (nearly) eliminated in the Old World. That way, the New World will usually only have Classical-era barb units, and occasionally Medieval. Another approach would be to use several barbarian players, e.g. minor civs, but that would be a major change; can make this work well enough within the established rules. Also prevents barbs on any continent from being more advanced than every civ on that continent.
See also	300: Barb aggressiveness now escalates based only on local cities (not those on other landmasses)
303	Never build culture, can't build cultural buidings, found value considers only inner ring
Barbs never build culture. Can only build the following buildings: Barracks, Granary, Lighthouse, Walls, Forge, Stable, Aqueduct, Colosseum and Bunker.	Can build all mundane buildings except religious buildings and research buildings, Theater, Security Bureau, Int. Agency and Broadcast Tower. Can expand its borders through Monument (or Castle); not sure how often they actually do that. The K-Mod barbarians immediately expand their borders by building culture if they have the Music tech.
Rationale	Want each barb city to appear as an independent entity. If they expand their borders as in K-Mod, the borders can easily touch, and then barb cities appear like a unified empire. Aqueduct, Colosseum: Want barbs to occasionally have populous cities (think Tenochtitlan); for that they need all the health and happiness they can get.
See also	Important for the New World because change 300 places barb cities more densely on uninhabited continents. 300 also prevents barbs from building a road network.
Config	Buildings are disabled through `Civ4CivilizationInfos.xml`.
Only the inner ring is taken into account when placing barb cities.	All 21 tiles are considered, no different from the evaluation of civ city sites.
Rationale	Since barb borders never expand, it doesn't make sense to factor in the outer ring. (Even if the borders expanded sometimes as in BtS, the outer ring should be discounted.) I also like that this makes barb city sites distinct from normal city sites, and a bit weaker overall.
See also	300 fixes barb city placement bugs.
304	`synchRandPlot` fix

`CvMap::syncRandPlot` is guaranteed to return a plot when there is at least one satisfying the selection criteria. For placement of barbarians, I'm probabilistically not returning a plot when fewer than four plots are eligible.		Picks plots at random until it finds one that satisfies the criteria, or gives up after 100 trials.
Rationale	Don't want to place a barb unit on every turn (or every other turn) in the same plot, so a probabilistic failure to return a plot is good. However, the probability for failure is too high in BtS and dependent on the map dimensions.	
305	Barbarian Workboats	
Barb cities can build Workboats, and tend to build them early, i.e. after producing 1 or 2 military units. Build Workers a bit later than in BtS, especially in coastal cities.		Can't build Workboats. Usually build Worker after 15 turns.
Rationale	To allow barb cities to grow more population. The original developers had perhaps been worried that Workboats would distract barb cities too much from building military units. To make up for that distraction, I have barb cities build Workers later.	
306	Units spawned on Galleys, barbarian (naval) assault AI	
Barb land units can be placed aboard ships in the fog of far. If there is no such ship, the land units are placed on land tiles instead; the total number of barbs placed is the same either way. Barb ships with cargo target a nearby city with a naval assault, though the units can also be dropped along the way to the target. Once unloaded, the ships switch back from assault mode to "attack" mode, which works as in BtS: Harass a city for a while, then move on and patrol.		Barb land units can only be placed on land tiles, and their AI does not allow them to enter cargo units. Created cargo units only harass cities and patrol. Units produced in barbarian cities, however, can undertake naval assaults, which is why naval assaults do happen in BtS, but very rarely.
Barb sea patrols tend to move in a consistent direction and seek out unobserved tiles where they can receive new cargo.		Sea patrols are memoryless, i.e. change direction a lot, and therefore tend to remain in one place for a long time.
Rationale	Should make barb sea units more interesting and harder to ignore; allows them to interact with civs that don't have worked sea tiles.	
Tbd.	When a barb ship has been on the map for a long period of time, say, 20 turns, it should stop patrolling and just blockade a city; can get annoying if a player just can't build a ship for lack of a coastal city.	
Credits	The Mongoose SDK PirateMod works similarly, but hasn't been merged; I only learned about this mod after implementing my own changes.	
307	Post-Medieval barbarians	

Barb units can be created by the game in all eras. Barbs can receive and train Musketman, Cavalry, Anti-Tank and SAM Infantry. Cannot train Rifleman, Grenadier, Frigate.	Can only receive and train Warrior, Archer, Spearman, Axeman, Swordsman, Horse Archer, Longbow, Maceman, Galley. No barb units created by the game in Renaissance and beyond. Can train Rifleman, Grenadier and Frigate.
Barbs can't receive cities in Renaissance and beyond.	Barb cities still appear in the Industrial era.
Starting from Renaissance, barb research ignores tech prereqs.	In BtS, barb research always ignores tech prereqs, i.e. barbs can research e.g. Pottery and the Wheel simultaneously. K-Mod has changed this, so that barbs only make progress on techs that they could research if they were a civ.
RB creates more barb units in later eras: the tiles-per-unit divisor is reduced to 60% in the Ancient era, 52.5% in Classical, 45 in Medieval, 37.5 in Renaissance, 30 in Industrial, 22.5 in Modern and 15 in Future (relative to the divisor without RB).	RB reduces the divisor to 50% in all eras.

Rationale	Gunpowder units mostly for Terra and similar maps. On normal maps, there is typically no land left for post-Medieval barbs to appear on. Therefore the reduced divisor for later eras with RB; so that RB players get to see the occasional post-Medieval barb. Muskets and Cavalry are supposed to represent natives that have acquired firearms (through trade or as spoils). Barbs normally won't be able to train Cavalry for lack of Horse, but may receive some at random. Anti-Tank and SAM as some type of guerilla that isn't too effective against Infantry. Don't want barbs with firearms to be on par with properly trained armies, hence no Rifle, Grenadier and Frigate. No Pikeman: Two Medieval barb units (Longbow, Mace) are enough, and want mounted units to be effective against barbs, especially Cuirs/ Conquistadores. Barb research ignoring tech prereqs allows barbs to catch up very quickly once colonies are founded. By the time New World barbs turn aggressive, they'll typically have Muskets. No barb cities past Renaissance: Seems more realistic, and enough cities are created in the New World during the early eras.
See also	302 stops barb research if they stop sharing a continent with any civ. dlph.6 disables barbarian Spies
Tbd.	Perhaps enable barb Privateers. Historically, privateers were funded by states, and other types of pirates are covered by barb galleys. That said, barb Privateers could add sth. to the guessing game about Privateer ownership (though one can always tell from the turn order anyway), and make navies more relevant overall; unsure. Also considering to allow barb Transports, but only for combat, not cargo; representing pirates with motorboats like in Somalia. Probably better not to include such post-Cold War content.

Barbs can train War Elephants, but only in cities with connected Ivory, and no War Elephants are created by the game.	No barb War Elephants, and no check of resource requirements for barb units.

Rationale	Saw a barb city with connected Ivory in one game and was filled with regret that they couldn't train elephants.	
See also	301 lets barbs only build units that some civ on the same continent can build.	
Marines (or is it Infantry?) as free defensive units in Modern-era starts.		Machine Gun as free defensive unit.
Rationale	Can't use Machine Guns to prevent barbs from pillaging.	
308	Tech speed increased when playing with RB	
Increased research speed modifier for all civs in games with RB in the Classical in Medieval era.		
Rationale	RB forces the civs to dedicate resources into fighting barbs, and as a result, global research tends to lag behind the historical time line.	
309	No Animals option, patrolling animals prefer their native terrain/features	
"No Animals" option added; disabled by default (i.e. animals do appear by default). "No Espionage" option removed. "No Barbarians" implies "No Animals". Without animals, barbs tend to appear a bit quicker.		Can't disable just animals, only all barbs. "No Espionage" was added with patch 3.17; converts espionage points to culture. The game counts animals as barbs when deciding how many barbs to create on a given turn. Therefore, the presence of animals slows down the placement of (proper) barbs.
Rationale	Animals are nice for teaching beginners how combat works, but too silly for some tastes. Of course, one can always imagine they're "really" human hunter-gatherers; say, "lion warriors" instead of lions. Don't want to clutter the Custom Game screen with options. The No Espionage option wasn't properly implemented and can't be recommended in its current state. Players who dislike espionage are better off just ignoring it.	
Patrolling animals favor their native terrain and features (as defined in `Civ4UnitInfo.xml`). They still enter other tiles, but with a smaller probability.		Animals spawn only on their native terrain and features, but move indiscriminately.
Rationale	Flavor	
Credits	Idea from Mongoose SDK AnimalMod	
Animals aren't removed from landmasses without civ cities (unless the landmass gets too crowded with units; change 300).		Once the game stops creating animals, it removes one animal per turn from each landmass.
Rationale	Buffalo flavor for the New World. Once colonized, the animals will start disappearing.	
310	Great Wall reworked, balance changes to Great Lighthouse and Colossus	
Config	Can be reverted in `CIV4BuildingInfos.xml`.	

<table>
<tr><td colspan="2">The Great Wall (TGW):
cost 250,
req. Archery, 2 Walls (1 on Duel and Tiny world size, 3 on Huge),
obs. with Corporation,
2 Great Merchant points,
abilities based on game settings:
i. +1 trade route in cities on the same continent except when playing with RB. This ability is based on a "global trade routes" ability that was already in the game but unused. Now restricted to cities on the same continent.
ii. Prevents barbarians from entering your borders on this continent (no change) except when playing with No Barbarians.
iii. +100% emergence of Great Generals within owner's borders (no change) if playing with RB or No Barbarians. I.e. TGW doesn't have this ability anymore under normal settings.</td><td>cost 150,
Masonry, no prereq. buildings,

no obsoletion,
2 Great Spy points,
abilities (ii) and (iii) regardless of settings.</td></tr>
<tr><td>Rationale</td><td colspan="2">A strangely cheap wonder in BtS considering that it represents (arguably) the most massive building on Earth. Can be costlier now that barb activity peaks later. Removing the GG ability under normal settings keeps the rules complexity in check (wouldn't be a problem wrt. game balance).

Trade route flavor: One purpose of the Chinese Great Wall was to protect traders. Some segments protected a portion of the Silk Road. Similar to Castles providing an extra trade route. GM points go along with this, but the goal is also to further sideline the awful espionage system.

Nice side effect of the Wall prereq. is that Protective leaders get an implicit discount on TGW. Also makes sure that TGW can't be built before founding a second city – players should analyze whether they're exposed to barb attacks before deciding to build TGW.

The Archery req. is to make Archery a bit better, and to make Masonry less cluttered visually; TGW still requires Masonry for the prereq. Walls. I believe this makes some sense historically as well – walls (with protruding towers) are much more useful with effective projectiles. (But this doesn't explain why ordinary Walls don't require Archery.)</td></tr>
<tr><td>Tbd.</td><td colspan="2">GG emergence from TGW should perhaps, for consistency, be restricted to one continent like the other two abilities of TGW.</td></tr>
<tr><td colspan="2">The Great Lighthouse (GLH):
cost 250;
obs. with Astronomy</td><td>cost 200 in BtS, 300 in K-Mod;
obs. with Corporation</td></tr>
<tr><td>Rationale</td><td colspan="2">Too powerful in BtS, at least compared with most other wonders. Also don't like that this ancient wonder becomes most effective in renaissance (with Astronomy). I meant to nerf this later on (along with other balance changes), but with TGW obsolete at Corporation, GLH obsoletion needs to be moved right away.</td></tr>
<tr><td colspan="2">The Colossus:
cost 250 (as in K-Mod);
obs. with Chemistry.</td><td>cost 150 in BtS, 250 in K-Mod;
obs. with Astronomy.</td></tr>
</table>

Rationale	Don't want both Colossus and GLH obsolete at Astronomy. The K-Mod cost increase seems reasonable; it's an extraordinarily cheap wonder in BtS.
Tbd.	Perhaps Forge should be nerfed instead – if Forges weren't spammed everywhere, Colossus wouldn't be such a small investment.
311	Number of units from uprising events reduced (now independent of world size)
Tbd.	These events could use additional checks and balances.
312	XP from barbs counts half for Great General

XP from combat against barbs counts 50%, rounded down, towards Great Generals (GG). Rounding down means that 1 XP (i.e. after combat with very one-sided odds or withdrawal) doesn't count at all towards GG. Units that already have 10 XP can't gain further XP from barbs (no change), and thus can't contribute to GG either.	XP from barb combat never counts for GG.
XP multiplier for attacking barbs reduced to 3; no change when defending against barbs. Thus, can't hope to gain more than 1 XP (0 GG points) by fighting a barb unit at odds above 90%.	XP multipliers are 4 when attacking and 2 when defending. Can expect to gain 2 XP from attacking a barb unit even at 95% odds.
Upper limit for XP gain per combat set to 6. Consequently, can gain at most 3 GG points per barb combat.	Can gain up to 10 XP from a single attack.

Rationale	It's not plausible that wars against barbs should produce no GG. Ancient China had plenty of GG that only fought against peoples that Civ would represent as barbs. I'd also like to give players a (fighting) chance to get a GG without starting a war. The original developers must've been worried about barb XP farming, and for good reason. Having barbs respawn in some cul-de-sac isn't difficult. Can be worthwhile to exploit just for getting units to 10 XP; which is why I think some restrictions were needed regardless of GG points. I haven't reduced the XP that barbs gain from fighting non-barbs, i.e. barbs now tend to gain more XP from barb vs. non-barb combat than non-barbs. I guess the barbs have more to learn from the non-barbs than vice versa.
Tbd.	Farming may still be feasible; is a 15% risk of losing a unit worth 2 XP and 1 GG point? Could be, especially if it's an outdated unit. See *Tbd*. about "Barb cities slightly less likely to occur on landmasses where barb cities were destroyed previously" (change 300). Reduce upper bound for per-combat XP to 5 (2 GG points)? Perhaps apply the XP restrictions to all combat; would like to reduce combat XP in general in order to lower the stakes in combat.

313	Difficulty-based combat bonus vs. barbs increased

Set the human combat bonus against barbarians to 5% on Monarch, Emperor and Immortal (and King; see 250a). This is addition to the 10% bonus against barb Galleys from K-Mod. No change to the other settings, no change to the animal bonus and no change to the AI bonuses.	The bonus is 40% on Settler and drops by 10% with each difficulty level to 10% on Noble. Then 5% on Prince, and 0 on all levels above Prince. The (additional) bonus vs. animals starts at 70% on Settler decreases in steps of 10 to 10% on Emperor, then 5% on Immortal and 0 on Deity. For combat between AI civs and barbs, the AI-specific settings from Noble are used regardless of the configured difficulty setting: 25% vs. barbs and another 40% vs. animals.
Rationale	Despite the nerf to fogbusting (300), it still seemed best to rely mostly on fogbusting on the higher difficulty settings because fighting barbs at tech parity is very costly. This slight change to the combat bonus should make a significant difference because when units are evenly matched, even a slight change in combat strength tips the combat odds from 50:50 to 60:40 or more. Haven't changed Deity because I don't to make that difficulty any easier. Actually, the various balance and AI changes in this mod should (eventually) make Immortal challenging enough for everyone, and then Deity will only exist as a bizarre dort of Ironman challenge beatable only through degenerate tactics (such as excessive fogbusting). Also fits with the degression of the animal bonus, which reaches 0 only on Deity.

500	Dormant changes; to be enabled sometime in the future
See also	004h is also dormant
AdvCiv	*BtS*
500a	Land of two rivers
Tiles bordering on more than one river get twice the commerce yield from rivers, i.e. 2 commerce instead of 1. A shortcut on a far-winding river also works. Normally, only a few tiles per map qualify. Exact condition: two river segments that aren't connected along the tile in question. Settling on a double-river tile leads to 2 commerce on the city tile (akin to settling on plains hill).	A tile is either river-side (+1 commerce) or isn't.
Rationale	Plan to nerf the Financial trait first, which will make rivers less useful. The double commerce bonus will make up for that a tiny bit. But mostly just for added flavor.
Tbd.	Tile help text should say "Land of two rivers". Implement a similar bonus (+1 commerce) for Coast tiles that have two orthogonally adjacent land tiles opposing each other and call that a "Bay" in help text.
Config	Disabled in `CvPlot.cpp`.
500b	Demand better protection

Anger from lack of protection computed based on the defensive strength of the local units and population size. A single weak unit doesn't always suffice to avoid "We demand better military protection". A city requires a total defensive strength equal to at least half its population. Defensive strength is computed as combat strength increased by defensive modifiers (e.g. from Archer, Wall, Garrison promotion) Outdated units, i.e. units that the city can no longer train, count only half. The anger is proportional to the lacking defensive strength; e.g. an almost sufficient garrison will lead to just 1 anger.	Any one military unit suffices to avoid "We demand military protection".
Rationale	Requiring just any military unit becomes a pretty nonsensical rule by the Medieval era. Can either abolish it, or change it so that credible garrisons are required.
Config	Disabled through `DEMAND_BETTER_PROTECTION` in `GlobalDefines_advc`.
Tbd.	Need to show "Garrison strength x.x, population: y" in help text when there is anger. Otherwise it's too difficult to learn. Remove the "can no longer train" clause; would get circumvented by cutting off strategic resources. More changes to the happiness system to come eventually, in particular luxury resources scaled to total population (akin to Civ 4 Reimagined). Change the ability of Hereditary Rule before activating this change. Also planning to make upgrades mandatory (if not upgraded in time, units refuse to fight with outdated equipment and defect). Then this change will be important because otherwise players might try to play around unit obsoletion (e.g. don't get Hunting so that Warriors can be trained indefinitely) so that they don't have to upgrade their city garrisons.

550	Changes to tech trading
550a	Tech trade value dependent on tech score and power

AdvCiv	*BtS*
AI gives tech away cheaper (or expects to get it cheaper) when the receiving side is less advanced and powerful than the giving side; charges more if the receiving side is more advanced/ powerful. The effect is small in the early game and increases as the game progresses. Exception: Doesn't apply to vassal-master relationships, i.e. vassals don't expect to get tech from their master at a discount.	Tech trade value is independent of how well the involved civs are doing. (Vassals can receive free tech from an AI master if they're behind, but that's not a matter of trade value.) Vassals charge less from their master for resources, trade embargos and civic/religion changes. Tech trades are unaffected by vassal/ master relation.

Rationale	A little extra catch-up mechanism. Also, when dealing with a backwards civ, it's smarter to be generous than to insist on a square deal. For vassal-master, the basic idea in BtS is that the master can trade favorably with the vassal. Don't want to turn this upside down.
550b	AI doesn't make bad offers for human tech

AdvCiv	*K-Mod*
The AI doesn't propose or counter-propose any trade to a human civ that gives tech to the AI civ and is more than 50% in favor of the AI civ.	The AI can (counter-)propose trades that are up to 300% in its own favor.
The AI always offers something when proposing a trade.	May offer nothing at all.

Rationale	I used to accept bad AI offers for tech because I believed that they're due to partial research progress of the AI. That can be the case, but often isn't; so it's a bit of a trap.
Tbd.	The AI probably shouldn't contact players with bad deals at all.
550c	Changes to tech monopoly thresholds ("don't want to trade just yet")

AdvCiv	*BtS*
AI is more willing to trade tech if it has contact with few civs and still hasn't met most civs.	AI willingness to trade a tech is based on the percentage of known civs (excluding itself) that already know the tech.
E.g. if an AI civ knows only one civ, the AI civ acts as if 40% of the other known civs already knew the tech (when in fact it's 0%).	If the AI knows only one civ, the AI will hardly ever trade (unless Friendly) because the percentage is either 100%, meaning the other civ already knows the tech, or 0%, meaning the AI tries to monopolize the tech.

Rationale	This should make civs on small continents fare better.

The AI leader-specific thresholds for monopolies (`TechTradeKnownPercent`; between 0 and 100) are randomly increased or decreased by up to 15 points. This random adjustment is applied once per game to each tech separately, i.e. it's not the same for all techs, and can't be manipulated through repeated trade requests by a human player.	`TechTradeKnownPercent` is only adjusted for techs that the AI wants to monopolize badly, in particular military techs. There's no random component.

Rationale	The BtS monopoly thresholds are a bit too predictable in some cases, especially when there are just two or three civs on a continent. And e.g. Pleased Tokugawa *never* trading anything useful is depressing.
Tbd.	Perhaps the issues with small continents are already taken care of by the other change; not sure if the randomization is needed.

551	AI trade value of tech reduced

AdvCiv	*BtS*
When the AI trades for tech, the research cost of that tech is multiplied by 1.25 as part of the trade value computation.	The multiplier is 1.5. For comparison, traded gold gets multiplied by 2.

Rationale	Could argue that research and gold should have the same modifier because gold and beakers are essentially interchangeable. But gold should be more valued in trade because the other side loses the gold whereas imparting a tech costs nothing. By reducing the trade value of tech, I'm making it harder to conduct diplomacy (sponsored war, brokered peace) through tech, and easier to buy tech with gold. I'm not setting the multiplier even lower (say, 1) because change 550a already makes it easier to buy tech (for civs that have fallen behind).
Tbd.	The underlying issue is that it doesn't cost anything to share tech.

650	Changes to nuclear warfare	
Tbd.	Nukes need major balance and AI changes. I've only implemented two little things.	
See also	130q about diplo effects of nukes	
AdvCiv		*BtS*
AI uses air recon along its coast.		AI seems to use air recon only on rival cities.
Rationale	Could reveal enemy submarines. Not enough to properly defend against Tactical Nukes, but the BtS AI doesn't even seem to try.	
AdvCiv		*K-Mod*
AI willing to build the Manhattan Project unless it looks like it will win the game anyway,		AI considers the Manhatten Project only when in the Dagger or Crush strategy, or when close to a Conquest victory.
Rationale	The AI shouldn't take risks with nukes when it's winning anyway (Conquest, or crushing its current war opponents).	
Tbd.	The new conditions are still ad-hoc.	
AI doesn't disband nukes when in financial trouble unless the only other remaining units are cargo units.		As far as I can tell, nukes are disbanded before most any unit. BtS tried to save expensive units, which is fine in the case of nukes, but K-Mod focuses on XP, which is generally better, but fails for nukes.

700	Rise & Fall game option; see chapter Rise & Fall. Id 700: the fundamentals. Other ids only for code outside the R&F classes. Except for those highlighted in blue, all changes in the following are only relevant if R&F is enabled.
Rationale	For the term "intermediate period": Ancient Egyptian periodization (Wikipedia).
Config	The number of chapters, interlude length and scoring delay are configurable through `GlobalDefines_advc.xml`.
Tbd.	Proper testing. Text so far only in English and German. Earth1000AD scenario not currently supported. During initialization, `CvPlayer::verifyAlive` kills all civs because no cities have been created yet. I don't see how the R&F code causes this, but apparently, it does. Also, the unequal AI handicaps aren't currently supported by R&F. Would have to store the AI handicap (in `RFChapter` and in savegame) before human takeover and restore it when AI control resumes. Should perhaps factor game settings other than difficulty into the Rise score, in particular the number and length of chapters. For now, my assumption is that a higher number of chapters implies a lower number of turns per chapter, which makes it harder to maximize the chapter score, and that this about cancels out. The `AI_calculate..VictoryStage` functions aren't ideal for determining how close a civ is to victory. The purpose of these functions is to determine whether and how much the AI should focus on a particular victory condition; therefore, e.g. AI flavor values factor in. Would be better to write separate code for measuring the progress toward victory.
Credits	Inspired by board games like Peloponnesian War and History of the World (both from 1991) and Kael's Assimilation mod (which is, I think, included in Fall From Heaven II).
See also	Since R&F scoring is partially based on victory stages, it somewhat hinges on change 115, which revises the computation those stages.
701	"Require complete kills" option replaced by the R&F option

AdvCiv	*BtS*
When the last city of a civ is captured, all its remaining units are removed, and the civ is eliminated; there is no option for changing this behavior.	When "Require Complete Kills" is checked, units remain in the game when the final city is captured. A civ is only eliminated when all of its units are killed and all cities captured.

Rationale	I had already disabled the complete-kills option (for the reasons stated below) before adding the R&F option. Removed it entirely now because it's easier to replace a game option than to add a new one (while maintaining savegame compatibility). Too much of a hassle to keep the complete-kills option in mind for all the AI code. I doubt that the WL, BtS, BBAI and K-Mod code can really handle it either, especially in team games when some team members still have cities and others don't. Not sure if this option was ever intended to be more than a gimmick. You even need to kill every enemy Spy (or since BtS: hope that the Spy kills itself somehow). Now, in principle, the AI still needs to be able to handle civs without cities because a human player could decide to never found a city. Through Advanced or later-era Start, the player could even have a sizeable army, not to mention scenarios. I'm trying to have the game at least not crash in such cases, but it's not really supported. (Barbarians don't necessarily have cities either, but get special treatment in most of the AI code; this works.)
Tbd.	Instead of just removing the units, remove some, turn some into Barbarians and turn

	some over to any team mates or (war) allies that the dead civ might have had before its demise. This is more plausible and doesn't create issues for the AI.

702	Error handling if game settings are incompatible with R&F
Not compatible: multiplayer, team games (including Permanent Alliances), One-City Challenge, SPaH.	

703	"Score" tab on the Victory advisor screen
Showing scores of past chapters and the start dates of chapters still to be played. When R&F is enabled, the tabs "Resolutions" and "Members" are merged into one in order to make room for another tab.	

704	Changes to Dawn of Man (DoM) screen	
Show the screen at the start of each chapter.		
Tbd.	In the later chapters, the DoM can appear with a few seconds delay. Seems like the EXE is too busy with something else. Perhaps this wouldn't happen if I'd launch the popup earlier.	
AdvCiv		*BtS*
Heading of the DoM screen says "The Dawn of Civilization".		"Dawn of Man"
Rationale	Perhaps they were thinking of Kubrick's "2001", which shows a subtitle "The Dawn of Man"; but this is followed by a scene with apes ...	

705	Rules and AI changes to prevent self-collusion (helping a civ from the previous chapter that hasn't been scored yet, or one about to be taken over)
The AI is a bit more lenient in pre-Currency tech trades – accepts if it receives only 90% of what the player receives. If UWAI is enabled, the AI refuses to talk when war utility is 10 or greater.	
Rationale	During a chapter, the player should (ideally) only have to consider the interests of his/her current civ. The AI changes described above (and in the R&F chapter) combined with intermediate periods can't completely prevent self-collusion, but make it much less relevant. Restrictions don't apply to civs that have already been scored because it should be quite rare that a civ gets played more than once. Trade acceptance: With R&F, it can be extra annoying when the AI refuses to trade two techs of (almost) equal value, but won't accept a 2 for 1 either because this would already favor the AI too much. War utility threshold: Could otherwise use reparations to bypass trade restrictions. Would be nice to give the player more feedback, e.g. a grayed-out "gift" button, or the AI responding "you're being too generous" when an offer is too good, but these things seem almost imposible to implement. I did manage to get the AI to say "no thanks" to gifts.
Tbd.	Perhaps the AI should always show some leniency in pre-Currency trades, i.e. regardless of the &F option. Perhaps reduce or remove the penalty for playing a civ multiple times. Then, restrict trade with those civs that are ranked lower than the human player (i.e. not based on whether a civ has been scored). Should the AI be willing to talk when all potential peace deals are too favorable for the AI? E.g. when the AI wants the equivalent of 1000 gold and the player doesn't have that much gold, but does have some 5000-beaker technology. Currently, the AI is willing to talk then, and that's a bit confusing. Though refusing to talk would also be confusing I think – "How is that big technology not enough?"

706	Changes related to AI Auto Play and switching the human-controlled civ
When the player "Retires", the current chapter completes on AI Auto Play. The intermediate periods in between chapters aren't actually AI Auto Play; there simply isn't a human-controlled civ at all. I hide some UI interface elements during intermediate periods and suppress advisor screens and popups. This has required changes in a bunch of different places.	
Rationale	The player may simply want to end a chapter because he/she doesn't feel like completing it. But retirement is mainly intended for situations when things are going *too* well. The civ could then become a huge obstacle in later chapters (or just win the game for the AI). Don't want the player to sabotage his/her own civ then.
Tbd.	After retiring, the player's civ keeps the game handicap, e.g. Prince, but since the civ is treated as an AI, the AI modifiers from the game handicap also apply, e.g. 5% faster training of units on Prince. This is confusing, but difficult to change because the AI modifiers get applied in many different places. AI Auto Play without retirement applies the AI handicap (change 127), which is consistent, however, a retired civ should generally do rather badly because retiring is supposed to help when the player's civ gets dangerously far ahead. Perhaps set the handicap after retiring one higher than the game handicap (or always Monarch?) to somewhat cancel out the AI modifiers. Known issue: When taking control of a civ via Civ Changer (Alt+Z) for debugging purposes, all non-expired messages that that civ ever received are displayed on the main interface. Calling `CyInterface().clearEventMessages()` from `ChangePlayer.py` doesn't get rid of them.

707	Changes to the game end sequence
No game end upon defeat; Rise score shown als "final score" in HoF, scaled up ("normalized score") for the Dan Quayle screen.	
See also	043: Changed (stricter) thresholds for the titles on the Dan Quayle screen.

901 et sq.	Changed stats		
Config	all XML-based		
See also	310 (Great Wall, Great Lighthouse, Colossus) would also fit here. 160 lets Granary store less food.		
901	*AdvCiv*	*K-Mod*	*BtS*
Forest Preserve	at Biology; +1 commerce	at Scientific Method; +1 commerce; +1 commerce if riverside	at Scientific Method; +1 commerce if riverside
K-Mod 1.45 has added a 7th effect to Scientific Method, and enlarged all tech boxes to make room for a 7th icon. Not a good solution; surely no single tech needs to do 7 things. Forest Preserve can use a buff anyway, and nature reserves originated in the early 19th century according to Wikipedia, which fits with Biology. I also don't see much of a connection between scientific method and forest preserves. Not a question of game balance really because Forest Preserves are rarely useful. Removed the riverside commerce while I was at it. Simpler this way. Not much of a loss because Forests along rivers get chopped anyway (see also change 117). Consistent with Lumbermills, which also provide commerce regardless of river.			

Tbd.: Make the Forest spread ability more predictable and more useful. Grant health instead of happiness.			
902	*AdvCiv*	*K-Mod*	*BtS*
Watermill	+1 commerce and +1 production initially; +1 commerce with Electricity; 4 turns to build; +1 production with Replaceable Parts	+1 commerce and +1 production initially; +1 commerce with Electricity; 8 turns to build +1 production with Replaceable Parts	+1 production initially; +2 commerce with Electricity; 8 turns to build +1 production with Replaceable Parts
Watermills are decent with Replaceable Parts, but rarely useful before that (whereas, historically, they were extremely useful throughout the Middle Ages). The K-Mod change to Serfdom (+1 commerce from Farms) exacerbates this. One commerce at Machinery (also a K-Mod change) is the least that needs to be done. Commerce from Electricity is apparently supposed to get the shift from waterwheels to turbines across (similar for Windmill). That's OK (electricity can be sold), but doesn't have to be so pronounced. Electricity boosting local production is also plausible. Never saw why Watermills should be slow to build. Perhaps originally an attempt to make Serfdom attractive – well, that didn't work. Reducing build time is a way to make Watermill better early on without making it too good later on.			
Tbd.: Still a bit unattractive. 6 turns to build but +2 production earlier?			
Lumbermill	at Guilds +1 commerce initially; +1 production with Replaceable Parts; 5 turns to build +1 production with Railroad track; doesn't remove Forest	at Guilds +1 river commerce and +1 production initially; 8 turns to build +1 production with Railroad track; doesn't remove Forest	at Replaceable Parts +1 river commerce and +1 production initially; 8 turns to build +1 production with Railroad track; doesn't remove Forest
The middle column is K-Mod 1.45; I'm keeping the earlier version (not shown separately) and reducing the build time in order to give Lumbermill a little extra push. Also, Replaceable Parts is just one tech away from Steam Power, which grants +50% Worker speed, but since Lumbermills are now at Guilds, that bonus is still out of reach, so they really take a long time to build in K-Mod. I don't think players can be incentivized to not chop all Forests along rivers; not without making Lumbermills too strong in the lategame. Therefore, I don't like the river commerce ability (not on Forest Preserve either).			
Tbd.: Want to move both Lumbermill and the +50% chopping yield (currently at Mathematics) to Machinery eventually, and apply chopping yields only to buildings and ships (not land units).			
903,904	reserved		
905	*AdvCiv*	*K-Mod*	*BtS*
Galley	3 moves, 3 cargo, cost 45	2 moves, 3 cargo, cost 50	2 moves, 2 cargo, cost 50

Trireme	3 moves, 3 strength, no bonus vs. Galley, upgrades to Caravel and Privateer, cost 45	2 moves, 2 strength, +50% vs. Galley, upgrades to Caravel and Frigate, cost 50	
Caravel	4 moves removed AI types "Reserve" and "Escort"	3 moves	
Carrack	4 moves, 2 cargo, removed AI type "Reserve"	3 moves, 3 cargo	3 moves, 2 cargo
Navigation2 promo	Only available for units that can enter ocean	Available for all sea units	

Should give Galleys a use in early warfare (fast deployment), and make them better explorers. If 3 moves aren't enough to make naval deployment useful in land wars, then 4 moves with Navigation1 should do the trick. Sea units moving twice as fast as infantrymen along roads is reasonable from a historic pov, but 5 moves might be a bit much, also gameplay-wise. Therefore, I'm restricting Navigation2. Makes sense that "navigation" benefits ocean-going vessels more.

4 moves for Caravel to keep it faster than the early ships. Now just as fast as Galleon, which is also more accurate historically. Carracks, caravels and galleons could travel at 4 to 5 knots, triremes at 2 to 3 (much faster during battle; see e.g. Olympias on Wikipedia).

3 strength for 45 production makes Trireme the best warship until Frigate, which should make Triremes more worthwhile overall and might help the AI, which tended to train too many Caravels previously. Should now train a mix of Triremes and Caravels, and use only Triremes for protecting resources and escorting Galleys. May still train too many ships, but at least Trireme is cheaper than Caravel. While I'm at it, the upgrade from Trireme to Privateer is a bit less painful than to Frigate because Privateer is cheaper than Frigate, and this should make AI privateering a bit more common.

Historically, trireme-based ships remained in use in the Baltic Sea until the 18th century, and the usage peak wasn't reached until the 16th century. "[The Battle of] Lepanto [1571] marks the last major engagement in the Western world to be fought entirely or almost entirely between rowing vessels, the galleys and galeasses that were still the direct descendants of the ancient trireme warships." (Wikipedia)

Carrack: K-Mod had increased the cargo capacity along with the other transport ships, but I think this takes the unit unnecessarily close to Galleon, especially now that I've increased the speed (can't not increase Carrack speed if I increase Caravel speed). Back to 2 cargo spaces.

Tbd.: Further reduce the costs of naval units.

See also: 124 assigns Galley the Explore AI type.

906	*AdvCiv*	*K-Mod*	*BtS*
Submarine	2 first strikes, 60% withdrawal chance, +0% attack	0 first strikes, 50% withdrawal chance, +25% attack	0 first strikes, 50% withdrawal chance, +0% attack
Attack Submarine	2 first strikes, 60% withdrawal chance, +0% attack, 28 strength	0 first strikes, 50% withdrawal chance, +25% attack, 30 strength	0 first strikes, 50% withdrawal chance, +0% attack, 30 strength

Battleship	250 cost	225 cost	225 cost
Stealth Destroyer	240 cost 33 strength	220 cost 36 strength	220 cost 30 strength

Subs need a buff. They can't trade 1:1 with Battleships in BtS, and 1:1 isn't even attractive enough for human players. About the K-Mod ability I dislike that it's implemented as a terrain bonus on Coast and Ocean, which is a little confusing, and that it adds another attack-only bonus – shouldn't a high withdrawal chance be enough? First strikes match the flavor of torpedos and invisibility well; consistent with Stealth Destroyer (also has 2 first strikes).

Attack Submarine doesn't need to be buffed that much, but should have the first strikes for consistency, so I'm reducing its strength by 2.

Increased cost of Battleship and Stealth Destroyer makes subs more effective against those units. The original costs are also too close to Destroyer (200) for my taste.

See also: 028 allows Submarines to defend weaker visible units.

907: Uniques	*AdvCiv*	*BtS*	*before patch 1.52*
907a Praetorian	strength 7, cost 40, starts with March named "Legionary"	strength 8, cost 45, named "Praetorian"	strength 8, cost 40 named "Praetorian"

Clearly intended to be easy to recognize as powerful even for new players, and it worked, but this mod isn't for new players, and the unit is toxic for game balance. Supplants all pre-Renaissance units plus Musketman. Because it's so obvious, I'm nerfing this unit before all others.

7 strength for 40 would be fine, I think, but bland. March is a promotion that doesn't give the unit more raw power, but is still useful, and a good fit flavor-wise as the Roman army was known for its forced marches.

As for the name change (only in the English game text), Soren Johnson mentioned in a Twitch video that "Praetorian" was chosen over Legion(ary) to avoid repeating too many names from Civ3, and seemed regretful about this. Legionary is obviously a better fit for the BtS unit, and also fits well with my changes.

Tbd.: Nerf other early attackers, starting with Axeman; Legionary should then cost 45 again, which also fits with the high-quality equipment of Roman legions.

910	Era tech cost modifiers adjusted; these modifiers were added by BBAI. There's one per era, and it changes the costs of all techs in that era. K-Mod has tweaked them, and eventually (version 1.45) tied them to the inflation rate.		
Config	Set in `Civ4EraInfos.xml`.		
Tech Era	*AdvCiv*	*K-Mod 1.44*	*BBAI*
Ancient	0	0	0
Classical	-2%	0	0
Medieval	3%	4%	6%
Renaissance	14%	12%	9%
Industrial	25%	16%	14%
Modern	33%	20%	18%
Future	30%	18%	18%
See also	251 adjusts the AI research speed based on difficulty.		

912: Civics	*AdvCiv*	*K-Mod*	*BtS*
Serfdom	+1 commerce from Farm, Plantation -1 commerce from Town +50% Worker speed Medium upkeep	+1 commerce from Farm, Plantation -1 commerce from Town +50% Worker speed Low upkeep	+50% Worker speed Low upkeep
Rationale	The switch to Emancipation is a bit too painful in the K-Mod version. At Low upkeep, Serfdom is usually still less powerful than Slavery, but that's not a good baseline.		
Tbd.	Lots of broken civics ...		

test	Temporary changes for debugging and testing are marked with `advc.test`.

make	Changes to the compilation process are marked with `advc.make`.
Credits	The AdvCiv Makefile is essentially DannyDaemonic's.

sha	Changes to the merged Show Hidden Attitude Mod (SHAM)	
AdvCiv		*SHAM*
No display of the low-rank modifier because this has been disabled by change 130c.		"Developing nations should work together to catch up."
No option for hiding spoilers. 130c changes rank-based modifiers so that they don't give away the ranks of unknown civs. Rank-based hate explained as "You're getting ahead of us".		"We feel threatened by your large civilization."
First impressions not shown when playing with randomized personalities.		Still shows the human penalty from the difficulty setting – which doesn't hurt, but isn't exactly helpful either.
Config	`SHOW_HIDDEN_ATTITUDE` in `GlobalDefines_advc`. Game text in `HiddenAttitudes_CIV4GameText.xml`.	
Removed the penalty "This war is going badly for us"; instead "This war spoils our relations" partly based on war success.		-1 "going badly" if their war success is less than ours, "spoils relations" based only on how long the war has been lasting.
Rationale	The -1 doesn't make any difference, a needless complication. The AI not getting as mad if a war sees no action makes more sense. Gameplay-wise, it's mostly a matter of whether (or at which point) a war enemy becomes the worst enemy.	
If a non-vassal AI civ would otherwise be Pleased towards a non-vassal war enemy, "... spoils our relations" is increased just enough to make the attitude Cautious.		War enemies can have any attitude towards each other, though anything better than Cautious is rare.
Rationale	Weird if the AI is pleased despite war. Cautious is also weird, but less so, and UWAI actually increases the willingness for peace a little ("Affection cost") if Cautious despite war. Vassals excluded because they don't choose their wars, and may not participate much; conceivable that attitudes remain non-hostile.	

dlph	Bugfixes (and other changes) by DarkLunaPhantom
Credits	Source (Kek-Mod) I've only adopted those changes that were easy to make (cost/ benefit), and none that only deal with PBEM.
See also	001: My own misc. bugfixes
dlph.1	"*Circumnavigation bonus is now always preserved when forming permanent alliance, previously it was only when the player having it had smaller team number.*" (also fixed in K-Mod 1.45)
dlph.2	"*Fixed a (...) bug which caused unremovable espionage city visibility after forming permanent alliance for all cities that the player with larger team number had visibility of at that moment.*"
dlph.3	Defensive pacts despite war

AdvCiv	*BtS*
BBAI option for defensive pacts despite war enabled, and adopted a bugfix and extension from DarkLunaPhantom: "*now enable[s] defensive pacts to be signed while at war.*" But the AI only signs a DP when sharing all wars; cancels DP after a while (probabilistically; see change 133) when wars are no longer shared. And I'm allowing defensive pacts to be canceled (0 turns to cancel) after a DoW.	When war is declared on a civ, the defensive pacts of that civ take effect and are then canceled. BBAI has an optional rule change that leaves defensive pacts in place after taking effect; disabled by default. A civ that declares war loses all its defensive pacts. Can't sign defensive pacts while at war.

Rationale	May not make defensive pacts a lot more useful, but it's more plausible this way. As for my adjustment: "We'll aid you against any further aggression, but in your current wars, you're on your own" doesn't sound like a typical military pact.
See also	130y reduces the diplo penalty from DoW triggered by a DP.
dlph.4	Can't gift cargo if it contains units that can't be gifted.
See also	An addition to 123a
dlph.5	"*Obsolete buildings and unused power plants (e.g. Nuclear Plant without Uranium or in a city that also has Hydro Plant or receives power from Three Gorges Dam) cannot trigger meltdown event anymore.*" Further change by AdvCiv: Adjust the meltdown probability to game speed (always 0.05% in BtS).
dlph.6	Barbarians can't build spies.
See also	307 prevents the barbarians from training some later-era units.
dlph.7	Can nuke despite neutral units; they take no damage.
Rationale	If the neutral units took damage (without having to declare war), this would again be exploitable. Units in nuke range not taking damage is counterintuitive, but I don't see a better simple solution.
dlph.8	"*Fixed bug in AI evaluation of gifted unit for the purpose of relations bonus.*"

Not merged	"*Player cannot gift combat units to third party which in war with rival with whom the player has unbreakable (temporary or permanent) peace treaty. Also, the receiving player now must satisfy technology requirements (both for the unit itself and for the prerequisite resources).*" These aren't restrictions that players would intuitively expect, and I'm not sure that they're necessary. (I do think that there should be diplomatic consequences for gifting units beyond "traded with our worst enemy".)
dlph.9	"*Fixed how AI and worker actions treat fallout feature. Fallout had bNoImprovement set to 1 signaling to AI that no improvements can be built there which didn't make sense since fallout can be cleared just like forest and jungle can. This made AI far less likely to scrub fallout (if at all) than to chop jungle although the features are similar. Improvements can now be built directly on top of fallout and fallout will be cleared in the process just like it is with forest and jungle.* *Fixed interface and AI bug that caused the game to sometimes wrongly show an improvement as unbuildable. Sometimes the game doesn't* [realize] *that an improvement can be built. E.g. plains jungle yields 0 food so farm cannot be built as it requires 1 food, but farm can be built there by choping the jungle as the underlying plains terrain yields 1 food. AI followed the same slightly flawed logic as did the interface. My fix for fallout feature introduced many more such situations.*"
dlph.10	~~"*Added verification of state religion. Player shouldn't be able to keep their state religion when there are no cities with it anymore.*"~~
Rationale	Disabled this again. If a minority religion can be state religion, then why not a religion that is mostly only followed by the ruling class. It can get a bit weird when a human player holds onto a religion without followers indefinitely for diplomatic reasons, but I don't want to force a civ out of its religion while it may still try to reconquer its holy city.
Config	Disabled through `CvPlayer::doTurn`.
dlph.11	"*Fixed advanced start bug with reduced unit costs. Advanced start code is bad in general so I just fixed the immediate problem. (There was a way to get extra gold by refunding a worker while having expansive trait.)*"
dlph.12	"*Removed Disorganized promotion from free barbarians boats with hidden nationality. Hidden nationality units shouldn't be too obviously (non-)barbarian.*" (I'm not allowing barbs to have Privateers, but I might in the future.)
dlph.13	"*Fixed permanent alliance bug with AP/UN leader. Similar as with other permanent alliance bugs, if AP/UN leader had higher team number than its permanent ally an empty team would become AP/UN leader instead of the newly formed team.*"
Not merged	"*Changed condition when is a team considered AP/UN full member (and thus eligible for election). Previously all team members had to be full members, but now at least one is enough.*" I don't have an opinion on how this should work.

kmodx	Bugfixes from K-Mod Extended
Credits	By alberts2 Git repository These issues appear to have been found through a stricter compiler or some other code analysis tool. A lot of it just improves hazardous code, but there are also actual bugfixes, e.g. comparisons betweens different enum types and a mix-up of inner- and outer-loop variables. Hard to say how significant these bugs were, but good riddance! I'm listing the descriptions of the merged Git commits below. (K-Mod 1.45 includes these fixes as well, but I had merged them separately before v1.45 was published.)
"*Fixed a MemoryLeak in CvDllPythonEvents::reportSelectionGroupPushMission* *Fixed a memory leak in CvGameTextMgr::setCombatPlotHelp* *Fixed uninitialized variables in CvInfoWater.cpp* *Fixed the CyGameTextMgr(CvGameTextMgr* pGameTextMgr) constructor* *Fixed a few coding errors* *Fixed various coding errors*"	